BGE Substation - 9500 Area

Fort George G. Meade

Final Environmental Assessment

October, 2012

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

DEPARTMENT OF THE ARMY
FORT GEORGE G. MEADE
FORT MEADE, MARYLAND 20755-5115

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT

BGE Substation - 9500 Area

Fort George G. Meade, Anne Arundel County, Maryland

NAME OF ACTION: Construction of a new electrical substation and supporting infrastructure at Fort George G Meade (FGGM) to support future expansion at MPO and FGGM.

BACKGROUND: Pursuant to the provisions of the National Environmental Policy Act (NEPA) of 1969, Executive Order 12114, Council on Environmental Quality (CEQ) Regulations [40 Code of Federal Regulations (CFR) Parts 1500-1508], 32 CFR Part 989, the Department of the Army, FGGM in conjunction with the Maryland Procurement Office has conducted an Environmental Assessment (EA) of the potential environmental consequences of constructing, operating and maintaining a new electrical substation within the 9500 Area of FGGM.

The Maryland Procurement Office (MPO) is forecasting significant growth of electrical demand over the next ten years due to the anticipated growth of the MPO and the USCYBERCOM Campus initiative. MPO has therefore determined that it is necessary to upgrade the electrical infrastructure and to enhance the level and nature of transmission service to FGGM. The existing service configuration is over 50 years old and has become less reliable, resulting in several power disruptions each year. Power disruptions and surges can cause irreparable damage to sensitive computer systems that are critical in the fight against terrorism.

The EA documents the purpose and need for the Proposed Action, the site selection process, the alternatives developed, and the analysis of potential environmental impacts for the Proposed Action and the No-Action Alternative. This Finding of No Significant Impact (FNSI) summarizes the results of the evaluations of the activities associated with the proposed substation.

DESCRIPTION OF THE PROPOSED ACTION: The Baltimore Gas and Electric Company (BGE), in cooperation with FGGM, propose to construct a new switching station, substation, overhead to underground transition station and associated transmission line duct bank connections to provide electricity to three separate electrical power facilities within the FGGM boundary for the MPO. Substation construction will be comprised of the substation building, the access road to MD 32, stormwater management facilities, site grading, and construction of a fence to enclose the substation building and access road. The transmission line duct banks will be installed using a combination of open-cut trenching and horizontal directional drilling (HDD) technology. HDD is a trenchless method of installing underground cables and lines with minimal impact to the surface and surrounding areas. HDD will be used to install the transmission duct banks underneath the Little Patuxent River and MD 32 to minimize impacts.

NO-ACTION ALTERNATIVE: The No-Action Alternative is the continuation of existing conditions without implementation of the Proposed Action. Inclusion of the No-Action Alternative is prescribed by the Council on Environmental Quality regulations as the benchmark against which Federal actions are evaluated. The proposed activity is designed to improve both the reliability and capacity of the electrical power supply for the MPO, and is being designed in concert with other improvements to the electric distribution system within the Installation perimeter. Additional electric supply capacity is required to support proposed expansions at FGGM, and if the Proposed Action is not constructed, growth within FGGM will be constrained and improvements in electrical system reliability will not be realized.

ENVIRONMENTAL IMPACTS: Pursuant to the provisions of Army Regulation 200-2 and the regulations issued by the Council on Environmental Quality, November 29, 1978 (40 CFR Parts 1500-1508), and based on the attached Environmental Assessment as incorporated by reference, the Proposed Action, will not have any significant adverse effects on the human environment.

The Proposed Action is expected to disturb approximately 21.9 acres of undeveloped land which is now mature trees and other woody growth. Approximately 13.1 acres is FGGM property. A total of 15.8 acres of forest cover would be removed, 10.5 acres of which are on FGGM property. There would be low impacts to jurisdictional wetlands and wetland buffers. Duct banks leading from the switching station to the 9500 Area electrical substation will cross underneath the Little Patuxent River using HDD technology. The crossing of the Little Patuxent River would not require a permit due to the use of HDD technology and there are no other impacts to stream crossings within the project area. Minor impacts to the 100-year floodplain (0.3 acres) may occur during construction operations only, and would be temporary. The Proposed Action would not displace any residences or businesses, nor would it require private right-of-way acquisition. No adverse cultural resource impacts are anticipated and none of the identified potential hazardous sites within the project area would be impacted by the proposed construction activities or ongoing operations. Short-term impacts to traffic, business access, and air quality and noise levels could be expected during construction of the project.

MITIGATION

- **Air Quality.** Mitigation using standard Best Management Practices (BMPs) would lessen the minor impacts of the construction of the Proposed Action. During construction, the contractor will control fugitive dust emissions from soil piles and unpaved construction roads by surface treatment with watering and traffic-control regulations.

- **Vegetation.** Impacts on FGGM land will be mitigated on the Installation in accordance with the current FGGM Forest Conservation Act (FCA) and Tree Policy through forest preservation and reforestation. The FGGM FCA requires that 20% of the project's limit of disturbance be forested; therefore, approximately 4.4 acres of reforestation will occur. The forest buffer to the Little Patuxent River will be voluntarily expanded to 100 feet wherever possible to further protect resources. Impacts on non-FGGM land will be mitigated outside of the FGGM boundary by BGE in accordance with applicable state and county laws and regulations.

- **Soils.** The use of anti-erosion procedures and other BMPs during and after construction would minimize the potential for cumulative impacts to area soils. A Maryland Department of the Environment (MDE) approved sediment and erosion control plan will

be obtained prior to any earth disturbance. Therefore silt fences, straw bales and other temporary measures will be placed along parts of the construction site perimeter.

- **Surface Waters and Water Quality.** An MDE approved stormwater management plan must be obtained prior to any earth disturbance. The construction contractor would be required to comply with the *Maryland Erosion and Sediment Control Guidelines for State and Federal Projects* to avoid and minimize erosion at the construction site. Under all circumstances, sediment runoff from the site will be captured and prevented from entering nontidal wetlands in the vicinity of the construction site and adjacent surface water bodies, especially the Little Patuxent River. Water quality impacts associated with the implementation of the Proposed Action should be considered in conjunction with other actions in an installation context.

- **Wetlands and Wetland Buffers.** Any proposed impacts to the wetlands and/or 25-foot wetland buffer will require a Joint-Permit Application to be submitted to the Maryland Department of the Environment/U.S. Army Corps of Engineers. Less than 0.2 acre of direct wetland impacts and 0.5 acre of wetland buffer impacts are anticipated as a result of the Proposed Action. Avoidance and minimization will be demonstrated to regulators to justify any potential impacts to wetland resources.

- **Floodplains.** Impacts to floodplains and soils are being minimized or avoided to the maximum extent possible. Horizontal Directional Drilling (HDD) has been proposed to install the duct banks to avoid the majority of the floodplain of the Little Patuxent River. The impacts to the 0.3 acres will be minimal and temporary.

PUBLIC REVIEW

The EA and draft FNSI were available for public review and comment for 30 days, from August 25, 2012 through September 29, 2012. A notice of availability was published in *The Baltimore Sun* (Baltimore, Maryland), the *Annapolis Capital* (Annapolis, Maryland), and the *Maryland Gazette* (Anne Arundel County, Maryland) on Saturday, August 25, and in *SoundOff!* (Fort Meade) on August 30. Copies of the EA and draft FNSI were available for review at the Medal of Honor Memorial Library, Fort Meade, and online at www.ftmeade.army.mil. No comments or adverse responses were received.

CONCLUSION/FINDING OF NO SIGNIFICANT IMPACT

I have reviewed the EA and find that the Proposed Action to lease land on Fort Meade to BGE to construct the substation and supporting infrastructure will have no significant impacts on the natural environment, cultural resources or the human environment. Based on these findings, an Environmental Impact Statement is not required for this project and a Finding of No Significant Impact shall be issued.

Date: 16 OCT 2012

EDWARD C. ROTHSTEIN
Colonel, Military Intelligence
Commanding

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Final Environmental Assessment

BGE Substation - 9500 Area

Fort George G. Meade

Baltimore Gas & Electric

Fort George G. Meade

Anne Arundel County, Maryland

October, 2012

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FINAL ENVIRONMENTAL ASSESSMENT

BGE SUBSTATION – 9500 Area

FORT GEORGE G. MEADE
ANNE ARUNDEL COUNTY, MARYLAND

Prepared by:

Baltimore Gas & Electric

Reviewed and Recommended for Approval by:

Michael P. Butler — 11 OCT 12

MICHAEL P. BUTLER
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Date

Approved by:

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Approved by:

16 OCT 2012

EDWARD C. ROTHSTEIN
Colonel, Military Intelligence
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EXECUTIVE SUMMARY

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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EXECUTIVE SUMMARY

Introduction

The Baltimore Gas and Electric Company (BGE), in cooperation with Fort George G. Meade (FGGM), proposes to construct a new switching station, substation, overhead to underground transition station, and associated transmission line duct bank connections to provide electricity to three separate electrical power facilities for the Maryland Procurement Office (MPO) within FGGM. This Environmental Assessment (EA) documents the purpose and need for the Proposed Action, the site selection process, the alternatives developed, the analysis of potential environmental impacts, and the recommended or "Preferred" alternative. Construction for the proposed project would begin once all studies and design are complete and all permits and funding are secured.

Background and Setting

FGGM encompasses approximately 5,140 developed acres in northwestern Anne Arundel County Maryland, with 65.5 miles of paved roads and about 1,300 buildings (FGGM, 2007). Located midway between Baltimore, Maryland and Washington, D.C., FGGM houses approximately 11,000 military personnel and 6,000 family members, and employs 40,000 military, civilian, and contractor personnel on the installation. FGGM is located near the communities of Odenton, Laurel, Severn, and Jessup.

FGGM is a permanent United States Army Installation with the mission of providing Garrison operation support for facilities and infrastructure, quality of life, and protective services in support of Department of Defense (DoD) activities and Federal agencies. The major command for FGGM is the Military District of Washington.

Specifically, the installation houses more than 95 partner organizations from all five services and several Federal agencies. Major tenant units include the National Security Agency (NSA), the Defense Information School (DINFOS), the Defense Information Systems Agency (DISA), the Defense Media Activity (DMA), Army Adjudication Activities, the Defense Courier Service, the U.S. Army Field Band, the U.S. Army Intelligence and Security Command, First U.S. Army Division East, the Naval Security Group Activity, the 694th Intelligence Group (U.S. Air Force), the U.S. Environmental Protection Agency (USEPA), the Asymmetric Warfare Group (AWG), the 902nd Military Intelligence Group, Kimbrough Ambulatory Care Center, U.S. Army Corp of Engineers (USACE), and the U.S. Army Reserve (USAR).

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, its implementing regulations published by the Council on Environmental Quality (40 Code of Federal Regulations [CFR] 1500- 1508), and 32 CFR Part 651, which implements NEPA for the Army under Environmental Analysis of Army Actions. Pursuant to NEPA, Federal agencies are required to consider the environmental consequences of their proposed actions. NEPA typically applies when the Federal agency is the proponent of the action or where Federal funds are involved in the action.

Purpose and Need

The purpose of the Proposed Action is to provide reliable, fully dedicated premium electrical power to the MPO, within FGGM. In order to provide this enhanced reliability and additional capacity to satisfy future load expectations, the MPO has determined that it is necessary to upgrade the electrical infrastructure, and to enhance the level and nature of transmission service to FGGM. The existing service configuration is over 50 years old, and has become less reliable resulting in several occurrences of down time each year. This reconfiguration will significantly improve the MPO's electrical reliability from approximately five outages a year to one outage every five years. Power disruptions and surges can cause irreparable damage to sensitive computer systems that are critical in the fight against terrorism. The MPO is forecasting significant growth of electrical demand over the next ten years created by anticipated growth of the NSA and the USCYBERCOM Campus initiative. In order to ensure that BGE maintains an adequate supply of electric power to meet the growing demand, transmission service upgrades must be met.

The MPO requires that its facilities be supplied directly from BGE's 230 kilovolt (kV) transmission system through an underground, dedicated transmission system. A new switching station, substation, transition station and supporting duct banks would be needed to address reliability issues, and increase capacity to support planned expansion within FGGM. Therefore, the Proposed Action would meet the Installation's reliability and capacity needs for the foreseeable future.

Proposed Action

The Proposed Action is to provide an easement to BGE for the construction of a 230kV to 115kV electrical substation and connecting duct banks within a portion of the FGGM-owned property referred to as the 9500 Area. The 9500 Area is located outside the FGGM perimeter fence, south of MD 32. The site is adjacent to the existing water and wastewater treatment plant facility (WWTP) to the east, and the District of Columbia Children's Center to the west. The 9500 Area's current land use designation is 'industrial' as described in the *Real Property Master Plan – Long Range Component, Fort Meade, MD*. However, the property is primarily undisturbed, comprised of mature forest and wetland features.

The electrical substation will be supported by a transmission switching station located on existing BGE property in the Russett East area near the MD 198 / Baltimore-Washington (BW) Parkway interchange. Duct banks leading from the switching station to the 9500 Area electrical substation will have to cross underneath the Little Patuxent River. This will be accomplished with Horizontal Directional Drilling (HDD) technology. HDD requires a series of bore pits for drilling and receiving operations to create a subterranean tunnel. The depth of the HDD will be determined after studying soil bore samples, with the intent to avoid certain geological composition and to minimize the probability of leaked drilling fluid.

Other components of this action include:

- Duct banks carrying (3) 230kV transmission lines adjacent to Old Portland Road and MD 198, constructed using a combination of HDD technology and open-cut trenching in order to transmit electricity from the switching station to the new substation.

- An underground to overhead transition station southeast of the substation and adjacent to MD 32. This transition station allows for an additional connection to an existing 115kV overhead transmission line.
- Duct banks carrying (2) 115kV transmission lines adjacent to eastbound MD 32 between the 9500 Area and the BW Parkway, in order to transmit electricity from the new substation to the MPO facilities.

The proposed electrical substation facilities within the MPO boundary that the duct bank corridors will ultimately connect to have been analyzed and are covered in both the 2009 *Final Environmental Impact Statement (FEIS) for the Proposed Utilities Upgrade Project at Fort George G. Meade* and the *FEIS for Addressing Campus Development at Fort George G. Meade*, September 2010. Pending the final location of these transmission lines connections to the MPO, an additional NEPA study may be required.

Alternative Sites Considered

Initial site investigations were undertaken to identify properties that were in close proximity to FGGM and adjacent to existing 230kV transmission lines. Areas on both sides of the BW Parkway and within the triangle formed by MD 32 and MD 198 were explored. Four potential sites were identified and underwent preliminary analysis and screening. All but the 9500 Area site revealed that the property/parcel sizes were insufficient in size; the sites had highly sensitive environmental resources; the potential for hazardous materials existed on-site; and/or the site was already committed for future use. Therefore the 9500 Area was chosen as the substation site.

The duct bank corridors are proposed to follow the existing road alignments of Old Portland Road, MD 198, and MD 32. Alternative alignments were not considered as following the existing roadways minimized encroachment into adjacent sensitive environmental resources, forest and wetland systems, and avoided encroachment onto private property.

However, the Army did consider 3 design concepts for the 9500 Area Substation to further minimize environmental impacts on forests and wetlands on this site. Design Concept A is an Air Insulated Switchgear (AIS) substation that would impact heavily on wooded riparian forest, nontidal wetlands, wetland buffers, and a small portion of the buffer zone protecting Great Blue Heron rookery. AIS substations rely on air gaps between high voltage cables, bushings, bus bars, and other exposed equipment to prevent flash over between high voltage equipment and pathways to ground. AIS substations require large footprints because of the air gap spacing requirements (typically a minimum of 10 feet between the conductors and the ground).

Design Concept B and Design Concept C are both newer technology Gas Insulated Switchgear (GIS) designs. GIS substations require a much smaller footprint than the AIS substations. A specially designed insulating gas is used in lieu of using conventional air gaps. High voltage conductors are installed in pipes that contain the insulating gas. The gas used in GIS substations has approximately 2.5 times the dielectric withstand capability of air (at atmospheric pressure) and increases further when the gas is pressurized. The primary advantage of GIS substations is that they are substantially more compact than AIS substations of equal capacity. The primary disadvantage of GIS substations is that they are more expensive to construct.

Design Concept B would impact riparian forest, nontidal wetlands, and wetland buffers, but would avoid the Heron rookery impacts.

Design Concept C shifts the substation footprint approximately 600 feet to the north and west of Design Concept B in order to avoid a high-quality forest stand and minimize potential wetland impacts. Design Concept C also avoids impacts to the buffer zone protecting a Great Blue Heron rookery. This location does contain some steeper slopes which would require additional grading and possibly retaining walls, but the wetland and high-quality forest impacts would be minimized and therefore, Design Concept C is the Army's chosen design.

No-Action Alternative

The No-Action Alternative is the continuation of existing conditions without implementation of the Proposed Action. Inclusion of the No-Action Alternative is prescribed by the Council on Environmental Quality regulations as the benchmark against which Federal actions are evaluated. The proposed activity is designed to improve both the reliability and capacity of the electrical power supply for the MPO, and is being designed in concert with improvements to the electric distribution system within the Installation perimeter. Additional electric supply capacity is required to support proposed expansions at FGGM, and if the Proposed Action is not constructed, growth within FGGM will be constrained and improvements in electrical system reliability will not be realized.

Environmental Inventory and Impact Assessment Methodology

Nine areas of potential environmental concern were considered to provide a context for understanding the potential effects of the Proposed Action and to provide a basis for assessing the severity of potential impacts. These areas include air quality, natural environment, cultural resources, geology and soils, hazardous materials and waste, infrastructure (transportation, and utilities), land use, socioeconomics, and water resources.

Table S-1 presents a list of Federal environmental statutes and executive orders that are applicable to the proposed project as well as the status of compliance with each.

The natural environmental features within the project area are primarily associated with the Little Patuxent River corridor. Features include gentle slopes, immature and mature forest, wetland systems, 100-year floodplains, and sensitive wildlife habitat areas. Wetlands systems are prevalent within the 9500 Area and in some areas along MD 32 and near the MD 198 / Bald Eagle Road intersection. The systems are primarily heavily wooded, palustrine forested, broad-leaved deciduous habitat and are priority for protection. Forest within the project area was classified into stands, comprised mainly of hardwoods.

For determining potential impacts, surface ground disturbance from the construction of the duct banks will be limited to the bore pits and areas where open cut trenching is required due to the radius of the transmission line route being tighter than 1,000 feet.

Summary/Results

Table S-2 summarizes the analyses performed in the EA by comparing the differences in potential impacts the Proposed Action would have on the environmental resources in comparison to the other design concepts considered and the No-Action Alternative. In summary, the Proposed Action does not displace any residences or businesses, nor requires private right-of-way acquisition, only the conveyance of easements to BGE. No adverse cultural resource impacts are anticipated and none of the identified potential hazardous sites within the project area will be

impacted by the proposed construction activities or ongoing operations. There may be temporary access impacts to the businesses along the north side of MD 198 during construction of the duct banks. Maintenance of traffic along both MD 198 and MD 32 will need to be addressed during the construction stage to minimize disruption. The crossing of the Little Patuxent River would not require a permit due to the HDD technology and there are no other impacts to stream crossings within the project area due to the HDD construction. HDD technology for duct bank construction is essential to avoiding substantial wetland, stream and additional forest clearing impacts.

Minor impacts to the 100-year floodplain may occur during construction operations only, and would be temporary. Direct impacts to nontidal wetlands would be less than 0.2 acre.

Mitigation for the environmental impacts for the Proposed Action include adherence to best management practices (BMP's) during construction, establishment of a 100-foot expanded buffer to nontidal wetlands adjacent to the Little Patuxent River where possible, and utilizing gas insulated technology to reduce the footprint and impacts on vegetation, water resources and habitat. Any reforestation that may be necessary would follow FGGM Directorate of Public Works Environmental Division guidance in tree replacement on another area of FGGM as mitigation.

Conclusion

Environmental impacts resulting from the Preferred Alternative would not be significant. Impacts, quantification, and description, as well as comparison with other alternatives considered, is documented in the remaining sections within this EA.

Based on the evaluation of environmental consequences by this EA, an Environmental Impact Statement will not be needed and a Finding of No Significant Impacts (FNSI) will be prepared instead.

Table S-1 Compliance with Federal Environmental Statutes and Executive Orders

Acts	Compliance
Clean Air Act, as amended (Public Law 88-206)	FULL
Clean Water Act, as amended (Public Law 95-217)	FULL
Coastal Zone Management Act	FULL
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. §9601 et seq.)	FULL
Endangered Species Act of 1973, as amended (Public Law 93-205)	FULL
Farmland Protection Policy Act (Public Law 97-98)	FULL
Fish and Wildlife Coordination Act, as amended (16 United States Code [U.S.C.] 661, et seq.)	FULL
National Environmental Policy Act of 1969 (Public Law 91-190)	FULL
National Historic Preservation Act of 1966, as amended (Public Law 89-665)	FULL
Noise Control Act of 1972, as amended (Public Law 92-574)	FULL
Resource Conservation and Recovery Act (Public Law 94-580)	FULL
Safe Drinking Water Act, as amended (Public Law 93-523)	FULL
Solid Waste Disposal Act of 1965, as amended (Public Law 89-272, Title II)	FULL
Toxic Substances Control Act of 1976 (Public Law 94-469)	FULL
Watershed Protection and Flood Prevention Act of 1954 (16 U.S.C. §1101, et seq.)	FULL
Wetlands Conservation Act (Public Law 101-233)	FULL
Wetlands Conservation Act (Public Law 101-233)	FULL
Sikes Act, Energy Policy Act of 2005, Archaeological Resources Protection Act	FULL
Executive Orders	
Floodplain Management (Executive Order 119880	FULL
Environmental Justice in Minority Populations and Low-Income Populations (Executive Order 12898)	FULL
Protection of Wetlands (Executive Order 11990)	FULL
Protection of Children from Environmental Health Risk (Executive Order 13045 as amended by EO 13229)	FULL
Strengthening Federal Environmental, Energy, and Transportation management (Executive Order 13423) and Leadership in Energy and Environmental Design (LEED) Silver Level	FULL

Table S-2: Summary of Impacts

Potential Impacted Features	No Action	Alternative Site 4 – Design Concept A	Alternative Site 4 – Design Concept B	Alternative Site 4 – Design Concept C (Proposed Action)
Natural Environmental Impacts				
Limit of Disturbance (acres)	0	25.9	20.9	**21.9**
Forest Cover Removed (acres)	0	18.2	13.3	**15.8**
Direct Impacts to High Quality Forest (acres)	0	Moderate (4.0)	High (6.9)	**Low (1.0)**
Direct Impacts to the Heron Rookery (acres)*	0	Low (0.6)	0	**0**
Direct Impacts to Jurisdictional Wetlands (acres)	0	Moderate (< 0.6)	Moderate (< 0.6)	**Low (< 0.2)**
Direct Impacts to the 25' Wetland Buffer (acres)	0	Moderate (1.1)	Low (0.9)	**Low (0.5)**
Streams Directly Impacted (number)	0	0	0	**0**
Impact to Jurisdictional Waters (linear feet)	0	0	0	**0**
Direct Impacts to the 100-Year Floodplain	No impact	0.3 acres of temporary construction impacts	0.3 acres of temporary construction impacts	**0.3 acres of temporary construction impacts**
Acres of new impervious surface (acres)	0	3.7	3.2	**3.2**
Human and Social Environmental Impacts				
Direct Impacts to the Social Environment	No impact	temporary construction impacts to MD 198 businesses	temporary construction impacts to MD 198 businesses	temporary construction impacts to MD 198 b usinesses
Adverse Effects on National Register of Historic Places Listed or Eligible	No impact	No impact	No impact	**No impact**
Archeological Sites Impacted (number)	0	0	0	**0**
Meets National Ambient Air Quality Standards	Yes	Yes	Yes	**Yes**
Potential Hazardous Materials Sites (number)	0	0	0	**0**

* *Restriction dates to forest clearing (see Section 4.2)*

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ACRONYMS AND ABBREVIATIONS

AOC	U.S. Architect of the Capital
AIS	Air Insulated Switchgear
AR	Army Regulation
BG&E	Baltimore Gas & Electric
BMP	Best Management Practices
BRAC	Base Realignment and Closure
BWI	Baltimore-Washington International Airport
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COMAR	Code of Maryland Regulation
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DISA	Defense Information Systems Agency
DoD	Department of Defense
DoI	Department of the Interior
DMA	Defense Media Activity
DMM	Discarded Military Munitions
DNR	Maryland Department of Natural Resources
EA	Environmental Assessment
EO	Executive Order
EPA	Environmental Protection Agency
EUL	Enhanced Use Lease
FCA	Forest Conservation Act
FFA	Federal Facility Agreement
FIDS	Forest Interior Dwelling Birds
FGGM	Fort George G. Meade
FNSI	Finding of No Significant Impact
GIS	Gas Insulated Switchgear
GPR	Ground Penetrating Radar
HAZMAT	Hazardous Materials
HDD	Horizontal Directional Drilling
HPAs	Habitat Protection Areas
IRP	Installation Restoration Program
ISCP	Installation Spill Contingency Plan

kV	Kilovolt
kVA	Kilovolt Ampere
MARC	Maryland Area Regional Commuter Rail
MC	Munitions Constituent
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MGD	Million Gallons Per Day
MMRP	Military Munitions Response Program
MPO	Maryland Procurement Office
MSDS	Material Safety Data Sheets
Msl	Mean Sea Level
MTA	Maryland Transit Authority
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NO or NOx	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NSA	National Security Agency
NWR	National Wildlife Refuge Lead
OCRM	Ocean and Coastal Resource Management
PM	Particulate Matter
RONA	Record of Non-Applicability
SARA	Superfund Amendments and Reauthorization Act
SHA	Maryland State Highway Administration
SHPO	State Historic Preservation Office
SO2	Sulfur Dioxide
SPCC	Spill Prevention Control and Countermeasures Plan Sewage
SSUP	Sludge Utilization Permit
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TPY	Tons Per Year
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOCs	Volatile Organic Compounds
USAR	US Army Reserve
UXO	Unexploded Ordnance

WMATA	Washington Metropolitan Area Transportation Authority
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant

1.0 PURPOSE, NEED, AND SCOPE

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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1.0 PURPOSE, NEED, AND SCOPE

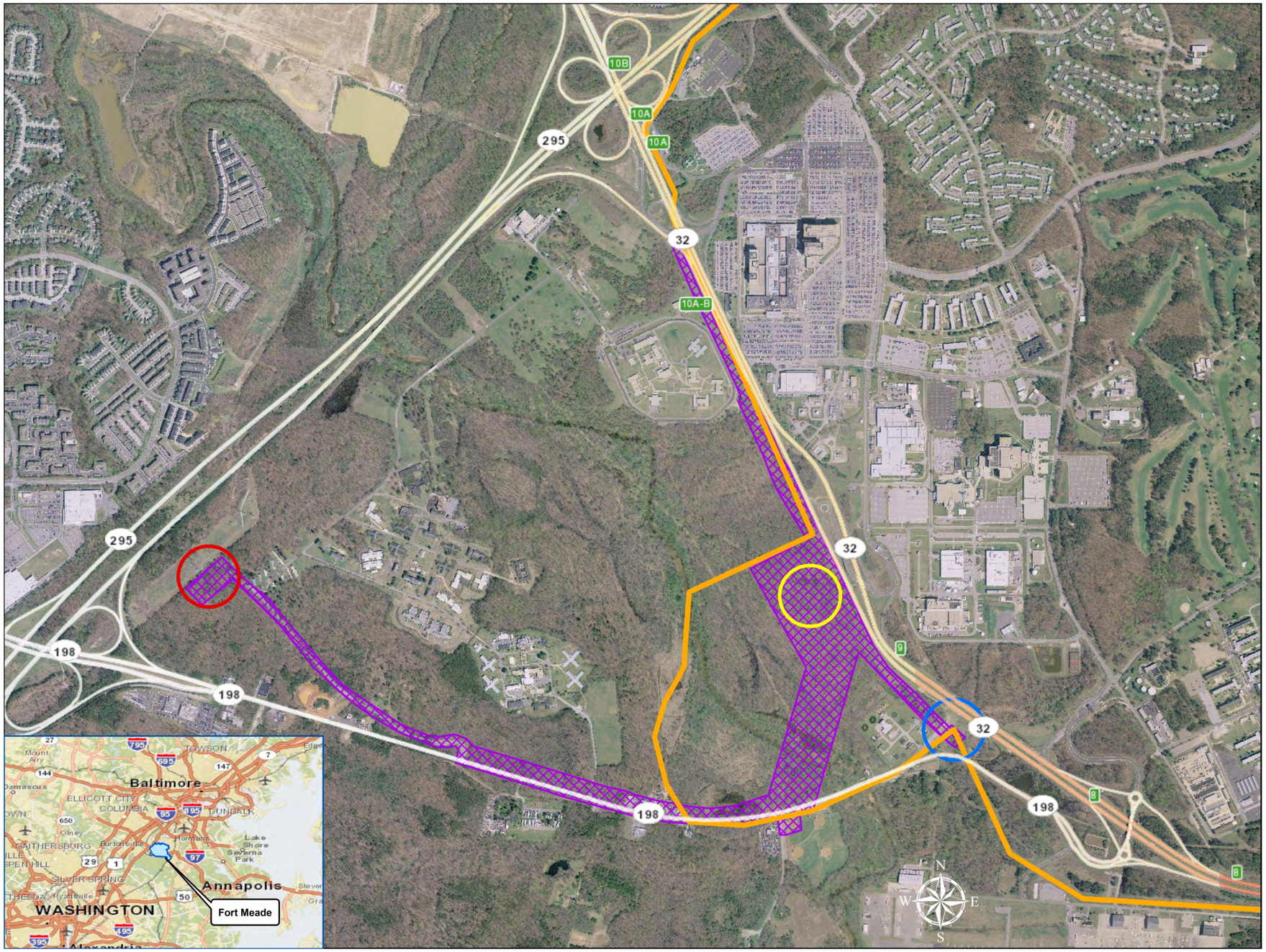
1.1 INTRODUCTION

The Baltimore Gas and Electric Company (BGE) in cooperation with Fort George G. Meade (FGGM) propose to construct a new electrical substation, new switching station, an overhead to underground transition station and associated electrical transmission line duct bank connections to three separate electrical power facilities for the Maryland Procurement Office (MPO) within FGGM. These improvements are needed to provide increased electrical capacity to FGGM. The implementation of this new infrastructure is referred to as the Proposed Action. *Figure 1-1* shows the location of the project area, along with an outline of the FGGM boundary. Alternative site locations needed to be investigated as well as the analysis of various power transmission technologies and the impact the construction of the facility would have on the natural and social environment.

This Environmental Assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, its implementing regulations published by the Council on Environmental Quality (40 Code of Federal Regulations [CFR] 1500-1508), and 32 CFR Part 651, which implements NEPA for the Army as revised and published in the Federal Register on 29 March 2002, as Environmental Analysis of Army Actions. Pursuant to NEPA, Federal agencies are required to consider the environmental consequences of their proposed actions. NEPA typically applies when the Federal agency is the proponent of the action or where Federal funds are involved in the action. FGGM's mission is to provide Garrison operations support for facilities and infrastructure, quality of life, and protective services in support of DoD activities and Federal agencies. Specifically, the installation houses more than 95 partner organizations from all four services and several Federal agencies. Major tenant units include the National Security Agency (NSA), the Defense Information School, the Defense Courier Service, the U.S. Army Field Band, the U.S. Army Intelligence and Security Command, First U.S. Army (East), the Naval Security Group Activity, the 694th Intelligence Group (U.S. Air Force), the Defense Information Systems Agency (DISA) Defense Media Activity (DMA) and the U.S. Environmental Protection Agency Center.

FGGM encompasses approximately 5,140 developed acres in northwestern Anne Arundel County, with 65.5 miles of paved roads and about 1,300 buildings. Located midway between Baltimore, Maryland and Washington, D.C., FGGM houses approximately 10,000 military personnel and 6,000 family members, and employs 40,000 civilians on the installation. FGGM is located near the communities of Odenton, Laurel, Columbia, Severn, and Jessup.

Recent rapid expansion of FGGM as the result of employment influx from the Defense Base Closure and Realignment (BRAC) Act and other activities, combined with proposed MPO expansion, have necessitated the construction of several new or enhanced electrical infrastructure facilities within the FGGM boundary. These facilities are described and analyzed in both the 2009 *Final Environmental Impact Statement (FEIS) for the Proposed Utilities Upgrade Project at Fort George G. Meade* and the *FEIS for Addressing Campus Development at Fort George G. Meade*, September 2010. The Proposed Action for the purpose of this EA will consist of the additional infrastructure needed both within and outside of FGGM property to supply power from BGE's existing 230 kilovolt (kV) transmission system within the Russett East area to the MPO.



Fort Geoge G. Meade
BGE Substation-9500 Area
Environmental Assessment

Fort Meade Boundary
Area of Potential Impacts
9500 Area Substation
Transition Station
Switching Station

Orthophotography Source: Northern MD USGS - 2008 Dataset

Figure 1-1
Project Area

0 1,200 2,400 Feet

August 2012

BGE
A Constellation Energy Company

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to provide reliable, fully dedicated premium electrical power to the MPO, within FGGM. In order to provide this enhanced reliability and additional capacity to satisfy future load expectations, the MPO has determined that it is necessary to upgrade the electrical infrastructure within FGGM and to enhance the level and nature of transmission service to FGGM. With respect to the enhanced transmission service, the MPO requires that its facilities be supplied directly from BGE's 230kV transmission system through an underground, dedicated transmission system. Additional electric distribution circuits significantly improve the capacity of the system, while simultaneously diversifying the electrical supply sources. The new system will need to be an underground system that will be less vulnerable to severe weather events or terrorist activity than the existing overhead systems. From a feasibility and cost effectiveness standpoint, this new substation site must connect to an existing 230kV transmission line; must be reasonably close to the MPO; and must be developable, with no zoning or environmental and permitting hindrances.

A reliable electric distribution system is essential to meeting the missions of FGGM's tenants, and the existing system has well documented limitations and deficiencies. The existing service configuration is over 50 years old and has become less reliable resulting in several occurrences of down time each year. This reconfiguration will significantly improve the MPO's electrical reliability from approximately five outages a year to one outage every five years. Power disruptions and surges can cause irreparable damage to sensitive computer systems that are critical in the fight against terrorism. The MPO is forecasting significant growth of electrical demand over the next ten years created by anticipated growth of the NSA and the USCYBERCOM Campus initiative. In order to ensure that BGE maintains an adequate supply of electric power to meet the growing demand, transmission service upgrades must be met.

The combination of the new feeders, the diverse supply points, and the underground construction will result in a distribution system that will be significantly more robust than the existing system. Future demand will also increase substantially with the full build-out of the MPO facilities. The MPO is forecasting significant growth of electrical demand over the next ten years created by anticipated growth of the campus and new construction initiatives. In order to ensure that BGE maintains an adequate supply of electric power to meet the growing demand, transmission service upgrades must be met. Therefore, the Proposed Action would meet the Installation's reliability and capacity needs for the foreseeable future.

1.3 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

This EA addresses the scope of activities associated with the eventual construction of the Proposed Action. Pursuant to NEPA, Federal agencies are required to consider the environmental consequences of their proposed actions. The environmental effects of this action are anticipated to be minor, but because there are known impacts to forest stands and potential impacts to wetlands and wildlife habitat, Army regulation (32 CFR Part 651) requires the preparation of an EA.

This EA identifies the environmental resources within the project area and analyzes the environmental effects of the Proposed Action, compared amongst potential alternatives. Alternatives encompassed several site locations for a new 230kV to 115kV electrical substation, including design concepts for both air insulated and gas insulated technology. Transmission line connections to and from the new substation are included as part of the Proposed Action evaluated,

which also includes a switching station and an underground to overhead transition station.

The transmission connections to the MPO have not been developed to a sufficient level of detail to be evaluated and assessed for potential impacts, and are therefore not included within the Proposed Action and within the scope of this EA. Pending the final location of these transmission line connections to the MPO, an additional NEPA study may be required.

Section 2.0 of this EA provides a more detailed description of the Proposed Action and the various alternatives and design concepts that were considered and evaluated. *Section 3.0* of this EA discusses the existing social/human and natural environmental features within the project area, including air quality, biological resources, geology and soil, hazardous material and waste, cultural resources, infrastructure, land use, socioeconomics, and water resources. *Section 4.0* of this EA addresses the potential impacts to the social/human and natural environment as a result of the construction and operation of the Proposed Action.

References and citations are included in this EA where relevant. The secondary (indirect) effects of the proposed new construction and the cumulative effects of the proposed construction with other known current and foreseeable future actions in the area are also analyzed and presented in this EA. The methods and procedures established within the Federal guidelines (32 CFR - Part 651) were followed in preparation of this EA. Information sources used in preparing this EA include those gathered in facility planning meetings, environmental planning and technical reports provided by FGGM's Environmental Division, and interviews with FGGM staff, and U.S. Army Corps of Engineers (USACE) officials.

1.4 PUBLIC AND AGENCY INVOLVEMENT

Coordination with Federal and State agencies was initiated for the Proposed Action in February, 2011 to solicit comments related to their areas of responsibility/jurisdiction and to obtain concurrence with the preliminary findings. The agencies contacted include the U.S. Fish and Wildlife Service (USFWS), the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture-Natural Resources Conservation Service, Anne Arundel County, the Maryland Department of Natural Resources (DNR), the Maryland Department of Planning (MDP), the Maryland Department of Transportation (MDOT), the Maryland Department of the Environment (MDE), the Maryland Department of Business and Economic Development, the Maryland Military Department, and the Maryland State Historic Preservation Office (SHPO). Copies of the agency and public responses are located in *Appendix B*

Public participation opportunities with respect to this EA and decision making on the Proposed Action are guided by 32 CFR Part 651. Upon completion, the EA will be made available to the public for 30 days, along with a draft Finding of No Significant Impact (FNSI). At the end of the 30-day public review period, the Army will consider any comments submitted by individuals, agencies, or organizations on the Proposed Action, the EA, or draft FNSI. As appropriate, the Army may then execute the FNSI and proceed with implementation of the Proposed Action. If it is determined prior to issuance of a final FNSI that implementation of the Proposed Action would result in significant impacts, the Army will publish in the Federal Register a notice of intent to prepare an environmental impact statement, commit to mitigation actions sufficient to reduce impacts below significance levels, or not proceed with the Action.

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2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Proposed Action consists of new electrical facility infrastructure that will provide enhanced reliability and additional transmission capacity to satisfy future load expectations within the MPO and FGGM through an underground, dedicated transmission system. This Proposed Action is to tap high voltage power in the Russett area near the intersection of MD 198 and the BW Parkway via a new transmission switching station; construct 230kV transmission duct banks using a combination of horizontal directional drill (HDD) technology and open-cut trenching to a new 230kV to 115kV electrical substation adjacent to MD 32 within the 9500 Area of FGGM; a new 'underground to overhead' transition station near the intersection of MD 198 and MD 32, and construct 115kV transmission duct banks along MD 32, that will be needed to provide connections to the new utility infrastructure being constructed within the MPO (*see Figure 1-2*). The MPO's new utility infrastructure is comprised of a 50 megavolt-amperes (MVA) North Electrical Substation as part of a larger North Utility Plant, a South Generator Facility (to supplement the existing South Utility Plan), an East Electrical Substation and all the associated transmission and distribution lines. The MPO's new utility infrastructure and transmission line connections are not included as part of this Proposed Action and are not analyzed within this EA. The *Final Environmental Impact Statement for the Proposed Utilities Upgrade Project* provides more detail regarding those proposed facilities.

2.2 ALTERNATIVE SITES CONSIDERED

For proposed actions that require preparation of an EA, the Council of Environmental Quality regulations, NEPA, and Army guidance and policy require that appropriate alternatives for the proposed action be described and evaluated. A reasonable range of alternatives that meet the underlying purpose and need for the proposed action should be analyzed for their environmental impacts to support a fully informed decision. An EA must include an evaluation of the No Action Alternative as a reference for the comparison of potential environmental impacts associated with the proposed action. Additionally, the EA should identify any alternatives eliminated from detailed analysis and indicate the reasons for their elimination. Alternatives which did not meet the screening criteria were not analyzed in detail in this EA.

The alternatives development process consisted of determining the site location for the proposed 230kV to 115kV substation, comparing the footprint options within that site, and analyzing generation/transmission technology options.

The site selection process attempted to identify the most feasible, cost-effective and minimally invasive location for the substation. The screening criteria for the proposed construction of the substation and associated infrastructure (duct bank corridors) is driven by four functional requirements.

- the site must connect to and be adjacent to an existing 230kV transmission line;
- the site must be reasonably close to the MPO, which is within the southwest portion of FGGM;
- the site must be developable, with no zoning or environmental and permitting hindrances;
- the site has to be large enough to accommodate the footprint of the substation and associated infrastructure connections (duct bank drilling and receiving pits and the underground to overhead transition station)

Because there is a very limited amount of space available within the FGGM boundary, especially due to the influx of employment caused by the BRAC mandate and due to relocation of expansion of the MPO within FGGM, on-site generation of electrical power was not considered a viable alternative.

Alternative Site 1 – Konterra Property

Initial site investigations conducted by BGE were on the west side of BW Parkway or MD 295 (*see Figure 2-1*). One parcel that garnered further investigation was owned by Konterra, a large property being developed for residential and commercial use, located on the south side of MD 32, across from the National Business Park. The site was triangular with dimension of approximately 350 feet by 400 feet with a total area of approximately 70,000 square feet. The project team then determined that the parcel size and shape was insufficient to construct the needed substation components, which included both a switching and transformer station.

Konterra was not able to provide any additional land to add to the potential project site and the parcel to the immediate east contained a stream and other sensitive environmental features. Therefore, this location was removed from further consideration as a viable site and is not analyzed in detail in this EA. BGE investigated additional potential property locations further west on the High Ridge transmission corridor, but those properties were inadequate in size as well.

Figure 2-1

Alternative Site 2 – DOI Property

Property locations were then investigated east of MD 295. The project team identified a location owned by the Department of the Interior (DOI), situated on the south side of MD 198 across from the water treatment facility and near the Tipton airfield. However, it was determined that any construction within this site would impact natural environmental resources, categorized as a Wetland of Special State Concern by the Maryland Department of the Natural Resources. Nontidal Wetlands of Special State Concern are wetland sites with exceptional ecological and educational value designated for special protection under the State's nontidal wetlands regulations. Many of these 365 special wetlands within Maryland contain the last remaining populations of native plants and animals that are now rare and threatened with extinction. This designation also safeguards the beauty and natural diversity of Maryland's best remaining wetlands. This alternative was subsequently eliminated for further consideration and is not analyzed further in this EA.

Alternative Site 3 – DC Children's Center Property

Attention was then turned to the "triangle" formed by MD 198, MD 32 and BW Parkway, since this was the lone remaining area to investigate, as the site location needed to be within the vicinity of BGE's existing 115kV and 230kV feeds. The area investigated was the DC Children's Center property, also known as Oak Hill Youth Center and reopened as the New Beginnings Youth Development Center. Field visits revealed what appeared to be a landfill on-site with extensive dumping of various potentially contaminated materials including several dozen rusting drums of oil. The concern was that resolving potential contaminations issues would delay the project schedule and make the project cost prohibitive. The site is owned by the U.S. Government, but leased to the District of Columbia for its current use, potentially causing difficulty regarding legality of a substation use. Therefore, this location was removed from further consideration as a viable site and is not analyzed further in this EA.

A further review of undeveloped areas within this "triangle" did not reveal any additional sites besides the 9500 Area that were either capable of being developed into a new substation or that were not already committed to future use. The undeveloped areas to the east and south of the 9500 Area, for example, are either identified wetlands or wetland buffers. The 9500 Area of FGGM was therefore chosen as the location for the proposed substation. The site for the proposed Russett East switching station for the 230kV feed is existing BGE property that is adjacent to the existing high voltage corridor.

Alternative Site 4 – FGGM 9500 Area (Selected Site Location)

Site 4, the 9500 Area, is the preferred alternative site for the proposed substation primarily because of its proximity to the MPO and because the property already belongs to FGGM. The site is adjacent to the existing 230kV transmission line corridor, will accommodate the footprint of the Proposed Action, and is clear of contamination and hazardous material. Construction of the substation would also not interfere with other planned projects. Although the proposed substation site is FGGM property, it is located outside of the security fence line. The substation will be unmanned and will have its own security measures. Due to FGGM's current land constraints, if the substation were to be located within the security fence line, it could displace a future facility that would require to be within the security fence line. Additional details regarding the design concept options within Alternative Site 4 are discussed in *Section 2.4*.

2.3 NO-ACTION ALTERNATIVE

The No-Action Alternative is to not construct the Proposed Action, which could have the following consequences:

- The electric distribution system supplying the MPO would not be able to meet the demands imposed by planned growth.
- The documented limitations and deficiencies of the 50-year old existing service configuration would continue to result in several occurrences of down time each year.
- Planned growth within FGGM would be delayed indefinitely
- The electric distribution system would likely not meet the reliability requirements of the MPO.
- The MPO would be required to take alternative actions (restrict growth, add on-site energy generation, or move activities off installation) to operate within the constraints of the existing electric distribution system.

2.4 PROPOSED ACTION DETAILS

For the purposes of this EA, the Proposed Action has been broken out into substation design concepts and connection facilities, with locations shown in *Figures 2-2 through 2-6*.

2.4.1 Substation Design Concepts

Alternative Site 4 (the 9500 Area of FGGM) was selected as the preferred site for the construction of the new 230kV to 115kV substation. Additionally, three different design concepts were developed for the construction of the substation within the preferred site to minimize the project footprint and the environmental impacts.

Therefore, the siting of the proposed 230kV to 115kV substation needed to meet the following criteria:

- The substation must be located far enough from MD 32 to allow for future widening of the road without affecting the substation;
- The substation must be located so as to minimize disturbance to existing wetlands, floodplains, forested areas, and sensitive species habitat areas.
- The substation needed to be near an existing 230kV line

The three design concepts of the proposed 230kV to 115kV substation were developed, each containing differing types of technology and differing footprints within the 9500 Area of FGGM. The limit of disturbance of each substation design concept is comprised of the substation building, the access road to MD 32, stormwater management facilities, site grading, and a fence that encloses the substation building and access road.

Design Concept A (Air Insulated Switchgear Substation)

Design Concept A is the Air Insulated Switchgear (AIS) substation configuration (*see Figure 2-2*). The AIS substation consists of incoming 230 kV transmission lines, 230kV to 115kV transformers, a 230kV and 115 kV switchgear, and outgoing 115kV distribution cables. All incoming and outgoing cables are underground, all transformers and switchgears are above grade. The AIS substation consists of switchgears and transformers that are installed on concrete pads. The

transformer pads include oil retention systems to capture transformer oil in the unlikely event that the transformer leaks oil. In between the equipment pads, the site is covered with 6" of stone. The stone surface is designed to protect personnel in the event of an electrical fault that creates localized high potential in the soil. The stone is not compacted and allows for infiltration and ground water recharge.

The limit of disturbance of the substation (Design Concept A) is 14.0 acres with approximately 3.7 acres of new impervious surface area due to the substation and associated access road.

Design Concept B (Gas Insulated Switchgear Substation)

Design Concept B is a Gas Insulated Switchgear (GIS) substation configuration that consists of similar equipment as the AIS substation but is constructed within a smaller footprint (*see Figure 2-3*). The incoming and outgoing feeders are essentially the same as the AIS design.

The main difference with the GIS Design is that the entire substation is installed within a covered building. A specially designed insulating gas is used in lieu of using conventional air gaps. High voltage conductors are installed in pipes that contain the insulating gas and there is no need for the use of transformer oil as part of the operating system. The gas used in GIS substations has approximately 2.5 times the dielectric withstand capability of air (at atmospheric pressure.) If the gas is pressurized up to 3 to 5 atmospheres, the dielectric-withstand capability increases to approximately ten times that of air. The primary advantage of GIS substations is that they are substantially more compact than AIS substations of equal capacity.

The limit of disturbance of the substation (Design Concept B) is reduced to 9.0 acres with up to 3.2 acres of new impervious surface area due to the substation and associated access road.

Design Concept C (Gas Insulated Switchgear Substation) – "Chosen Concept"

Design Concept C is essentially the same design and configuration as Design Concept B, incorporating the GIS technology into the substation, but in a different location within the 9500 Area site, shifted approximately 600 feet to the northwest, as shown in *Figure 2-4.* The footprint would be slightly larger than Design Concept B, but would result in fewer environmental impacts than Design Concept B. The larger footprint of Design Concept C is due to additional grading needs and a longer access road connection to MD 32. The corridor location for the transmission duct lines connecting to the MD 198 bore pit would be shifted westward within the overall site as well.

The limit of disturbance of the substation (Design Concept C) is 10.0 acres, with up to 3.2 acres of new impervious surface area due to the substation and associated access road. Design Concept C minimizes impacts to nontidal wetlands, their associated buffers, the blue heron nesting area and high quality forest compared with Design Concept B, which are the main influences for choosing Design Concept C to be incorporated into the Proposed Action.

From an environmental perspective, the substation would introduce a limited amount of impervious surface area. Although the vegetation will be removed, approximately 80% of the substation surface area will be covered with an un-compacted stone base. The storm water management plan for the substation incorporates the stone base as part of the infiltration strategy. Rainwater will flow around the stone base and naturally infiltrate into the soil below the stone base, ultimately recharging the water table.

The Stormwater Management and Sediment Control design will be in accordance with Sections 4-106 and 4-205 of the Department of the Environment Article, Annotated Code of Maryland. The Stormwater Management and Erosion Sediment Controls will be designed such that the project is in compliance with the *2000 Maryland Stormwater Management Design Manual* as revised by the Stormwater Management Act of 2007, the *Maryland Department of the Environment Stormwater Management Guidelines for State & Federal Projects* (dated April 15, 2010), and the 1994 *Maryland Standards and Specifications for Soil Erosion and Sediment Control*.

2.4.2 Substation Connections

The Russett East switching station will consist of an overhead to underground transition station in BGE's existing overhead transmission line right-of-way, and gas insulated switches located in a metal enclosure building on private property also owned by BGE, immediately south of the overhead transmission line right-of-way. The building will consist of switches and protective relaying that will control connections to and disconnections from BGE's 230kV transmission system.

Electrical transmission lines from the Russett East Switching Station will be housed in duct banks along Old Portland Road and MD 198 (see *Figure 2-5*). Initially, there will be two 230kV lines installed in duct underground, with provision for a third future circuit. The duct will either be encased in concrete at depths varying from five to ten feet below grade, or will be encased in a high density polyethylene (HDPE) casing pipe installed at depths greater than ten feet below grade. The ducts will be installed using a combination of open-cut trenching and horizontal directional drilling (HDD) technology. The open cut trenching will occur in locations where the radius of the transmission line route is tighter than 1,000 feet, entering and exiting manholes, and other locations where the HDD installation is not possible. Transmission duct banks installed by open cut construction require that all vegetation be cleared above and managed to prevent forest stands from re-establishing over the transmission duct banks and therefore being affected by heat rejected from the duct bank to the soil. HDD drilling is more costly than open-cut trenching, but typically results in ducts that are 30 to 40 feet below grade, thereby avoiding surface disturbance and the environmentally sensitive areas that are prevalent within the project area including wetlands, streams, and high quality forests and wildlife habitats. Therefore, HDD is the preferred method for installing duct for this project.

The substation's incoming transmission lines will be fed through duct banks using a HDD drill rig located at a bore pit adjacent to MD 198 near the intersection of Bald Eagle Drive. The duct banks will cross underneath the Little Patuxent River and a wide swath of wetlands, 100-year floodplain, and sensitive forested areas. In order to connect the transmission lines through a subterranean tunnel to the Russett East switching station using HDD technology, receiving pits will be incrementally dug to access the horizontal drill. HDPE duct pipe is pulled back through the tunnel and the duct is filled with thermal grout. After the duct is installed, the drill rigs are relocated and manholes are installed in the pre-existing drilling pits. After the ducts are connected to the manholes, transmission cables are pulled through the HDPE duct into the manholes, and cable splices are made in the manhole. The depth of the HDD will be determined after studying geotechnical bore samples, with the intent to install the duct in such a manner as to minimize the probability of leaking drilling fluid (frac-out) during the duct installation phase. Another consideration is identifying soils with suitable heat transfer characteristics so that the transmission cables can operate at their rated loads without overheating. The manholes (and bore pits) will be located to avoid wetlands and flood plains where possible while maintaining the acceptable distances between manholes. Bore (or drilling) pits will be placed to minimize surface disturbances.

Electrical transmission line duct banks housing the 115kV transmission lines will exit the substation to the north and east within the 9500 Area, en route to proposed MPO electrical facilities. The duct bank corridor is proposed to be built parallel with existing utility corridors on the west side of MD 32 to a point within southwest quadrant of the MD 32/BW Parkway interchange and also to a new 'overhead to underground' transition station southeast of the substation, adjacent to MD 32 (*see Figure 2-6*). This 115kV duct bank corridor will provide the infrastructure for the eventual connections to the MPO electrical facilities.

The substation access road and the 115kV duct banks will have to cross through railroad right-of-way (owned by SHA) and MD 32 right-of-way (SHA easement from FGGM). The railroad right-of-way is the old Baltimore and Ohio (B&O) railroad right-of-way and does not include a functioning railroad, but does include a dual circuit 34kV electric distribution overhead pole line that belongs to BGE. Just north of the proposed substation is an existing BGE transmission right-of-way that is occupied by a 115kV overhead transmission line that currently supplies electrical power to the MPO. Natural gas distribution lines owned by BGE are also installed in the utility corridor. A new, dedicated corridor on the west side of the existing railroad and transmission rights-of-way is recommended because of the clearance that is required between circuits, and the need to avoid existing utilities. BGE will obtain utility construction permits from SHA to install its facilities within the public right-of-way, subject to SHA's terms and conditions.

Similar to the 230kV duct bank corridor connecting the proposed substation with the Russett East switching station, the ducts will be installed using a combination of open-cut trenching and HDD technology. The open cut trenching will occur in locations where the radius of the transmission line route is tighter than 1,000-feet, which occurs as the lines exit the substation and within the vicinity of the manholes. In general, open cut trenching will be employed when the duct is installed with less than ten feet of cover and the ducts will be installed via HDD at deeper depths.

The 'underground to overhead' transition station allows connections between an existing 115kV overhead transmission line and the 115kV transmission lines from the 9500 Area Substation. The transition station consists of an air insulated termination and switching structure with air break disconnect switches and cable terminations (transitions from the uninsulated overhead cable to the insulated underground cable). The transition station will be located approximately 1,900 feet southeast of the 9500 Area substation in the immediate vicinity of an existing transmission tower at the intersection of the overhead tower line and MD 198.

Alternative locations for the duct bank corridors along both MD 198 and MD 32 were not developed due to the high presence of sensitive environmental resources within the areas setback from the existing roadways. The route for the 230kV duct bank was also selected to avoid other utilities (existing power, natural gas, and communication cables), to avoid future road construction if and when MD 198 is widened, and to be located predominantly on federal property. The corridor for the 115kV duct bank was selected due to it being adjacent to an existing utility corridor along MD 32 that has previously been cleared of forest.

2.4.3 Total Limits of Disturbance

The total limits of disturbance for each of the substation design concepts, including the substation connections (duct bank open-cut trenching areas, transition station and switching station) are shown in *Table 2-1*: The table compares each design concept by facility type and by property ownership. Environmental impacts within the limits of disturbance for each design concept are described in *Section 4* of this EA.

Table 2-1 Limits of Disturbance (acres)

Impact	Design Concept A	Design Concept B	**Design Concept C**
Facility Type			
Substation	14.0	9.0	**10.0**
Connections	11.9	11.9	**11.9**
Total	25.9	20.9	**21.9**
Property Owner			
FGGM	17.1	12.1	**13.1**
Non-FGGM	8.8	8.8	**8.8**
Total	25.9	20.9	**21.9**

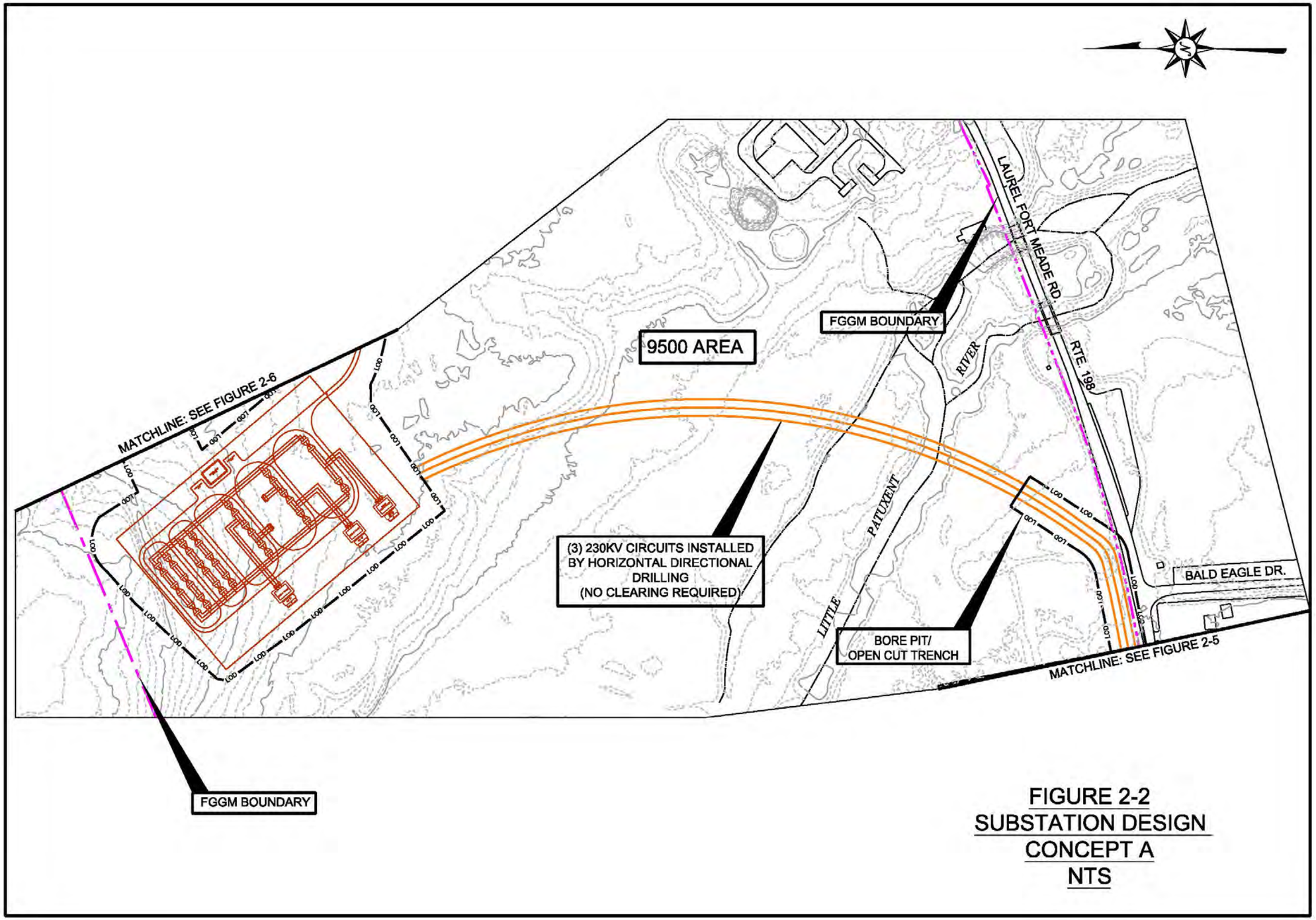

FIGURE 2-2
SUBSTATION DESIGN
CONCEPT A
NTS

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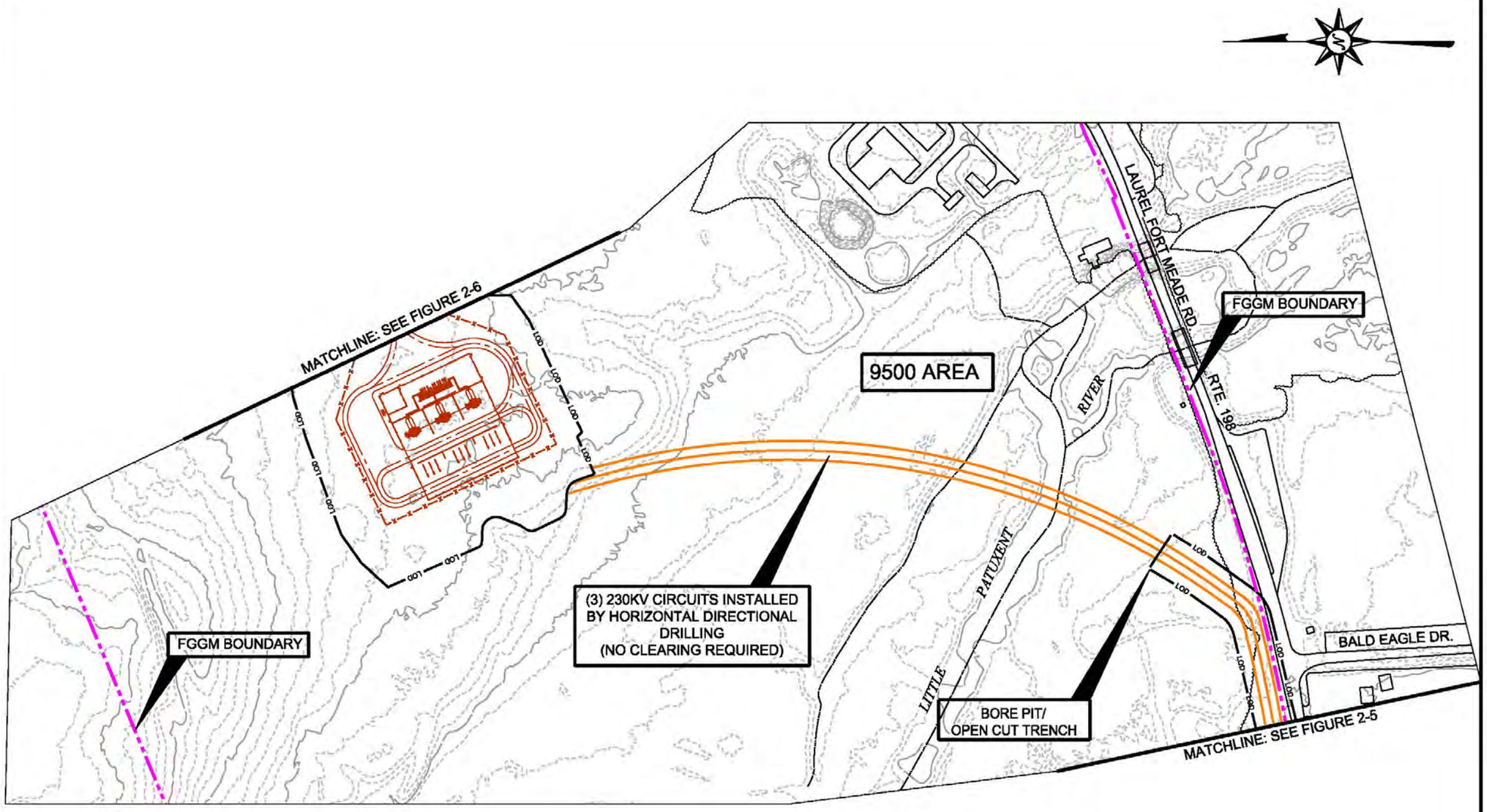

FIGURE 2-3
SUBSTATION DESIGN
CONCEPT B
NTS

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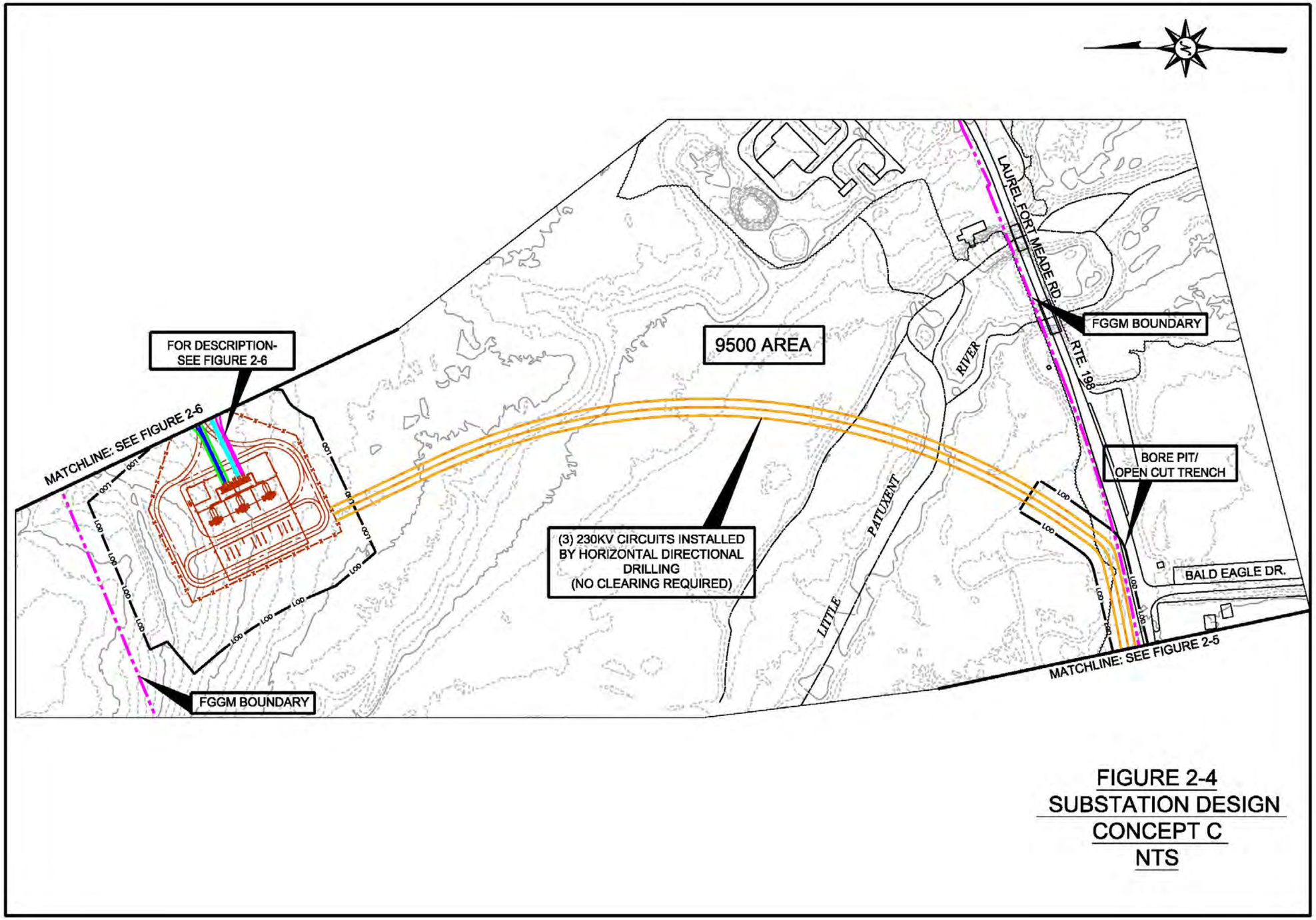

FIGURE 2-4
SUBSTATION DESIGN
CONCEPT C
NTS

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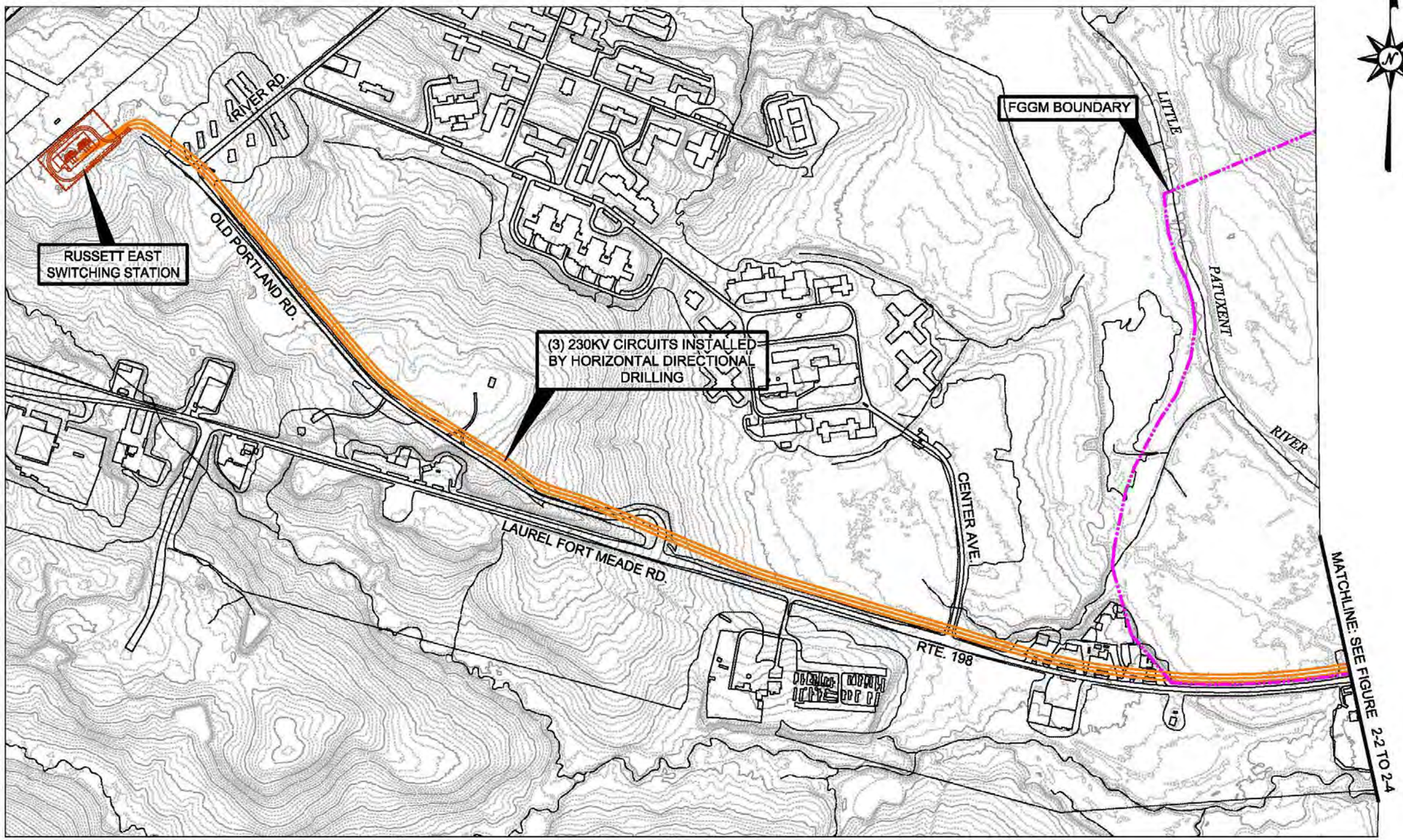

FIGURE 2-5
230 kv DUCT BANK CORRIDOR AND RUSSETT EAST SWITCHING STATION
NTS

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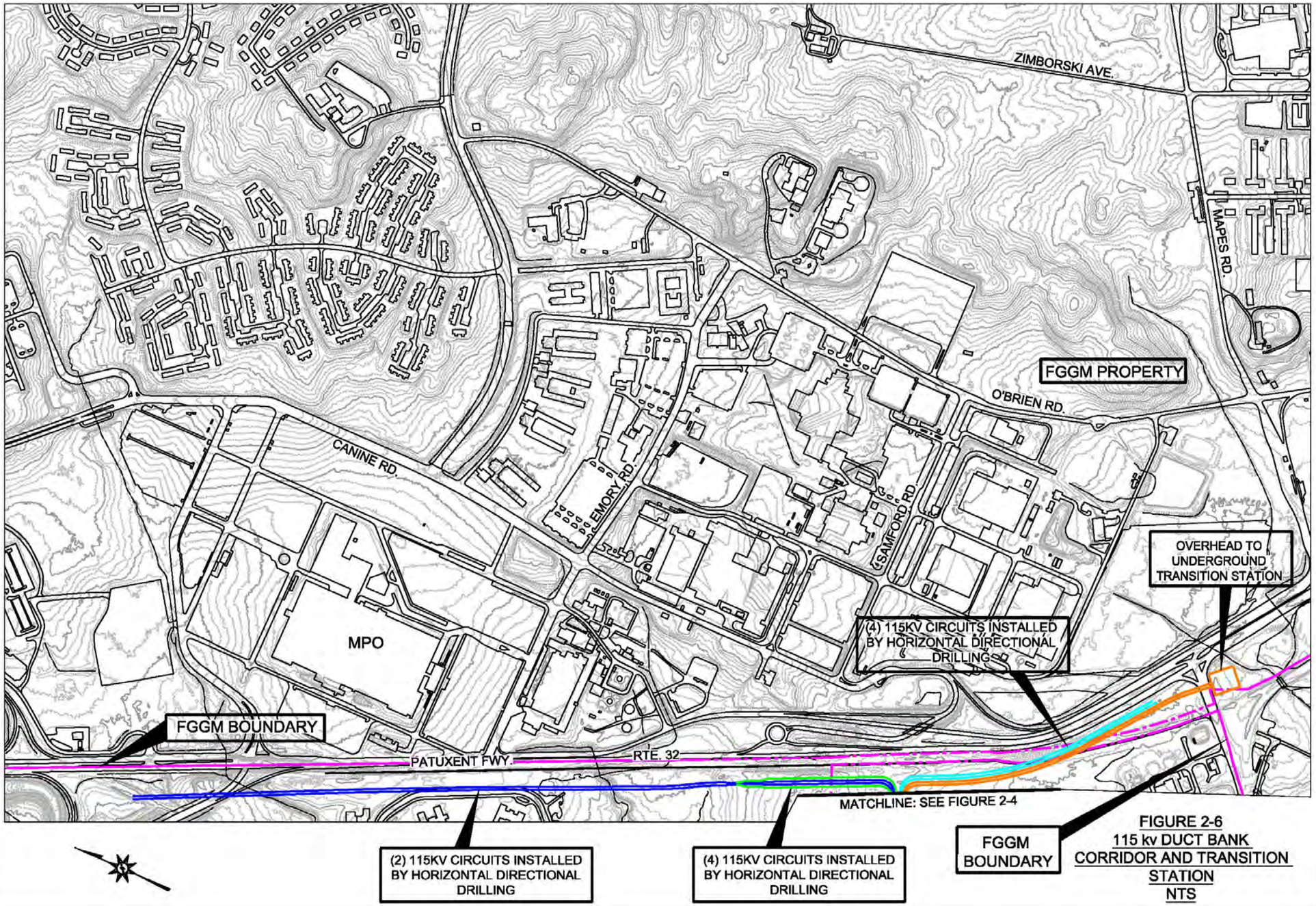

FIGURE 2-6
115 kv DUCT BANK CORRIDOR AND TRANSITION STATION
NTS

3.0 AFFECTED ENVIRONMENT

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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3.0 AFFECTED ENVIRONMENT

The information provided in this section of the EA serves as a point of reference for understanding any potential impacts from the construction and operation of the proposed new facilities and infrastructure within the project area. The affected environment is briefly described, and any areas of greater concern are described in detail.

Environmental Setting

FGGM encompasses approximately 5,140 acres in northwestern Anne Arundel County, Maryland, in the Chesapeake Bay watershed. MD 32 lies along the western part of the Installation and along the south; the installation shares a border with the Patuxent Research Refuge. MD 175 borders FGGM on the east, and Baltimore-Washington Parkway borders the installation on the north and the Little Patuxent River runs along the installation's southwest corner. Two tributaries to the Little Patuxent River, the Midway Branch and Franklin Branch flow south through the installation.

3.1 AIR QUALITY

The proposed project site of the BGE Substation - 9500 Area is located in Anne Arundel County, which is included in the Metropolitan Baltimore Intrastate Air Quality Control Region (AQCR). This Proposed Action is a Federal action and falls under the Record of Non-Applicability (RONA) category for Clean Air Act Conformity Determination. Federal actions may be exempt from conformity determinations if they do not exceed the designated *de minimis* threshold levels for criteria pollutants (40 CFR Part 51.853[b]), as determined through the current National Ambient Air Quality Standards (NAAQS).

The entire State of Maryland is located within the Ozone Transport Region and the Metropolitan Baltimore Intrastate AQCR is designated as a moderate ozone (8-hour) non-attainment area, but because ozone forms from other emissions, the air quality analysis focuses on ozone precursor pollutants. Criteria pollutants within the Metropolitan Baltimore Intrastate AQCR include:

- nitrous oxides (NOx)
- sulfur oxides (SOx)
- volatile organic compounds (VOCs)
- particulate matter (PM) less than 2.5 microns (PM2.5)
- particulate matter less than 10 microns (PM10)
- carbon monoxide (CO)

The applicable criteria pollutant emissions (direct or indirect) *de minimis* thresholds for the project are as follows: For both particulate matter PM2.5, the final rule established by the USEPA is 100 tons per year (TPY) as the threshold emissions level in areas under nonattainment for direct emissions. This 100 TPY emissions level is applicable separately to each of the precursors that form PM-2.5, such as SOx, NOx, VOCs, and ammonia. Neither the USEPA nor State of Maryland, however, has found PM-2.5 problems in the Baltimore air shed to be caused by VOCs or ammonia. Therefore, ammonia is not further addressed by the EA; while the VOC emissions are addressed (VOC is addressed as an ozone precursor). Within the Ozone Transport Region, VOCs can't exceed 50 TPY. Particulate matter (PM10) and CO are classified under the major source threshold and cannot exceed 250 TPY. *Table 3.1* lists the emissions threshold levels.

Table 3-1 Air Emissions Threshold Levels for Criteria Pollutants

Criteria Pollutant	*De minimis* Level (tons/year)	Major Source Level (tons/year)
Volatile Organic Compounds (VOCs)	50	
Nitrous Oxides (NOx)	100	
Sulfur Oxides (SOx)	100	
Particulate Matter (PM2.5)	100	
Particulate Matter (PM10)		250
Carbon Monoxide		250

3.2 BIOLOGICAL RESOURCES

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as the biological resources. For the purpose of discussion, the biological resources have been divided into the areas of vegetation, wildlife, threatened and endangered species, and environmentally sensitive habitat. Water resources and wetlands are covered in *Section 3.9*.

Area impacted by the Proposed Action has been identified as Green Infrastructure. Maryland's green infrastructure was mapped into hubs and corridors using satellite imagery, road and stream locations, biological data, and other information. Hubs are typically unfragmented forest areas hundreds or thousands of acres in size, and are vital to maintaining the state's ecological health. They provide habitat for native plants and animals, protect water quality and soils, regulate climate, and perform other critical functions. Corridors are linear remnants of natural land such as stream valleys and mountain ridges that allow animals, seeds, and pollen to move from one area to another. They also protect the health of streams and wetlands by maintaining adjacent vegetation. Preserving linkages (corridors) between the remaining blocks of habitat (hubs) will ensure the long-term survival and continued diversity of Maryland's plants, wildlife, and environment. The project-specific Green Infrastructure Hub and Corridor is shown in *Figure 3.1*

3.2.1 Vegetation

The vegetation within and adjacent to the proposed action is mostly forested. A Forest Stand Delineation was performed and stands were classified in accordance with the DNR *State Forest Conservation Technical Manual, (1997 third edition).* The definition of a forest stand according to reviewing agencies is a biological community dominated by trees and other woody plants covering a land area of 10,000 square feet or greater and includes areas that have at least 100 trees per acre with at least fifty percent of those having a two-inch or greater diameter at breast height. Stands were rated on a scale of poor, fair, good, or priority, based on stand composition, structure, condition, and function. Stands which serve a buffering function to maintain or enhance water quality protection are considered priority for retention.

Sixteen forest stands were identified within and adjacent to the proposed action. The southern duct bank corridor from Russett to the 9500 Area Substation is comprised of mid-successional stage

mostly hardwood deciduous forests in fair to priority condition. The 9500 Area includes forest stands that are mid- to late-successional stage, deciduous, hardwoods in good to priority condition. The duct bank corridors along MD 32 include stands that are early to late-successional mixed deciduous forests. The stands in this corridor are in poor to priority condition. Specimen trees (greater than or equal to thirty inches diameter at breast height) are present in most of the stands. A summary of the stands' characteristics are provided in *Table 3-2*, and a detailed description of each stand can be found in the Vegetation Summary included as Appendix C to this report.

Three forest stands are rated priority based on structural diversity, canopy cover, species composition, organic matter accumulation, density, presence of multiple layers, potential for wildlife habitat, occurrence as Green Infrastructure (hub and corridor), lack of invasive plants, and function as wetland, stream, and steep slopes buffer. These stands include Forest Stand 2, 4, and10 in the technical report. Forest Stands 2 and 4 are located in the eastern extent of the southern duct bank corridor, north of Old Portland Road and MD 198. Forest Stand 10 is located on the southern portion of the 9500 Area. Portions of many of the stands rank priority for retention based on their function as forested nontidal wetlands, buffer to nontidal wetlands, or bottomland/floodplain along the Little Patuxent River; however, they are priority only within the buffer or floodplain and are reduced in rank outside the buffer.

Table 3-2 Vegetative Characteristics of Forest Stands within the Proposed Action

Forest Stand	Area (AC)	Type	Successional Stage	Dominant Species	Quality	Presence of Invasives[1]	Specimen Trees	Topo-graphy	Rank[2]
1	5.5	Hardwood / Conifer	Late - Mid	Mixed Oak / Pine	Good	C – 0% U – 0% G – 5%	Yes	Upland Mod. SW slopes	I
2	0.7	Hardwood	Late - Mid	Black Oak / Chestnut Oak	Priority	C – 0% U – 0% G – 0%	Yes	Upland Mod. NE slopes	I
3	0.53	Conifer	Early	Virginia Pine	Fair	C – 0% U – 0% G – 1%	No	Hilltop Terrace	III
4	5.5	Hardwood	Mid	Tulip Poplar / Mixed Oak / Sweetgum	Priority	C-0% U-0% G-0%	No	Bottom-land	I
5	1.13	Hardwood	Early	White Oak / Sweetgum / American Beech	Fair	C-0% U- -0% G- 0%	No	Flood-plain	II
6	0.82	Hardwood	Early	Green Ash / Cottonwoo d / Sweetgum	Fair	C – 0% U – 0% G – 10%	No	Bottom-land	II
7	1.5	Mixed Hardwood	Mid	Tulip Poplar / Red Oak / American Sycamore	Good	C- 0% U- 0% G-2%	Yes	Flood-plain	I
8	0.92	Hardwood	Mid	Mixed Oak	Fair	C- 0% U- 0% G- 2%	No	Upland Gentle SW slopes	II
9	0.25	Conifer / Hardwood	Mid - Late	Virginia Pine / Tulip Poplar / American Beech	Good	C – 0% U – 0% G – 0%	No	Upland Terrace	I
10	8.49	Hardwood	Mid-Late	Mixed Oak	Priority	C-0% U-0% G-5%	Yes	Bottom-land Terrace	I
11	7.55	Hardwood	Mid	Tulip Poplar / Sweetgum	Good	C-0% U-5% G-15%	Yes	Upland Mod. S & W slopes	I
12	2.75	Mixed Hardwood	Mid	Tulip Poplar / Sweetgum / Sycamore	Good	C-0% U-10% G-10%	Yes	Hilltop Terrace	I
13	1.25	Mixed Hardwood	Early	Sweetgum / Red Maple / Black	Fair	C- U- G-	No	Upland Terrace	II

				Cherry					
14	1.1	Hardwood	Mid-Late	Mixed Oak /American Beech	Good	C-0% U-0% G-5%	Yes	Flood-plain Terrace	I
15	1.1	Hardwood	Early-Mid	Red Maple / Swamp Tupelo / Sweetgum	Good	C- U- G-	No	Bottom-land	I
16	0.9	Mixed Hardwood	Mid	Mixed Oak / Tulip Poplar, Beech	Fair	C- U- G-5%	Yes	Upland Gentle NW slopes	I

1. C = Canopy; U = Understory; G = Groundcover
2. I – High retention priority b/c of buffer function for streams, wetlands, and steep slopes; wildlife habitat function; mature, contiguous forest stands
   II – Moderate retention priority b/c of good forest structural diversity, stream buffer and habitat corridor function, contains specimen trees
   III – Low retention priority b/c poor forest structural diversity, and none of the characteristics above

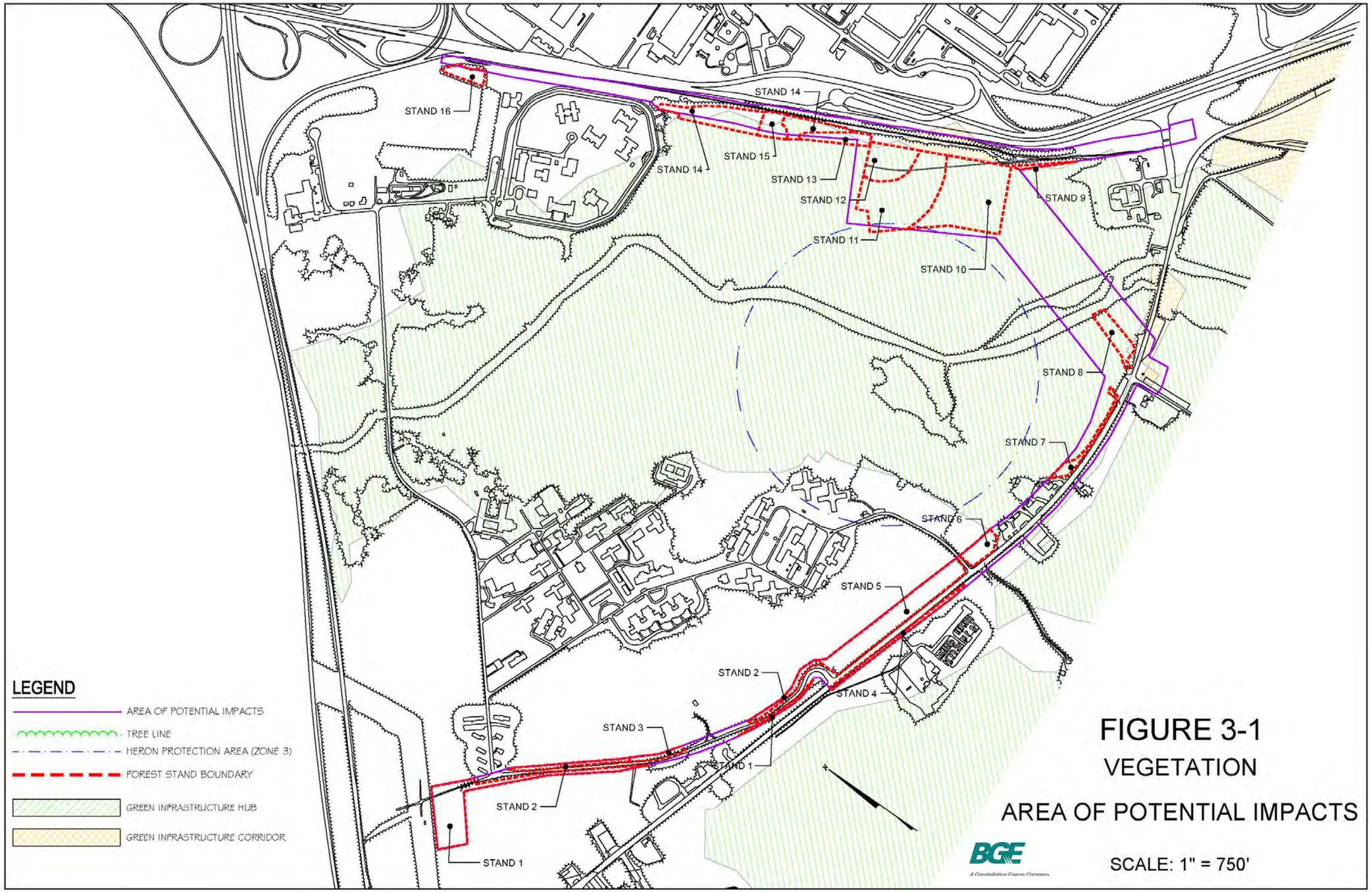


FIGURE 3-1
VEGETATION
AREA OF POTENTIAL IMPACTS

FGGM intends to maintain a campus like environment and protect forested areas to the maximum extent practical in accordance with the Maryland Forest Conservation Act (FCA) while continuing to sustain and support current and future missions. FGGM manages its Forest Conservation Program in accordance with the Maryland Department of Natural Resources (MDNR). The installation supports Army, federal, state, and local laws, regulations, policies, and initiatives to the fullest extent possible (USACE Mobile District 2007).

In keeping with the FCA standards, FGGM requires that the equivalent of 20% of the project area be forested. All projects 40,000 square feet or larger must comply with the FGGM policy. The project area will be defined as the area within the potential limit of disturbance. As per the FCA it does not matter if trees were there or not, 20% will be preserved or established. Preference is also given to contiguous areas of forest. Forestation that cannot feasibly be performed within the project area shall be performed on other designated land areas within FGGM. FGGM participates in the Army's conservation reimbursable and fee collection program for forestry. This program exists to provide ecosystem-level management that supports and enhances the land's ability to support each installation's respective military missionscape, while simultaneously obtaining ecologically responsible results that satisfy all federally mandated requirements for natural resources. Program revenues are generated through the sale of forest products. The fair market value of all forest products removed for the development of the substation shall be deposited into the Army's Forestry Account which will be utilized for natural resource activities and ecosystem management at Army Installations.

3.2.2 Wildlife / Threatened and Endangered Species

Wildlife species found within the vicinity of the project area are representative of those found in mature hardwood forests. Species observed at the site during field work included white-tailed deer, gray squirrel, rabbit, red fox, wild turkey, eastern bluebird, dark-eyed junco, black-capped chickadee, catbird, and downy woodpecker. A complete listing of flora and fauna species observed at FGGM is provided in the Flora and Fauna Surveys (U.S. Army Corps of Engineers, Baltimore District, December 2009; U.S. Army Garrison Fort George G. Meade, Anne Arundel County, Maryland.)

No federally listed or proposed endangered or threatened species are known to occur on FGGM (USASMDC 2011). Rare, threatened, and endangered species habitat searches performed in 1993-1994 (EcoScience Professionals and C.A. Davis, 1994) and in 2001 (Eco-Science Professionals) as well as a 2009 Flora and Fauna Survey (USACE Baltimore District 2009) did not identify federally listed endangered or threatened species on FGGM.

State-listed species are not protected under the Endangered Species Act; however, whenever feasible, the installation cooperates with State authorities in an effort to identify and conserve State-listed species (Army and Air Force Exchange Service, 2006). It is important to note that the nearby Little Patuxent River is known to support occurrences of some state-listed threatened species. *Table 3-3* lists the State List of rare, threatened, and endangered flora and fauna species in the vicinity of FGGM and *Table 3-4* lists the odonate species (dragonflies and damselflies) in the vicinity. The Little Patuxent River south of the proposed site supports one of only two populations of the State endangered Glassy darter *(Etheostoma vitreum)* in Maryland. The Glassy darter is a member of the Perch family named for its translucent body. It is relatively common immediately below the Fort Meade Dam adjacent to MD 198. Various species of herring and shad are also seen regularly in the Little Patuxent (Francis, 2006).

Table 3-3 State List of Rare, Threatened, and Endangered Species in the Vicinity of Fort George G. Meade

Scientific Name	Common Name	MD Natural Heritage Program
Flora		
Aronia prunifolia	Purple chokeberry	Watch list
Lespedeza stuevei	Downy bushclover	Watch list
Panicum leucothrix	Roughish panicgrass	Possible rare, but status uncertain
Fauna		
Etheostoma vitreum	Glassy darter	Threatened

Source: Maryland Department of Natural Resources, 2007

An archival analysis was conducted of the DNR's geographical information data base for sensitive species areas. The data base identifies the greater area as potential habitat for State Listed Species, but Federal Listed Species were not identified. Specific to the Proposed Action area, no federally listed or state listed rare, threatened or endangered species were observed on-site during site visits. The potential high quality habitat within the Proposed Action area warranted a rare, threatened and endangered species review from DNR. The project team will also request an additional review of the duct bank alignments during the permitting process. As a result of the request for further information from DNR, the Wildlife and Heritage Service responded with an environmental review summary dated March 28, 2011. The Wildlife and Heritage Service's database indicates that there is a Great Blue Heron colony documented within approximately ¼-mile of the project site. This is not a rare, threatened, or endangered species and is covered in Section 3.2.4 of this document.

Table 3-4 Odonate Species in the Vicinity of Fort George G. Meade, Maryland

Scientific Name	Common Name	State Status
Celithemis ornate	Faded Pennant	Historical
Celithemis martha	Martha's Pennant	Rare
Cordulegaster oblique	Arrowhead Spiketail	Rare
Epitheca costalis	Slender Baskettail	Rare
Gomphaeschne antilope	Taper-tailed Darner	Rare
Gomphus rogersi	Sable Clubtail	In Need of Conservation
Helocordulia selysii	Selys' Sunfly	Threatened
Libellula flavida	Yellow-sided Skimmer	Rare
Nehalennia integricollis	Southern Sprite	Rare
Nehalennia gracilis	Sphagnum Sprite	Rare
Ophiogomphus incurvatus incurvatus	Appalachian Snaketail	Endangered
Somatochlora filosa	Fine-lined Emerald	Rare
Somatochlora provocans	Treetop Emerald	Endangered
Stylurus Laurae	Laura's Clubtail	Rare

3.2.3 Aquatic Resources and Environmentally Sensitive Habitat

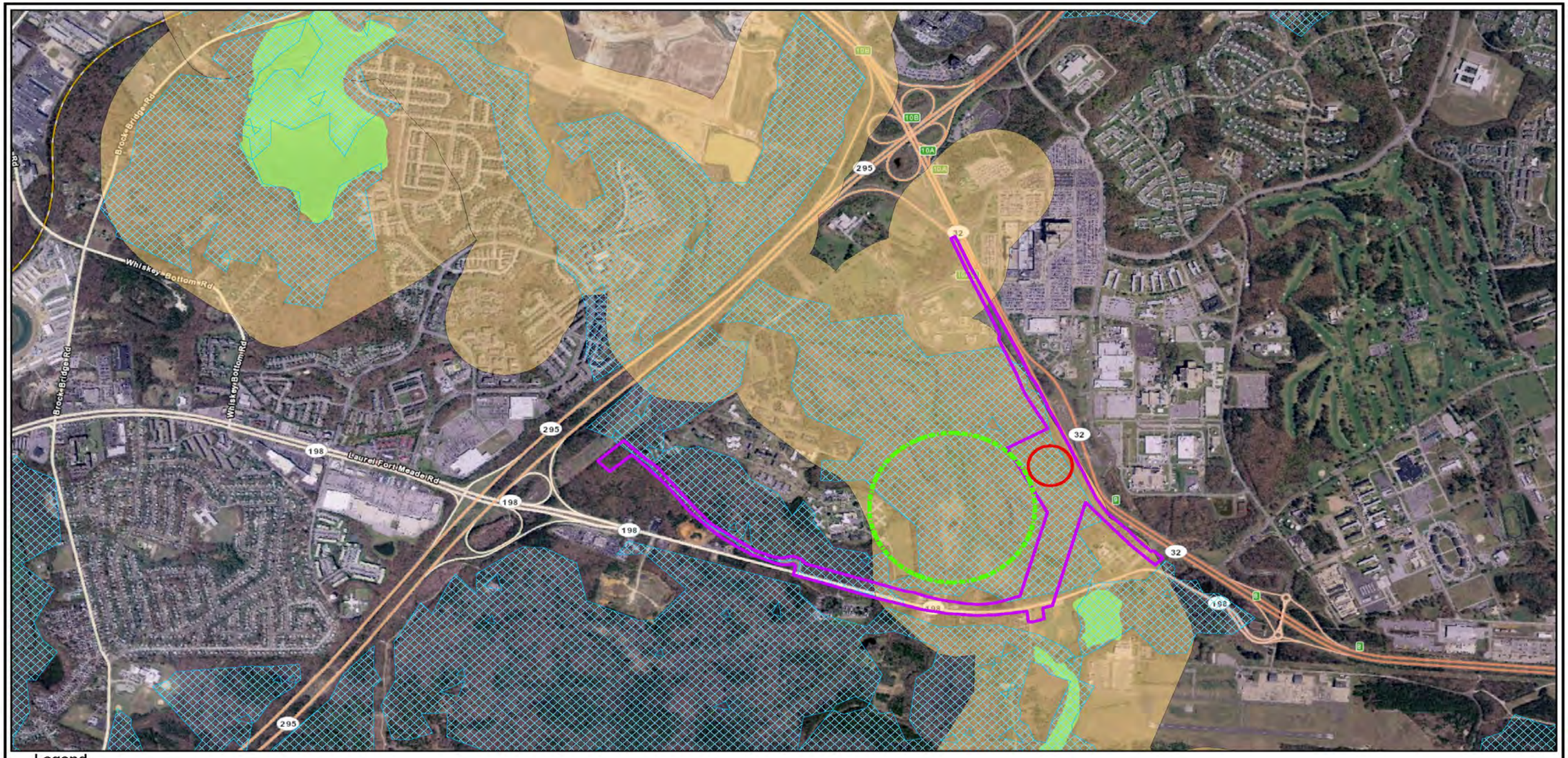
FGGM voluntarily maintains four Habitat Protection Areas (HPAs) on the installation. HPAs are self-designated sensitive areas. HPAs are included in FGGM's Integrated Natural Resource Management Plan and are protected as a Best Management Practice (BMP). FGGM coordinates with MD DNR and tries to avoid impacting these areas to the maximum extent practical. The proposed action is located adjacent to the Little Patuxent River Habitat Protection Area. The Little Patuxent River and its associated tributaries and small streams that flow though FGGM provide habitat for a number of aquatic organisms. Potential aquatic habitats were identified using Maryland Department of the Environment (MDE) database mapping and mapping provided by FGGM.

The Patuxent Research Refuge is located to the south of FGGM and to the east of the Baltimore-Washington Parkway and is one of over 500 refuges in the National Wildlife Refuge (NWR) System managed by the USFWS. It is currently the only NWR unit established to support wildlife research. A portion of the Little Patuxent River floodplain on the refuge, downstream of the project site is designated in state regulation as a Nontidal Wetland of Special State Concern (WSSC). This means that it is designated for special protection under the State's nontidal wetlands regulations, because it may contain the last remaining populations of native plants and animals or it is ecologically exceptional. Best Management Practices must be used when performing work in or in the buffer of the WSSC. The Patuxent Research Refuge supports a wide diversity of wildlife in forest, meadow, and wetland habitats. The land is managed to maintain biological diversity for the protection and benefit of native and migratory species. Increasing forest fragmentation in the area due to urban development has damaged many populations of neotropical migratory birds. The refuge is one of the largest forested areas in the mid-Atlantic region and provides critical breeding habitat and an important nesting area for these species (United States Fish and Wildlife Service, 2005)

The 9500 Area and part of the duct bank alignment has been identified as habitat for Forest Interior Dwelling Birds (FIDS) by Maryland DNR. FIDS require large forest areas to breed successfully and maintain viable populations. Populations of some forest bird species have been declining during the last 30-40 years. While many factors have contributed to the decline of FIDS populations, the loss and fragmentation of forest on the breeding grounds here in North America appear to play a critical role. Most FIDS require relatively large unbroken forests to live and successfully reproduce. Forest fragmentation reduces the size of forest patches, reducing the total area of contiguous habitat available to birds and increases the isolation of habitat, reducing the quality of that which remains. Forest interior refers to the area in the center of the forest greater than 300 feet from the forest edge. Edge habitat is the forest area within 300 feet of a forest edge. Interior habitat functions as the highest quality breeding habitat for FIDS. When a forest becomes fragmented, areas that once functioned as interior breeding habitat are converted to edge habitat and are often associated with a substantial reduction in the number of young birds that are fledged in a year. Higher rates of nest predation occur in forest edges.

The Maryland Wildlife and Heritage Service's database indicates that there is a Great Blue Heron colony within approximately ¼-mile of the project site. This colony was documented as being active in 2003 but there is no recent data available as to its current status. The approximate location of the colony site is indicated in *Figure 3-2*.

Great Blue Herons establish nesting colonies in forested areas that are relatively predator and disturbance free. Colony sites are often adjacent to water, in forested non-tidal wetlands and/or floodplains. Colony sites are very uncommon: all of Maryland's Great Blue Heron population nests at fewer than 50 locations. As Maryland continues to grow and develop, secure nest sites for Great Blue Herons will become scarcer. Mortality of chicks or eggs resulting from disturbance of the colony during the breeding season is a violation of the U. S. Migratory Bird Treaty. Disturbance includes actions such as cutting nearby trees or nearby construction that causes abandonment of chicks by the adults. Whenever possible, Great Blue Heron colony sites should be conserved as part of responsible land stewardship.



Legend

- AREA OF POTENTIAL IMPACTS
- POTENTIAL FIDS
- WETLANDS OF SPECIAL STATE CONCERN
- POTENTIAL STATE LISTED SPECIES
- HERON COLONY ¼ MILE PROTECTION ZONE
- 9500 AREA SUBSTATION

MARYLAND DNR SENSITIVE SPECIES

BGE

N W E S

Figure 3-2

1 IN= 1,500 FT

3.3 GEOLOGY AND SOILS

Geology and soils include those aspects of the natural environment related to the earth, which may be affected by the Proposed Action. These features include physiography, geologic units and their structure, the presence/availability of mineral resources, soil condition and capabilities, the potential for natural hazards and topography.

3.3.1 Geology

FGGM lies in the Atlantic Coastal Plain Physiographic Province. The Installation is underlain by a wedge-shaped mass of unconsolidated sediments that thickens to the southeast. Beneath the sediments is crystalline rock of Precambrian to early Cambrian age (Fort Meade Directorate of Public Works, 2007). The low elevation point occurs along the Little Patuxent River. The alluvium that underlies all of the rivers and wetlands in the project site area consists of interbedded sand, silt, and clay with gravel inclusions. These latter areas have been altered so severely that their association with a soil series is impossible to determine.

3.3.2 Topography

The topography around FGGM is gently rolling, with approximately 210 feet of topographic relief. The highest point reaches 310 feet mean sea level (msl) and occurs at the 1st Army Radio Station Tower in the northern-most central part of the installation. The lowest elevation, less than 100 feet msl, occurs in the southwestern corner of FGGM, along the Little Patuxent River (Fort Meade Directorate of Public Works, 2007). The land characteristics at the proposed 9500 Area are suitable for building, having gradual slopes, generally less than 7 percent.

The terrain along the duct bank corridor from Russett to the 9500 Area is a mix of moderate to steep sloping hills in the western portion of the study area along Old Portland Road. The terrain transitions in the east from gentle to nearly level northeast facing slopes toward the Little Patuxent River. Elevations range from 118 feet above mean sea level (MSL) to 256 feet above MSL with maximum slopes of up to twenty (20) percent.

3.3.3 Soils

FGGM has 39 distinct soil mapping units according to the U.S. Department of Agriculture's Fort George G. Meade Soil Survey (U.S. Army Corps of Engineers, 2007). Soils at sites selected by the Directorate of Public Works for construction are considered clean unless during excavation activities unforeseen conditions are encountered such as odor, staining, or the presence of waste materials. These soils must be segregated from other soils. Soils at FGGM have naturally occurring levels of the metal arsenic, which is also typical to this region of Maryland. (Fort Meade Directorate of Public Works Environmental Division, 2009)

Soil survey information was obtained from the U.S. Department of Agriculture Natural Resources Conservation Service (formerly Soil Conservation Service) for Anne Arundel County, Maryland. The characteristics of the soil types found on the site are summarized in *Table 3-5*. Soils on the site consist of Downer-Hammonton complexes, Downer-Hammonton-Urban land complex, Fallsington sandy loam, Udorthents, Woodstown sandy loams and offsite in the floodplain of the Little Patuxent River are Zekiah and Issue soils. The Zekiah, Fallsington, Corsica, Widewater, and Longmarsh are hydric components of these soils.

Table 3-5 Soil Map Characteristics for Project Area

[1] Group A – Soils having a high infiltration rate when thoroughly wet.

Group B – Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils.

Group C – Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture.

Soil Map Unit Symbol	Map Unit Name	Drainage Class	Hydrologic Soil Group[1]	Flooding Frequency	Foundation Support	Hydric Rating
CcrB	Christiana-Sassafras complex,	Moderately well drained	C	None	Very limited	Not hydric
CcrC	Christiana-Sassafras complex,	Moderately well drained	C	None	Very limited	Not hydric
DvB	Downer – Hammonton complex,	Well drained	B	None	Not limited	Not Hydric
DvC	Downer – Hammonton complex,	Well drained	B	None	Very limited	Not Hydric
DwB	Downer – Hammonton – Urban complex, 0 – 5%		B	None	Not rated	Not Hydric
FaA	Fallsington sandy loam, 0 – 2% slopes	Poorly drained	B/D	None	Very limited	Partially Hydric
PgB	Patapsco-Fort-Mott-Urban complex, 0-5% slopes	Somewhat Excessively	A	None	Somewhat limited	Not Hydric
RhD	Russett-Christiana-Hambrook,	Moderately well drained	C	None	Very limited	Hydric
UoB	Udorthents, loamy, 0 – 5% slopes	Well drained	B	None	Not limited	Not Hydric
UpC	Udorthents, reclaimed gravel pits	Well drained	C	None	Very limited	Not Hydric
W	Water			None	Not rated	Unknown Hydric
WdA	Woodstown sandy loam, 0 – 2% slopes	Moderately well drained	C	None	Somewhat limited	Partially Hydric
WrB	Woodstown-Urbanland complex, 0-5% slopes	Moderately well drained	C	None	Very limited	Hydric
ZBA	Zekiah and Issue soils, 0 – 2% slopes, frequently	Poorly drained	D	Frequent	Very limited	Partially Hydric

Group D – Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material.

If a soil is assigned to a dual hydrologic group (B/D, etc.), the first letter is for drained areas and the second is for undrained areas.

3.3.4 Seismic Activity

FGGM is located in a zone of low seismic activity. There are no important folds, faults, or joint systems that would indicate recent structural disturbances.

3.3.5 Prime and Unique Farmland

Of the soils identified at FGGM, only the Woodstown Sandy Loam, which covers approximately 1.8 percent of the installation is considered either prime farmland soil, or farmland soil of statewide importance, as determined by the Natural Resources Conservation Service (NRCS) (Resources Conservation Service). Prime farmland, as defined by the U.S. Department of Agriculture (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. This land could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. Although there are soils within the installation classified as Prime Farmland soils, acquisition or use of farmland by a Federal agency for national defense purposes is exempted by section 1547(b) of the Farmland Protection Policy Act, and as a result, it is not regarded as prime farmland.

3.4 HAZARDOUS MATERIALS AND WASTE

In general, hazardous substances (materials) and wastes are defined as those substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, would present substantial danger to public health and welfare or to the environment when released into the environment.

3.4.1 Hazardous Materials

FGGM's Environmental Division coordinates and inventories hazardous materials and the disposal of hazardous waste. Emergency response to spills of hazardous waste and materials is conducted through on-site coordinators, the installation's fire department, and the installation's hazardous materials team. FGGM operates under a Spill Prevention Control and Countermeasures Plan (SPCC Plan)/Installation Spill Contingency Plan (ISCP) for all facilities where hazardous materials are stored. The SPCC/ISCP Plan delineates measures and practices that require implementation to prevent and/or minimize spill/release from storage and handling of hazardous materials to protect ground and water surfaces. In accordance with State and Federal law and Army regulations, the SPCCP/ISCP is updated at least every 3 years, or when significant changes in operations occur that could impact the likelihood of a spill. FGGM has also prepared an *Installation Hazardous Waste Management Plan (*2011). Those who handle or manage hazardous materials or hazardous waste are trained in accordance with Federal, State, local, and Army requirements. Each facility has appointed an emergency management coordinator, who is responsible for emergency response actions until relieved by hazardous materials spill response personnel.

The ISCP provides emergency response instructions for spills and uncontrolled releases of hazardous materials. Instructions include notification, probable spill routes, control measures, exposure limits, and evacuation guidelines. Material Safety Data Sheets (MSDS) that provide information about health hazards and first-aid procedures are included in the ISCP.

The USEPA's Facility Registration System was checked for identification of additional potential hazardous sites within the project area. The database revealed two sites within the vicinity of the project area, but none within the potential limit of disturbance area. The sites are listed below:

- Laurel Auto Body – an automotive body, paint, interior repair and maintenance business,

currently located on MD 198 near the BW Parkway interchange, but was once located at 3227 Fort Meade Road (MD 198), and is listed in the Maryland-Resource Conservation and Recovery Act database (MD-RCRA) in the Hazardous Waste Program

- Forest Haven – site located within the DC Childrens Center property, listed in the Maryland-Resource Conservation and Recovery Act database (MD-RCRA) in the Hazardous Waste Program

3.4.2 Hazardous Waste

FGGM generates relatively small quantities of a variety of hazardous wastes, and is regulated as Hazardous Waste Generator ID No. MD 9210020567. Procedures for handling, storage, transportation, and disposal of hazardous materials and wastes are outlined in the *Installation Hazardous Waste Management Plan, Fort George G. Meade* (FGGM, 2011). The plan also outlines command responsibilities, identification procedures, inspections, personnel training, and spill response and emergency procedures.

Hazardous wastes are maintained at satellite accumulation areas on FGGM. After these facilities have reached regulated capacities (55-gallon drum for hazardous waste, 1 quart for acutely hazardous waste), the hazardous waste is transported to the Controlled Hazardous Substance Storage Facility (Building 2250). In accordance with USEPA and MDE regulations, a running inventory of hazardous waste is maintained at the storage facility.

Sludge disposed of from the WWTP requires a Sewage Sludge Utilization Permit (SSUP) to be obtained from the MDE by the contractor handling the sludge. SSUPs are required for any person who collects, incinerates, stores, treats, applies to land, transports, or disposes of sewage sludge or septage. The purpose of the permit is to maintain a degree of safety, since sludge contains pathogens that can be harmful to human health. The process to obtain a sewage sludge utilization permit typically lasts at least 10 months. It involves regular testing, monitoring, and paperwork (Freij, 2006).

Non-hazardous solid waste generated on FGGM is transported off the installation by a contractor and disposed of at permitted landfills.

3.4.3 Installation Restoration Program

The Department of Defense (DoD) established the Installation Restoration Program (IRP) in 1975 to provide guidance and funding for the investigation and remediation of hazardous waste sites caused by historical disposal activities at military installations. The fundamental goal of the FGGM IRP is to protect human health, safety and the environment. The IRP is carried out in accordance with all federal, state and local laws. The primary federal laws are Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Superfund Amendments and Reauthorization Act (SARA). In 2009, FGGM signed a Federal Facility Agreement (FFA) with the U.S. Environmental Protection Agency (EPA), U.S. Department of the Interior (DoI) and U.S. Architect of the Capitol (AoC). This document establishes the role that FGGM and the EPA each play in the restoration of the installation and the formal mechanisms of this process. The IRP's staff works closely with the EPA, MDE and local government agencies to ensure that cleanup processes are conducted properly and efficiently. The staff also receives input from community groups and nearby residential areas.

There are no active IRP sites within the planned area of disturbance for this project. There are, However, two active IRP sites within close proximity (Possible Dump Site G - 1957 and Waste Water Treatment Facility). Both of these IRP sites are currently under investigations with the nature and extent of potential soil and/or groundwater contamination currently being unknown. Based on preliminary review of these sites, the FGGM Environmental office does not anticipate that any potential contamination from these two sites will impact this project.

3.4.4 Military Munitions Response Program

The DoD recognizes its responsibility to protect the public from the potential hazards associated with military operations, both past and present. This is particularly true with regard to DoD's use of military munitions in training and testing. To address munitions-related issues and the potential hazards munitions pose on property that the DoD once used, DoD developed the Military Munitions Response Program (MMRP). The MMRP addresses non-operational range lands that are suspected or known to contain unexploded ordnance (UXO), discarded military munitions (DMM) or munitions constituent (MC) contamination.

There are no known active MMRP sites within the planned area of disturbance for this project.

3.5 CULTURAL RESOURCES

Section 106 of the National historic Preservation Act and the Maryland Historical Trust Act of 1985 require federal and state agencies to consider the effects of construction projects on historic and archeological properties through a consultation process known as “Section 106 Review”. The Maryland Historical Trust (MHT), Maryland’s State Historical Preservation Office (SHPO), plays a key consultation role in the Section 106 Review.

3.5.1 Historic Sites

Archival research and subsequent coordination with the MHT did not reveal any sites listed as National Register Eligible for Historic Places within the 9500 Area of FGGM. Field investigations also verified that there were no historic standing structures identified within those locations. There are no sites listed as National Register Eligible for Historic Places within the remainder of the Proposed Action area on FGGM.

3.5.2 Archaeological Sites

Archival research did not reveal any documented archeological sites within the 9500 Area and MHT concurred with this finding. However, a 1919 FGGM Installation map shows a 48-acre portion of the 9500 Area to be owned by Leland Dyke and vaguely identifies a small “cemetery” plot area between FGGM monuments #44 and #45 along the northernmost boundary of the exiting FGGM property. Investigations of deeds and plats revealed that the cemetery plot was instead a burial lot and that the land associated with the burial lot was not conveyed to the federal government with the Leland Dyke property in 1919. An extensive search undertaken by FGGM staff to locate the Dyke family graveyard using GPR technology showed no evidence of graves within the subject site area. Additionally, ancestry research resulted in locating the Dyke family burial sites in the Woodlawn Cemetery in Baltimore County, Maryland.

3.6 INFRASTRUCTURE

Infrastructure addresses transportation routes and those facilities and systems that provide water, wastewater treatment, collection and disposal of solid waste, and power.

3.6.1 Transportation

The region of influence for transportation encompasses FGGM and the roadways within approximately 1 to 2 miles of the Installation. FGGM is located in the western part of Anne Arundel County and is served by the surrounding roadway network. Access to FGGM is obtained through 10 control points, 8 of which are open and staffed on a regular basis. FGGM can be directly accessed (via secured gates) from MD 32, MD 175, Fort Meade Road (MD 198), and the Baltimore-Washington Parkway (which is designated as MD 295 north of MD 175).

3.6.2 On-Installation Roadways

Access routes through FGGM include Rockenbach Road, which extends from MD 175 south and west through FGGM to Canine Road and Samford Road, then to MD 32, and Mapes Road, which extends east from MD 32 through FGGM to MD 175. Internal circulation is provided through collector roadways such as Ernie Pyle Street, Mac Arthur Road, Cooper Avenue, Llewellyn Avenue, Reece Road, and Taylor Avenue. Most roads consist of one lane in each direction, with signals or stop signs (two-way, three-way, or four-way) at most intersections.

3.6.3 Public Transportation

Although it lacks direct access, FGGM is relatively close to several public transportation hubs, separated below by mode:

- Air: Baltimore Washington International—Thurgood Marshall Airport is approximately 10 miles from FGGM.
- Metro (Baltimore): Maryland Transit Administration's (MTA) Metro heavy rail system provides high-speed transit service in a 15.5-mile corridor from Owings Mills in western Baltimore County through downtown Baltimore to Johns Hopkins Hospital.
- Light Rail (Baltimore): MTA's Central Light Rail Line provides high-frequency, medium-speed transit service along a north-south 30-mile corridor from Baltimore County to Anne Arundel County. Intercity and Commuter Rail: MTA's MARC service provides high-speed, medium frequency commuter rail service in the Baltimore–Washington region and beyond.
- Amtrak: With Amtrak stations in Washington, DC, Baltimore, and BWI, connections can be made throughout the country.
- Metro (Washington): The Washington Metropolitan Area Transportation Authority (WMATA) Metro system can be accessed at the New Carrollton station, approximately 19 miles from the Installation, and at the Greenbelt station—almost 25 miles by road because of the orientation of the access roads to the station.
- Bus Service: MTA, WMATA, and Central Maryland Regional Transit (CMRT) Connect-A-Ride (sponsored by Anne Arundel and Howard Counties) provide a variety

of public bus services in the vicinity of FGGM. Only one route, however, (K Route) currently directly serves FGGM. Similarly, the F Route is the only route that serves MPO. There are however, several new shuttle bus routes connecting facilities on the Installation with the Odenton and Savage MARC stations, but they can be accessed by badged personnel only.

3.6.4 Potable Water Systems

American Water owns and operates FGGM's potable water system through a water treatment plant (WTP) located within the FGGM boundary, which receives its potable water from groundwater sources. Three aquifers underlie FGGM, the lowest of which, the Patuxent Aquifer with a thickness of 200 - 400 feet below the installation, provides potable water for the installation. The primary sources of potable water at FGGM are six groundwater wells on the south side of the installation. Drinking water is tested according to permit requirements (USACE Mobile District 2007). American Water's WTP will provide the source for the new potable water system that is required for the substation's fire suppression system, in accordance with safety regulations. The fire suppression system will be designed concurrently with the detailed design of the substation and may require additional NEPA review and documentation..

This WTP is a multimedia filtration plant that contains three above-ground clear well storage tanks and seven active water storage tanks. The treated water distribution system transports the water, approximately 3.4 million gallons per day (MGD), from the WTP to the Installation for domestic, industrial and fire protection water. Capacity upgrade plans for this WTP are currently being designed. Major upgrades were last implemented in 1986. All water generated at FGGM is also processed at the WWTP, and is discussed in the 'Wastewater' heading within *Section 3.6* of this EA.

3.6.5 Natural Gas

FGGM is supplied with natural gas by BGE via high pressure mains, which form a loop around the installation. The natural gas distribution system at FGGM is extensive and runs throughout the installation. BGE is installing new gas infrastructure that is replacing the government's current system. New gas-fired boilers installed throughout the installation have replaced old centralized oil-fired boilers. (Versar, 2005)

3.6.6 Stormwater Drainage

FGGM's storm drainage system consists of two major defined watersheds and one minor undefined watershed. These three natural drainage areas are supplemented with an extensive network of storm drain pipes and attendant drainage structures supplemented by swales, ditches, other drains, and retention ponds. These drainage areas are generally north-south (NS) oriented, emanate in the northern portion of the installation, and ultimately discharge into the Little Patuxent River, a tributary of the upper Chesapeake Bay (FGGM, 2005). The State of Maryland has stringent standards to protect the Chesapeake Bay watershed's valuable water resources. Provisions of the Code of Maryland Regulations 260901-260902 require that all jurisdictions within the State implement a stormwater management program to control the quality and quantity of stormwater runoff resulting from new development. The regulations require that the release rate from newly developed areas not exceed the rate generated by the site under undeveloped

conditions. Furthermore, FGGM maintains a Stormwater Pollution Prevention Plan (SWPPP) that establishes BMPs for controlling and preventing siltation and other contaminants associated with construction and industrial activity sites from reaching area surface waters.

3.6.7 Wastewater

All wastewater generated by FGGM, the MPO Complex and the D.C. Children's Center is conveyed to the WWTP located south of MD 32, immediately east of the proposed substation site. In August of 2010, American Water was awarded the contract for ownership, operation and maintenance of the WWTP, which currently has the capacity to process and treat 4.5 MGD of wastewater. The maximum flow to the plant typically occurs during wet weather. Once treatment of the wastewater is complete, the majority of the treated water is discharged into the Little Patuxent River, just downstream of the low water dam and north of the Simonds Bridge (FGGM, 2011).

The primary wastewater discharge point in the Little Patuxent River is approximately 12 miles upstream from where the Little Patuxent River flows into the Patuxent River, and it is approximately 43 miles upstream of where the Rivers empty into the Chesapeake Bay. The discharged water is required to meet specific parameters in order to be considered in compliance with its MDE permit. These include, but are not limited to, a nitrogen load cap of 54,800 lbs/year, a total phosphorous cap of 4,112 lbs/year, a minimum dissolved oxygen level of 5.0 mg/l, and a pH range of 6.5-8.5, as well as Biological Oxygen Demand and fecal coliform levels.

The WWTP operates under a National Pollutant Discharge Elimination System (NPDES) Wastewater Treatment Plant Permit, which authorizes and regulates the plant's water discharge to the Little Patuxent River. Along with this primary permit, the WWTP also operates under two installation-wide permits—an NPDES Stormwater Discharge Permit which allows the discharge of stormwater from industrial facilities, and an NPDES General Discharge Permit which allows discharge of stormwater from maintenance and repair activities. Each of these three permits is issued by MDE. The WWTP has historically and is currently in compliance with all of its discharge standards and permit requirements (FGGM, 2010).

Pollution from wastewater treatment plants can occur when discharged wastewater is not in compliance with local, State, or Federal standards. This is common in the Chesapeake Bay watershed, but, as stated earlier, the WWTP has consistently been in compliance with all of its operational permits.

3.6.8 Solid Waste Management

No active landfills are located on FGGM; all solid waste is transported to a permitted facility located off the Installation. Solid wastes are currently collected and disposed of under the base operations contract with Melwood.

3.6.9 Electricity

BGE provides the electricity used at FGGM. A 115kV transmission line brings electricity to Government-owned master substations on the installation. The existing primary source for approximately 79 percent of FGGM's power is a 110kV feederline from the BGE Waugh Chapel Power Station that is located along the southern and eastern sides of the installation along MD 32 in the immediate vicinity of the project site.

FGGM has privatized and is upgrading all on-installation electrical facilities. All aboveground distribution facilities previously operated by FGGM will be relocated underground as part of the BGE privatization upgrades.

3.7 LAND USE

This section addresses existing and proposed land use patterns within FGGM and vicinity, including the area being considered for the Proposed Action.

Current land use at FGGM includes housing, administrative, recreational, open space, troop housing, and industrial. Similar to other large military installations, FGGM has distinct zones based on prominent use. The northern section of FGGM consists primarily of military family housing with public schools. The southern section consists primarily of the administrative and industrial operations for the Installation. On the western edge of FGGM is the MPO campus, which conducts industrial and administrative functions (FGGM, 2005). A retail center is located in the center of the Installation, between the northern and southern sections. The former golf course will provide space for the proposed MPO campus expansion.

Approximately 800 of the 5,140 acres on FGGM are available for future development. Additional areas are expected to become available as older facilities are replaced or removed, and flat parking surfaces are replaced by parking structures. Current activities on the Installation include the support of more than 95 tenant units such as the Defense Information School Headquarters and the National Security Agency, Kimbrough Ambulatory Care Center, the Installation Exchange, the Commissary, barracks, and various family housing areas.

Land use categories within FGGM include 'professional/institutional', 'community', 'residential', 'industrial', 'troop', 'ranges' and 'training'. Based on the *Real Property Master Plan – Long Range Component, Fort Meade, MD*, the Proposed Action is located predominantly in the area designated as 'industrial' *(see Figure 3-3)*

The area along MD 198 is primarily designated as 'brush', but does contain small pockets of 'commercial', 'industrial' and 'open space – mature, deciduous, riparian forest'. The commercial area is comprised of six properties that front MD 198, including three operational businesses and one vacated business:

- Casey's Crab Company - a dine-in and carry-out seafood restaurant.
- Elite Autoservice Center – an automobile repair shop
- Fort Meade Service Center – an automobile repair shop with non-operational gas pumps
- Southern Style BBQ (closed)

The small piece of industrial land use is located off of Old Portland Road and is unimproved. The 9500 Area is entirely comprised of 'industrial' lands. The duct bank corridor area along MD 32 is a mixture of 'open space – mature, deciduous, riparian forest', 'institutional', 'pasture', and 'open urban land'. The institutional land is the DC Children's Center property (owned by the Federal Government) which abuts the existing SHA railroad corridor adjacent to eastbound MD 32 and directly across MD 32 from the MPO.

The Patuxent Research Refuge, established in 1936, lies to the south of MD 198, and contains a mix of deciduous forest, evergreen forest, brush and institutional lands. Contained within the institutional lands portion, on the southeast corner of the MD 198 and Bald Eagle Drive

intersection, are four baseball fields and are open to the general public at all times during the year through a permit. The Patuxent Research Refuge is managed through the U.S. Fish and Wildlife Service – Department of the Interior. The adjacent area is used for overflow parking to the baseball fields.

The master plan that governs future land use within the vicinity of the project area is the October, 2011 Long Range component of the *Real Property Master Plan Update*. That document recommends that the space currently designated as 9500 Area be reserved for industrial uses and tenants since it offers easy access to the MD 32 installation entrance currently used by industrial traffic. It also recommends expansion of the wastewater treatment facility and "other utilities" as needed in the area north of the existing wastewater facility. A separate section of the Master Plan refers to the proposed 9500 Area as being set aside for 'utilities expansion and wetlands preservation'.

3.7.1 On-Installation Recreation

FGGM offers a multitude of on-installation recreational services. Outdoor recreation includes Burba Lake, Camp Meade RV Park, Check-it-Out equipment rental, the Family Pet Center, and an RV storage lot. There are athletic and fitness centers, track, ball fields, jogging trail and a bowling alley. There are services that focus on children, youth and other family needs.

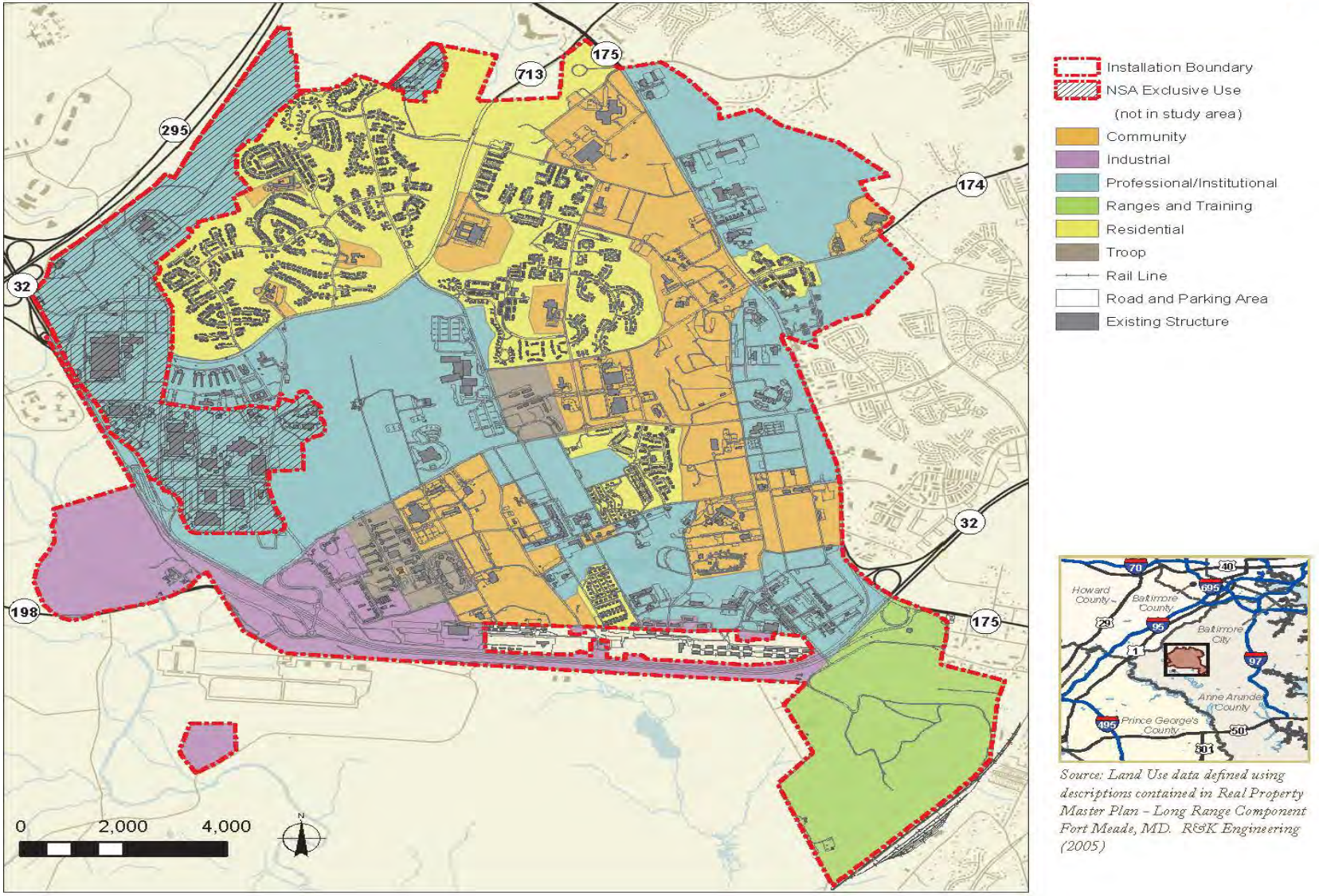
3.7.2 Landfills

There are no active landfills located on FGGM; as all solid waste is currently transported to a permitted facility located outside of the installation. A designated Clean Fill Dump is located in the Southeastern portion of the Installation, used from 1972 to 1985 for the disposal of miscellaneous debris and potential hazardous materials. There are other former landfills within the boundary of FGGM, such as the Manorview Dump Site near the location of the Manorview Elementary School. Both of these landfill locations are over a mile from the 9500 Area.

3.7.3 Prime and Unique Farmlands

Because there is no agricultural production within FGGM, no land within the installation is considered Unique Farmland.

Figure 3-3 Existing Land Use



Source: Land Use data defined using descriptions contained in Real Property Master Plan – Long Range Component Fort Meade, MD. R&K Engineering (2005)

3.8 SOCIOECONOMICS

Socioeconomics describes a community by examining its social and economic characteristics. Several demographic variables are analyzed to characterize the community, including population size, the means and amount of employment, and income creation. In addition, socioeconomics analyzes the fiscal condition of local government and the allocation of the assets of the community, such as its schools, housing, public services, and healthcare facilities.

The socioeconomic region of influence for FGGM consists of Anne Arundel County, Howard County, Montgomery County, and Prince George's County in Maryland. These counties comprise the area in which the predominant socioeconomic effects of the Proposed Action would take place. The geographical extent of the region of influence is based on residential distribution of the installation's military, civilian, and contracting personnel, and the location of businesses that provide goods and services to the installation and its employees. (U.S. Army Corps of Engineers, 2007).

3.8.1 Regional Economic Activity

The regional economy is dominated by non-farm industries such as Government and Government enterprises, retail trade, professional and technical services, and health care.

Installation Contribution to the Local Economy
FGGM is the number one employer in Anne Arundel County, employing 36,742. FGGM is projected to have a $5 billion per year economic impact on the regional economy. Following the BRAC process, FGGM became the site for the relocation and consolidation of several DoD organizations. As a result, 5,695 direct jobs will be consolidated to FGGM.

3.8.2 Population

Montgomery County is the most populous county within the region of influence and within Maryland. Howard County is the least populated county in the region of influence. Population data for the region of influence counties, Maryland, and the United States are presented in *Table 3-6* for comparison purposes.

Table 3-6 Population Growth Between 2000 and 2010

Location	2000 Estimated	2010 Population	Percent (%) Change
Montgomery County	873,341	971,777	11.3% increase
Anne Arundel County	489,656	537,656	9.8% increase
Prince George's County	801,515	863,420	7.7% increase
Howard County	247,842	287,085	15.8% increase
Maryland (State of)	5,296,486	5,773,552	9.0% increase
United States	281,421,908	308,745,538	9.7% increase

Source: U.S. Census Bureau, 2010

In 2010 the U.S. Census estimated a total population of 537,656 within Anne Arundel County, Maryland. Approximately 11.8 percent of the population was older than 65, and 23.3 percent of

the population was younger than 18. Minorities comprised 28 percent of the total population. (U.S. Census, 2010)

3.8.3 Housing and Income

Table 3-7 presents housing characteristics for the region of influence for the year 2010, as well as median housing income for the year 2010. The housing units identified in the table include all structure types (e.g., single-family homes, apartments, and mobile homes).

Table 3-7 2010 Housing Units and 2010 Median Household Income

	Montgomery County	Anne Arundel County	Prince George's County	Howard County
Total Housing Units (2010)	375,905	212,562	328,182	109,282
Median Household Income	$93,373	$83,456	$71,260	$103,273

Source: U.S. Census Bureau, 2010

3.9 WATER RESOURCES

Water resources include those aspects of the natural environment related to the availability and characteristics of water. Where practicable, water resources are described quantitatively; otherwise, they are described qualitatively (good, poor, etc.) when necessary.

3.9.1 Surface Water

FGGM is mostly located in the Little Patuxent drainage of the Western Shore Uplands region of the Atlantic Coastal Plain Physiographic Province. The extreme northeastern corner of the Installation drains to the Severn River. Within the FGGM boundaries there are approximately 38,000 linear feet (7.2 miles) of perennial stream channel as well as other intermittent channels. The majority of the installation is drained by Midway Branch and its primary tributary, Franklin Branch, both tributaries to the Little Patuxent River. The installation also includes smaller sized drainage areas associated with tributaries to the Little Patuxent River and Severn River. The Chesapeake Bay is approximately 12 miles to the east.

The Patuxent River is part of the greater Chesapeake Bay watershed. The Chesapeake Bay is North America's largest and most biologically diverse estuary, home to more than 3,600 species of plants, fish, and animals (Chesapeake Bay Project, 2000). To protect and restore this valuable ecosystem, Maryland joined a consortium of State and Federal agencies to establish the Chesapeake Bay Program partnership. The Army's conservation mission supports the Chesapeake Bay Programs, and FGGM is implementing BMPs that support the guidelines established by the partnership.

The project area is entirely within the Little Patuxent River drainage basin and includes both Midway Branch and Franklin Branch. Streams were identified and field delineated in accordance with the USACE 1987 Wetland Delineation Manual and the Atlantic and Coastal Plain Supplement (November 2010); and classified using the Cowardin classification system. Nine systems, including perennial (R2UB), intermittent (R4SB), and ephemeral channels; were located within or directly adjacent to the proposed action totaling approximately 3,910 LF. Specifically,

three perennial stream channels (approximately 2,851 LF) and one intermittent stream channel (approximately 312 LF) were identified within the vicinity of the Proposed Action. Additionally, five ephemeral drainage channels (approximately 747 LF) were located in the vicinity of the Proposed Action. More detailed information about these systems is included in *Table 3-9*.

3.9.2 Wild and Scenic Rivers

The Maryland Scenic and Wild Rivers Act of 1968 established State policy to protect the water quality of designated Scenic Rivers and fulfill vital conservation purposes of wise use of resources within the Scenic and Wild Rivers System. The Patuxent and Severn Rivers have been designated as Maryland Scenic Rivers. These rivers are not in the vicinity of the project site. There are no federally listed Wild and Scenic Rivers in Maryland (National Park Service, 2009).

3.9.3 Water Quality

The Maryland Department of the Environment designates the segments of the Little Patuxent River and its tributaries that are upstream from a point one mile south of the MD 198 Bridge, as Use I-P Waters. Use I-P Waters are protected for water contact recreation, aquatic life, and public water supply. The area of concern is located within the Department of Interior property near the Patuxent Environmental Science Center bordering FGGM to the south (FGGM, 1998). Use I-P Waters must be suitable for the following activities:

- Water contact sports
- Play and leisure-time activities where individuals may come into contact with the surface water
- Fishing
- The growth and propagation of fish (other than trout), other aquatic life, and wildlife
- Agricultural water supply
- Industrial water supply
- Public water supply

Section 303(d) of the Clean Water Act (CWA) directs each State to identify and list waters, known as water quality limited segments, in which current required controls of a specified substance are inadequate to achieve water quality standards. This list of impaired waters is commonly referred to as the "303(d) list." For each water quality limited segment, the State is to establish a Total Maximum Daily Load (TMDL) of the specified substance that the waterbody can receive without violating water quality standards. Prior to the development of a TMDL, Government decisions must ensure no net increase of impairing substances or stressors from permitted activities. Following the development of a TMDL, Government decisions must ensure that loads of impairing substances or stressors are consistent with allocations reflected in the TMDL.

Less than half a mile from FGGM's eastern boundary lie tributaries of the Severn River, which are designated as Use IV Recreational Trout Waters. These waters have the potential for, or are currently:

- Capable of holding or supporting adult trout for put-and-take fishing.
- Being managed as a special fishery by periodic stocking and seasonal catching.

3.9.4 Groundwater

The primary sources of potable water at FGGM are six groundwater wells located on the South side of the installation. Three aquifers—the Patuxent Aquifer, the Upper Patapsco Aquifer, and Lower Patapsco Aquifer—underlie FGGM. The Patuxent Aquifer lies beneath a layer of Arundel Clay, which can be up to 250 feet deep. The Arundel Clay serves as a confining unit for the Patuxent Aquifer. The Lower Patapsco Aquifer lies above the Arundel Clay formation and is composed of fine- to medium-grained brown sand. The Upper Patapsco Aquifer is unconfined and is considered the water table aquifer.

The Patuxent Aquifer is at or near the surface near the fall line (the boundary between the Coastal Plain and Piedmont physiographic provinces) and dips below the surface as it moves eastward. It is between 200 and 400 feet thick beneath the installation. Static water levels in the wells range between 80 and 120 feet below the surface.

American Water owns and operates the potable water system on FGGM and complies with standards in the Safe Drinking Water Act (SDWA) and Code of Maryland Regulations (COMAR). Drinking water is tested according to permit requirements.

3.9.5 Coastal Zone

FGGM lies within the Chesapeake Bay watershed, which is one of the nation's largest and most productive ecosystems. Its watershed includes six States and the District of Columbia and drains 64,000 square miles of land (Chesapeake Bay Foundation). Both farming operations and wastewater treatment plants are major contributors to Chesapeake Bay contamination. Nitrogen and phosphorous from both sources runoff or are discharged into rivers and streams and eventually reach the Bay (Chesapeake Bay Program Office, 2009, Chesapeake Bay Foundation, 2005). Eutrophication then occurs as excessive algal growth results from an increase in nutrients in the Bay. This makes it difficult or impossible for aquatic species such as fish and vegetation to survive as it causes an increase in turbidity and dissolved oxygen depletion (source: EPA).

FGGM is located entirely within Anne Arundel County, which has 447 linear miles of tidal shoreline, and major Chesapeake Bay tributaries that penetrate 8-10 miles inland. Because of its location, all of Anne Arundel County, including the proposed project site, must follow the federal Coastal Zone Management Act (CZMA) of 1972. The Act is ultimately administered by NOAA's Office of Ocean and Coastal Resource Management (OCRM). The Program is a network of Federal and resulting State laws and policies designated to protect coastal and marine resources.

To abide by the policies set forth within the Coastal Zone Program, a consistency determination and supporting materials must be provided to Maryland DNR at least 90 days prior to the start of construction. Typically, the Erosion and Sediment Control and Stormwater Management Plan approval processes will trigger DNR’s review for consistency with the CZMA. The project team will need to show that the forested and environmentally sensitive areas are being preserved to the maximum extent possible as required by DNR and OCRM.

3.9.6 Wetlands

The Chesapeake Bay watershed region supports some of the most ecologically and commercially important wetland areas in the United States (Versar, 2005). Of the approximately 5,140 acres on FGGM, approximately 271 acres have been designated as wetlands. The majority of these wetlands

are situated on the floodplain of the Little Patuxent River, in the southwestern section of the installation.

Information concerning the potential nature and extent of wetlands within and adjacent to the proposed action was obtained by performing a routine wetlands delineation of the potential project area. The criteria outlined in the *USACE 1987 Wetland Delineation Manual* and the *Atlantic and Coastal Plain Supplement* (November 2010) were used to determine the extent of non-tidal wetlands within the proposed action (see *Figure 3-4).* All wetlands within the Proposed Action were classified in the Cowardin Classification System *(Classification of Wetlands and Deepwater Habitats of the United States*, USFWS, 1979) and noted in the fourth column of *Table 3-9.*

There are approximately 55.9 acres of nontidal wetlands identified within the project area with 46.2 of those acres on FGGM property. Thirteen nontidal wetland systems consisting of palustrine forested (PFO), palustrine scrub-shrub (PSS), and palustrine emergent (PEM) were identified during the field visits. Specifically, a total of 1.3 acres of palustrine emergent wetlands (PEM), 0.4 acres of palustrine shrub-shrub wetlands (PSS), and 53.2 acres of palustrine forested wetlands are (PFO) within the project area.

These wetlands included connected and isolated wetland systems. Isolated wetlands generally have no surface water connections to other aquatic resources. Though not protected under federal law, isolated wetlands are regulated by the MDE and often perform many of the same important environmental functions as other wetlands, including recharging streams and aquifers, storing flood waters, filtering pollutants from water, and providing habitat for a host of plants and animals. While the systems were identified, located, and chronicled, a Jurisdictional Determination (JD) has not been completed. A Jurisdictional Determination will be pursued during the permitting process in order to verify jurisdiction of the wetlands within the Proposed Action. *Table 3-8* lists specific system information and additional detailed descriptions of each wetland system is contained in the Wetland and Waterway Summary included as Appendix D to this report.

Table 3-8 Wetlands, Waterways, and Channels

Designation	Acre (Ac.)	Type	Cowardin Classification+	Dominant Species	Quality
WL001*	0.03 ac	Nontidal Wetland	PFO1B	Red Maple/ Swamp White Oak/ Blackgum	Low
WL002*	2.43 ac	Nontidal Wetland	PFO1E	Red Maple/ Sweetgum/ Hornbeam/ Greater Bladder Sedge	High
WL005*	2.17 ac	Nontidal Wetland	PFO/EM1E	Black Willow/ Sweetgum/ Reed Canarygrass	Moderate
WL008*	0.16 ac	Nontidal Wetland	PSS1A	Sweetgum/ Nepalese Browntop	Low
WL009*	0.18 ac	Nontidal Wetland	PFO/SS1A	River Birch/ Sweetgum/ Reed Canarygrass	Moderate
WL010*	0.16 ac	Manmade Nontidal Wetland	PFO1K	Red Maple/ Green Ash/ Sweetgum/ Slippery Elm	Low
WL012	0.09 ac	Manmade Nontidal Wetland	PEM1E	Narrowleaf Cattail/ Sweetgum/ Pennsylvania Smartweed	Low
WL014*	50+ ac	Nontidal Wetland	PFO1E	Red Maple/ Hornbeam/ Sweetbay Magnolia/ Lady Fern/ Greater Bladder Sedge/ Skunk Cabbage	High
WP015	0.21 ac	Nontidal Wetland	PEM/SS/FO1E	Willow Oak/ Red Maple/ Sweetgum/ Reed Canarygrass/ Deer-Tongue Grass/	Moderate
WL016	0.02 ac	Manmade Nontidal Isolated	PSS1A	Arrowwood /Sweetgum	Low
WL017	0.04 ac	Manmade Nontidal Isolated	PSS1A	Arrowwood /Sweetgum	Low

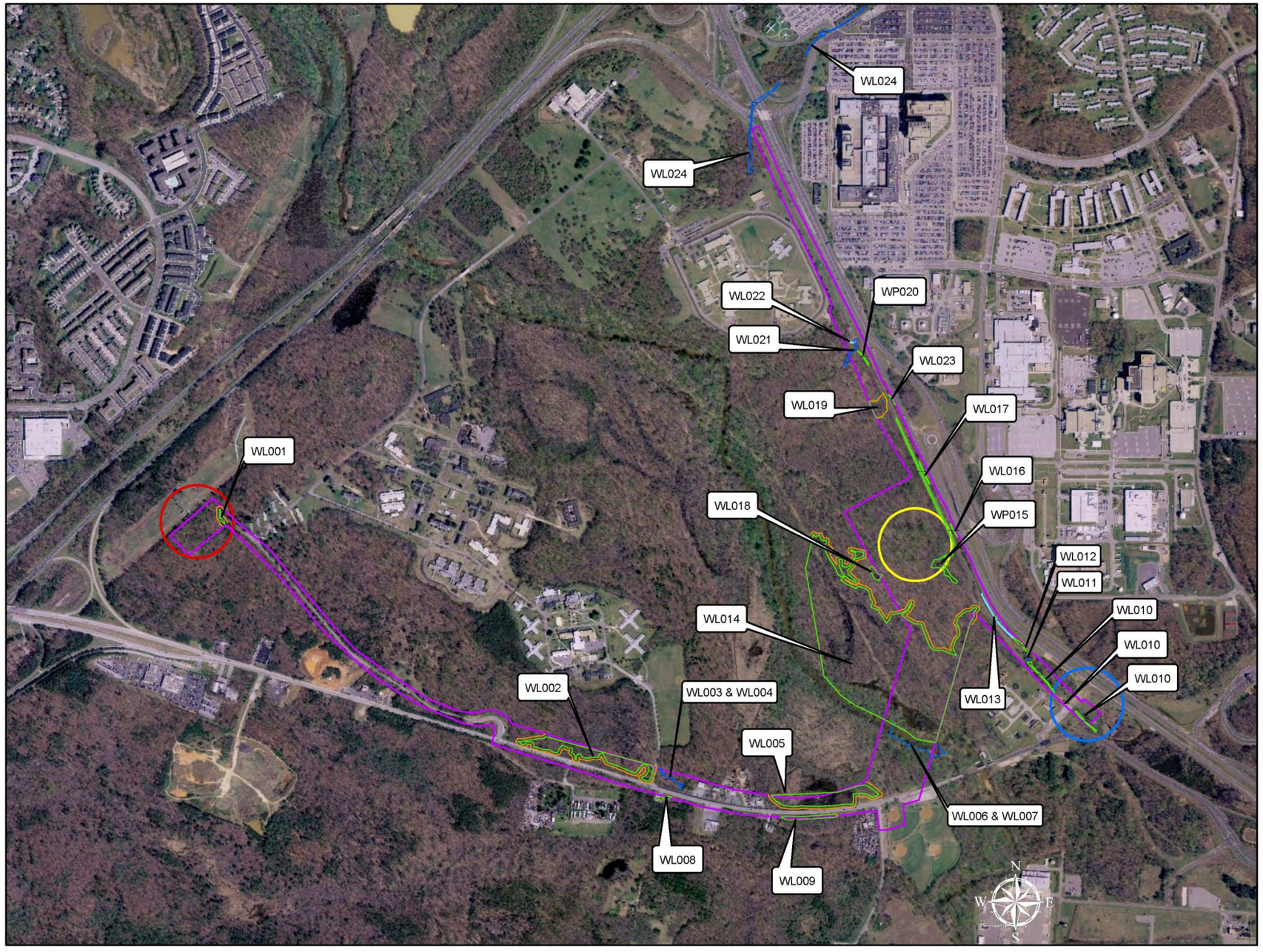
WL018	0.17 ac	Nontidal Wetland	PFO1E	Red Maple/ Sweetgum	High
WL019*	0.57 ac	Nontidal Wetland	PFO1E	Blackgum/ Red Maple/ Greater Bladder Sedge	High
WP020	0.04 ac	Nontidal Wetland	PSS1B	Sweetgum/ Southern Long Sedge/ Nepalese Browntop	Low
WP023	0.01 ac	Manmade Nontidal Isolated Wetland	PEM1J	Sweetgum/ Reed Canarygrass/ Nepalese Browntop	Low
Waterway^	**Length (Linear Feet)**		**Cowardin Classification+**		
WL003*	312 lf	Intermittent Stream	R4SB3/4	-	Moderate
WL004	52 lf	Ephemeral	Ephemeral	-	Low
WL006*	535 lf	Little Patuxent River	R2UB2	-	High
WL007	20 lf	Ephemeral	Ephemeral	-	Low
WL011	84 lf	Ephemeral	Ephemeral	-	Low
WL013	529 lf	Ephemeral	Ephemeral	-	Low
WL021*	296 lf	Riverine	R2UB1/2	-	Moderate
WL022	62 lf	Ephemeral	Ephemeral	-	Low
WL024*	2,020 lf	Riverine	R2UB1/2	-	Moderate

* Systems continue beyond the limits of the project area.
+ Classification of Wetlands and Deepwater Habitats of the United States, Cowardin et al. 1979
^ Waters of the United States

3.9.7 Floodplains

Executive Order 11988, Floodplain Management, instructs federal agencies to consider the risks, danger, and potential impacts of locating projects within floodplains. Floodplains are typically described as areas likely to be inundated by a particular flood. For example, a flood that has a one percent chance of occurring in any one year is the 100-year flood. The report titled "Floodplain Analysis And Mapping U.S. Army Garrison Fort George G. Meade, Anne Arundel County, Maryland", prepared by the U.S. Army Corps of Engineers, Baltimore District (U.S. Army Corps of Engineers, 2008), provides a detailed floodplain analysis indicating areas that are prone to flooding. This report is used by FEMA as the official floodplain mapping for the area and both 100-year and 500-year floodplain boundaries have been established (*see Figure 3-5*).

The National Flood Insurance Program requires local jurisdictions to issue permits for all development in the 100-year floodplain, as depicted on the maps issued by FEMA. Development is broadly defined to include any man-made change to land, including grading, filling, clearing, dredging, extraction, storage, subdivision of land, and construction and improvement of structures and buildings. For any development and construction to take place in wetlands and floodplains, a State Permit from the Wetlands and Waterways Program, Water Management Administration at MDE is required. This permit is requested through the Joint Permit Application, the same application for wetland and wetland buffer impacts. As such, floodplain regulations regarding construction fill, and storage of materials should be adhered to.



Fort Geoge G. Meade
BGE Substation-9500 Area
Environmental Assessment

Area of Potential Impacts
Jurisdictional Wetlands
MDE 25' Buffer
Waters of U.S.
Ephemeral Drainage Channel
9500 Area Substation
Transition Station
Switching Station

Orthophotography Source: Anne Arundel County
USGS - 2007 Dataset

Figure 3-4
Nontidal Wetlands and Buffers

0 1,000 2,000 FT

August 2012

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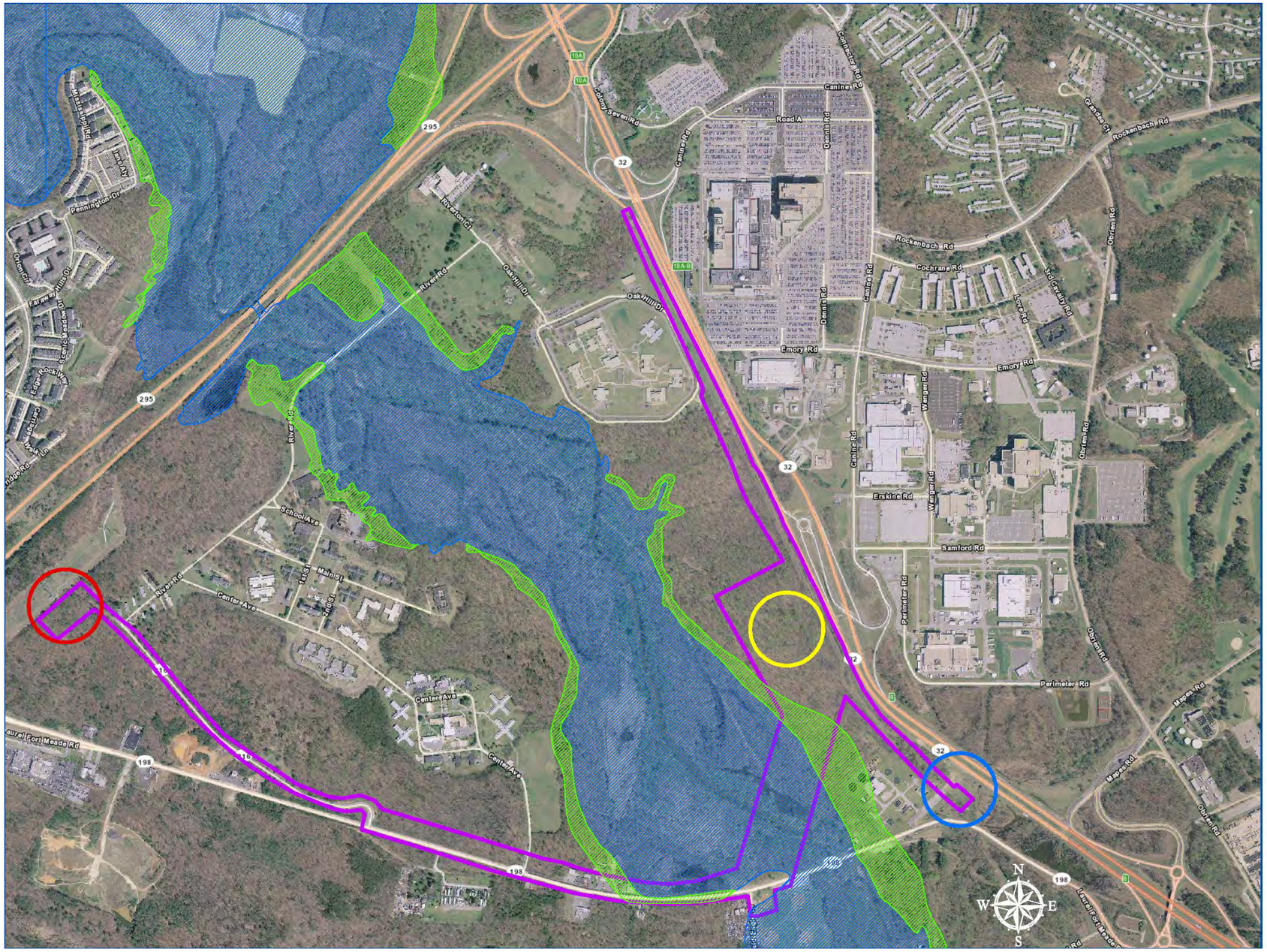

Fort Geoge G. Meade
BGE Substation-9500 Area
Environmental Assessment

- Area of Potential Impacts
- 100 Year Flood Plain
- 500 Year Flood Plain
- 9500 Area Substation
- Transition Station
- Switching Station

Orthophotography Source: Anne Arundel County
USGS - 2007 Dataset

Figure 3-5
Floodplains

0 1,000 2,000 FT

August 2012

BGE
A Constellation Energy Company

4.0 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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4.0 ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

This section describes the potential environmental consequences of implementing the Proposed Action by comparing the effects of these activities on the potentially affected environment. To assess the potential for and significance of environmental impacts from the construction of the proposed BGE Substation (Proposed Action), a project purpose and need, several project site alternatives, and substation design concept options were developed and discussed in *Sections 1.0 and 2.0*, and the environmental setting was described in *Section 3.0*. Activities associated with the construction and operation of the proposed substation were then compared with the potentially affected environmental resource areas to determine the impacts of the Proposed Action. The No-Action Alternative was also considered as a viable outcome and serves as a base-case condition.

Table 4-1 compares the environmental impacts between the Proposed Action, the substation design concepts considered, and the No-Action Alternative.

Cumulative impacts result from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions within the vicinity of the project, regardless of who undertakes such action. These actions may be individually minor, but collectively significant over a period of time. Therefore, each environmental issue within *Section* 4.0 was evaluated for potential cumulated impacts. Suggested measures to mitigate or minimize the potential impacts for each environmental resource affected are discussed as well.

Table 4-1: Summary of Impacts

Potential Impacted Features	No Action	Alternative Site 4 – Design Concept A	Alternative Site 4 – Design Concept B	Alternative Site 4 – Design Concept C (Proposed Action)
Natural Environmental Impacts				
Limit of Disturbance (acres)	0	25.9	20.9	**21.9**
Forest Cover Removed (acres)	0	18.2	13.3	**15.8**
Direct Impacts to High Quality Forest (acres)	0	Moderate (4.0)	High (6.9)	**Low (1.0)**
Direct Impacts to the Heron Rookery (acres)*	0	Low (0.6)	0	**0**
Direct Impacts to Jurisdictional Wetlands (acres)	0	Moderate (< 0.6)	Moderate (< 0.6)	**Low (< 0.2)**
Direct Impacts to the 25' Wetland Buffer (acres)	0	Moderate (1.1)	Low(0.9)	**Low (0.5)**
Streams Directly Impacted (number)	0	0	0	**0**
Impact to Jurisdictional Waters (linear feet)	0	0	0	**0**
Direct Impacts to the 100-Year Floodplain	No impact	Negligible (0.3 acres of temporary construction impacts)	Negligible (0.3 acres of temporary construction impacts)	**Negligible (0.3 acres of temporary construction impacts)**
Acres of new impervious surface (acres)	0	3.7	3.2	**3.2**
Human and Social Environmental Impacts				
Direct Impacts to the Social Environment	No impact	Temporary Construction Impacts to MD 198 Businesses	Temporary Construction Impacts to MD 198 Businesses	Temporary Construction Impacts to MD 198 Businesses
Adverse Effects on National Register of Historic Places Listed or Eligible	No impact	No impact	No impact	**No impact**
Archeological Sites Impacted (number)	0	0	0	**0**
Meets National Ambient Air Quality Standards	Yes	Yes	Yes	**Yes**
Potential Hazardous Materials Sites (number)	0	0	0	**0**

*

Restriction dates to forest clearing (see Section 4.2)

4.1 AIR QUALITY

4.1.1 Proposed Action

The proposed 230kV to 115kV substation and Russett East switching stations would consist of site preparation and would include construction of a housed substation, circulation and access road, and drainage facilities. The installation of the electrical transmission line duct banks throughout the project area would require clearing and grading for drilling pit operations at designated bore pit locations and the installation of a transition station. Construction activities for the Proposed Action would include clearing and grading of approximately 21.9 acres.

Emissions associated with construction activities will include fugitive dust emissions (PM10 and PM2.5) from ground disturbance, combustion byproducts from construction equipment (e.g., drill pit rigs, grading machinery, generators, saws), and construction worker vehicle miles traveled during construction. For the air quality analysis, equipment usage was based on similar construction projects to estimate combustion and fugitive dust emissions.

The net increase of emissions associated with proposed operational activities was too minimal to analyze since the substation will be enclosed in a building and would be unmanned, thus no increased Government and privately-owned vehicle use associated with its operations would occur.

The Army concludes that *de minimis* and major source thresholds for applicable criteria pollutants would not be exceeded based on the results of the annual emissions analysis for proposed construction activities. The project emissions would also not be regionally significant as a result of implementation of the Proposed Action. Therefore, the Proposed Action is exempt from Conformity Determination requirements. Detailed calculations, analysis methodologies, estimated air emissions per construction task, and the signed Record of Non-Applicability (RONA) is included in Appendix E of this EA.

4.1.2 No-Action Alternative

Under the No-Action Alternative, there would be no change in existing conditions, and no new construction activities would take place. Therefore, no additional impacts would occur to this resource (air quality).

4.1.3 Cumulative Impact

The construction and subsequent operation of both the Russett East switching station and the 9500 Area Substation will not substantially affect regional air quality in and around Anne Arundel County, Maryland, due to the relatively minor amount of emissions generated through construction activities and the lack of operational emissions expected to be generated. Numerous activities associated with the large urban corridors connecting Washington, DC and Baltimore contribute to the degradation of air quality within this region, and the emissions released from the Proposed Action will only be a miniscule, incremental addition to the larger air quality problem.

4.1.4 Mitigation

Mitigation using standard BMPs would lessen the minor impacts of the construction of the Proposed Action. During construction, the contractor should control fugitive dust emissions from soil piles and unpaved construction roads by surface treatment with watering and traffic-control regulations.

4.2 BIOLOGICAL RESOURCES

Detailed descriptions of the existing natural environmental features within the project area are contained in *Section 3.2*. At this stage of project design, impacts are estimated to the nearest acre, tenth of an acre, or rated on a qualitative basis.

4.2.1 Vegetation

4.2.1.1 Proposed Action

The 9500 Area is part of a large tract of contiguous forest and is heavily wooded. The forest on site is characterized by six distinct forest stands, #7 through #12, as described in *Section 3.2*. See *Table 3-3* for forest system quality specific to each stand. The new electrical transmission substation would require clearing of several acres of trees, varying depending on the design concept. Design concepts were analyzed to minimize forest clearing and fragmentation, maintain greenway hubs and corridors as much as possible, minimize impact to specimen trees and maintain contiguous forest/wetland systems. All three forest stands have high densities of specimen trees (over 30 inches in diameter at 4.5 feet above ground, considered diameter at breast height).

Design Concept A using an AIS technology requires a larger footprint for the substation and consequently more forest clearing than Concepts B or C, using GIS technology. One of the many advantages of Concepts B or C is the smaller footprint, requiring less clearing, and fewer disturbances to resources.

Design Concept A impacts Forest Stands #8, #10, #11 and #12, for a total of approximately 12.9 acres of forest clearing within FGGM property. Forest Stands #11 and #12 are mature and good quality but lower quality stands than stand #10 (*see Table 3-3*). Forest Stand #8 is considered a fair quality stand. Concept A also requires the clearing of many specimen trees (*see Figure 4-1*). Concept A is also within an area known as Green Infrastructure Hub and adjacent to and within Green Infrastructure Corridor and noted in *Section 3.2* of this document. The corridor may have been intended to cross MD 32 in order to connect to narrow greenway through the main part of FGGM.

Design Concept B impacts Forest Stand #10 with approximately 6.9 acres of forest clearing. Forest Stand #10 is the highest quality forest stand within the project area (*see Table 3-3*). Concept B is also within an area identified as Green Infrastructure Hub and adjacent to a Green Infrastructure Corridor as noted in *Section 3.2* of this document. The corridor may have been intended to cross MD 32 in order to connect to narrow greenway through the main part of FGGM. Alternative B requires the removal of many specimen trees; especially those which are slower growing and higher quality species, mostly oak.

Table 4-2: Impacts to FGGM 9500 Area Vegetation by Design Concept +

Impact	Design Concept A	Design Concept B	Design Concept C
Greenway Corridor	Moderate	Major	Minor
Forest Stand			
Stand #10 – High Quality (Priority for retention)	4.0 ac.	6.9 ac.	1.0 ac.
Stand #11 – Good Quality	6.2 ac.	0.2 ac.	6.7 ac.
Stand #12 – Good Quality	1.8 ac.	0	1.9 ac.
Stand #8 – Fair Quality	0.9 ac.	0.9 ac.	0.9 ac.
Total Vegetative Impact	12.9 ac.	8.0 ac.	10.5 ac.

+ This table is for concept comparison only. Impact numbers do not include non-FGGM properties.

Design Concept C only requires approximately one acre of clearing of Forest Stand #10 (*see Table 4-2*). Specimen trees are located within the limit of disturbance for this alternative, but the majority of the specimens are faster growing species such as Tulip Poplar. Alternative C is also farther away from the identified Green Infrastructure Corridor than the other concepts.

New 230kV electrical transmission duct banks would be constructed as part of the Proposed Action and would require additional clearing of approximately 4.3 acres of forest for the open-cut trench areas and the drilling operations parallel to both MD 198 and Old Portland Road. This additional clearing is outside of FGGM property. Negligible impacts to specimen trees would occur due to the narrow area needed for open-cut trench installation, horizontal directional boring beneath significant trees where they are adjacent to the Little Patuxent River, and lack of specimens along forest edges. Forest Stands #1, #3, and #4 would be the most impacted stands. The proposed clearing would not result in fragmentation of forest stands as all proposed clearing is along the perimeter of the above mentioned forest stands. The proposed trenchless technology used for much of the construction minimizes the need for forest clearing that may fragment the larger forest tract and impact specimen trees.

The linear 115kV duct bank corridor which parallels the eastbound lanes of MD 32 requires additional clearing of approximately 1 acre of forest, all outside of FGGM property, with negligible impacts to specimen trees. Forest Stands #13 and #14 would be the most impacted stands, with additional clearing in a hedgerow. The proposed clearing would not result in fragmentation of forest as all proposed clearing is along the perimeter of the above mentioned forest stands. The impact to specimen trees is minimized by the location of the limit of disturbance to the southern portion of Stand #14.

The 230kV and 115kV duct bank corridors require a combined 5.3 acres of forest clearing on non-FGGM property, as described above. Therefore, the total forest clearing impacts (combined with the Area 9500 impacts) for Design Concept C would be 15.8 acres.

4.2.1.2 No-Action Alternative

Under the No-Action alternative, the electrical transmission substation would not be constructed and no additional impacts would occur to biological resources.

4.2.1.3 Cumulative Impact

There are approximately 1,717 acres of forested area on FGGM. Implementation of the Proposed Action would result in the loss of 10.5 acres of forest on FGGM property, or less than 1% of the overall forest area. This is a cumulative impact to the amount of forest on FGGM when added to the loss from other current and planned construction projects, however these impacts are not cumulatively significant.

4.2.1.4 Mitigation

Design Concept C preserves the highest quality forest on site and the maximum amount of Greenway Corridor possible, as compared to the two other design concepts. The selection of this design concept allows FGGM to voluntarily and intentionally expand the riparian buffer to 100-feet wide, to the maximum extent practical, along wetlands that abut the Little Patuxent River. The voluntary expansion of this buffer would better protect the highest quality water resources on and off site.

Impacts on FGGM land will be mitigated on the installation in accordance with the current FGGM Forest Conservation Act (FCA) and Tree Policy, through forest preservation or reforestation. Impacts on non-installation land will be mitigated off the installation by BGE in accordance with applicable state and county laws and regulations.

In keeping with the FCA standards FGGM requires that the equivalent of 20% of the project's limit of disturbance be forested. Based on this requirement, project proponents would replant or preserve approximately 4.3 acres of forest land to mitigate for forest removed. Additionally, Design Concept C would require clearing 4 acres less of forest over the AIS substation design. Reforestation that cannot feasibly be performed within the project area shall be performed on other designated land areas within FGGM.

FGGM participates in the Army's conservation reimbursable and fee collection program for forestry. This program exists to provide ecosystem-level management that supports and enhances the land's ability to support each installation's respective military missionscape, while simultaneously obtaining ecologically responsible results that satisfy all federally mandated requirements for natural resources. Program revenues are generated through the sale of forest products. The fair market value of all forest products removed for the development of the substation shall be deposited into the Army's Forestry Account which will be utilized for the Army's natural resource activities and ecosystem management.

All construction equipment will be treated according to Best Management Practices (BMPs) in a manner that would minimize the spread of any invasive species either onto or from the project site. Existing trees to remain will be protected during construction activity. Grading, cutting, filling and compaction of soil beneath the trees' drip line shall be avoided. Mitigation shall conform to industry standards for acceptable tree preservation practices under the supervision of a certified arborist.

4.2.2 Wildlife and Threatened and Endangered Species

4.2.2.1 Proposed Action

Construction noise, tree clearing and the temporary presence of personnel could have a minimal,

short-term effect on wildlife within the area. Construction ground disturbance and equipment noise-related impacts would include loss of habitat, displacement of wildlife, and short-term disruption of daily/seasonal behavior. At 50 feet from construction equipment, noise levels typically range from 70 to 98 dBA. The combination of increased noise levels and human activity would likely displace some small mammals and birds that forage, feed, or nest within and adjacent to the construction site. Foraging birds would be subjected to increased energy demands if flushed by the construction noise, but this should be a short-term, minimal effect. Construction would not affect the wetlands that some of these birds use for resting, nesting, and foraging. Bird migration patterns would not be altered.

As noted in *Chapter 3*, there are no federally listed or threatened and endangered species on the Project Site or on FGGM property, therefore no impacts would occur. Additionally, with the incorporation of proper erosion and sediment controls and BMPs to negate sediment runoff and increased stormwater flow, impacts to rare, threatened, or endangered species that may be located downstream from this Proposed Action will be avoided.

4.2.2.2 No-Action Alternative

Under the No-Action Alternative, the new substation would not be constructed, and no impacts would occur to wildlife or RTE's.

4.2.2.3 Cumulative Impacts

Construction activities would result in the loss of 1% of forested land (possible habitat) on FGGM. This is a cumulative impact to the amount of habitat on FGGM when added to the loss from other current and planned construction projects, however these impacts are not cumulatively significant. The proposed action may eliminate some wildlife habitat. However, as described above, it is anticipated that most wildlife species would be able to avoid the disturbance by relocating to adjacent undisturbed areas.

4.2.2.4 Mitigation

The Proposed Action minimizes fragmentation of high quality habitat by impacting edge and/or forested habitats that regenerate rapidly while avoiding species rich, slower growing habitats. The Proposed Action would follow all applicable federal, state laws, and regulations to control erosion and sediment runoff during and after construction. All construction equipment should be treated according to BMPs in a manner that would minimize the spread of any invasive plant species either onto or from the project site.

In order to reduce the likelihood of adverse impacts to important species that are supported by the Little Patuxent River and its associated wetlands, the Proposed Action follows applicable protective measures for aquatic habitats supporting rare, threatened and endangered species:

1) Pursues environmentally sensitive design to address stormwater runoff by promoting the use of nonstructural best management practices to the maximum extent. The goal is to mimic natural infiltration patterns across the site in order to maintain natural hydrology.

    a. Methods include the use of sheet flow to buffers, vegetated channels or swales to convey pavement runoff, and methods of bioretention.

    b. Reduced impervious cover as outlined in the *MDE Stormwater Management Manual - Section 5.3*, and incorporate pervious materials within the design wherever possible.

    c. Locate impervious surfaces as far as possible from permanent and intermittent streams and their floodplains.

2) In order to minimize risk of sedimentation in the aquatic and wetland habitats and to minimize changes to the hydrology of these habitats, the design:

a. Minimizes clearing and retains forest – The limits of disturbance are the minimum needed to allow access and provide fire protection. Clearing and construction conducted will be in phases in order to avoid having large areas cleared at one time.

b. Stabilizes soil – Stabilization will occur immediately (within 24 hours). Special effort will be made to retain fine particle silt, sand and clay sediments including the incorporation of redundant/additional control measures in the sediment and erosion control plan to ensure maximum filtration of any sediment-laden runoff (e.g., accelerated stabilization, super silt fence instead of silt fence, etc.).

c. Is inspected frequently – All measures will be inspected daily to ensure that they are functional from the very initial stages through final construction, and any problems will be corrected immediately.

d. Increases the minimum 25-foot buffer to a 100-foot (or maximum extent practical) undisturbed forested upland buffer to permanent and intermittent streams and abutting nontidal wetlands.

e. Avoids disturbing areas of highly erodible soils.

4.2.3 Aquatic Resources and Environmentally Sensitive Habitat

The project area has been identified as habitat for Forest Interior Dwelling Birds (FIDS) by Maryland DNR, and is described in *Section 3.2*. Also as noted in Section 3.2, the Wildlife and Heritage Service's 2011 database indicates that there is a Great Blue Heron colony documented within approximately ¼-mile of the project site. No recent data is available as to its current status. The approximate location of the protection boundary of the colony site is indicated in *Figure 3-2*. A portion of the Proposed Action falls within or directly adjacent to the one-quarter mile boundary of this possible Great Blue Heron rookery as described in *Section 3.2*.

Table 4-3 provides a preliminary quantification of the potential impact to FIDS habitat and Heron Rookery. Interior forest habitat is located 300 feet from an edge or clearing and therefore any impact to the edge forest will diminish interior habitat. This is not a 1:1 relationship where a quantity of edge clearing will result in the same quantity of interior loss. Edge shape and location of the proposed clearing will influence the totals. The column "Total Interior Impact" represents the amount of interior habitat converted to edge.

4.2.3.1 Proposed Action

Total amounts of clearing include the linear duct bank portions of the proposed action. Design Concept A would require approximately 19.2 acres of total forest clearing, with nearly 25 acres of forest interior clearing impacts to FIDS. The southwestern portion of the disturbance area caused by Alternative A would impact the quarter mile Great Blue Heron rookery protection area by approximately 0.6 acre. Disturbance of the colony during the breeding season is a violation of the U. S. Migratory Bird Treaty and would include actions such as cutting trees within the protection area or nearby construction that causes abandonment of chicks by the adults. Construction and cutting trees within the quarter mile radius is allowed outside of the breeding season.

Design Concept B would require a total of 14.3 acres of clearing, resulting in an impact of 15 acres to FIDS habitat. The area that would be cleared is a priority for retention mixed oak forest with a high potential for wildlife habitat. Concept B would affect 15 acres of forest interior.

Design Concept B has no impact on the possible Great Blue Heron rookery. Since there is no evidence that any other federally endangered or threatened plant or wildlife species occur at the site of the Proposed Action other than potential transient species (such as migrating birds), no threatened or endangered species or critical habitat would be adversely affected by the Design Concept B option of the Proposed Action.

Design Concept C would require a total of approximately 15.8 acres of clearing which impacts approximately 18 acres of forest interior. Siting Design Concept C further westward to establish a more substantial riparian buffer and avoid higher quality forest requires a slightly larger footprint due to additional grading needs and a longer access road to MD 32. Although a slightly larger area of interior habitat is impacted, it only results in an additional one percent loss of interior habitat within the project vicinity. The loss of interior habitat due to Design Concept C would be of a lower quality than the Design Concept B impact and less likely to support as many species of FIDS. Design Concept C has no impact on the possible Great Blue Heron rookery. As there is no evidence that any other federally listed species occur at the site of the Proposed Action, no critical habitat would be adversely affected by Design Concept C, and is therefore chosen as the substation design concept to be incorporated into the Proposed Action.

Table 4-3: Environmentally Sensitive Area Impacts *

Existing Contiguous Forest within Project Vicinity = 413 acres+			
Existing Forest Interior (for FIDS) Within Project Vicinity = 252 acres+			
FIDS Impacts	**Design Concept A**	**Design Concept B**	**Design Concept C**
Limit of Disturbance (LOD)	19 acres	14 acres	16 acres
Total Interior Impact (subtracting edge)	25 acres	15 acres	18 acres
Interior Habitat Remaining+	227 acres (90%)	237 acres (94%)	234 acres (93%)
Heron Rookery			
Zone 3 (1/4 mile radius)	0.6 acres	0 acres	0 acres

* all acreages are approximate (to the nearest acre)
+ FIDS quantities are based on total contiguous forest area, not on property ownership. FGGM may not own or have any control over the forest interior areas.

4.2.3.2 No-Action Alternative

Under the No-Action Alternative, the new substation would not be constructed, and no impacts would occur to sensitive habitat.

4.2.3.3 Cumulative Impact

Construction activities of the Proposed Action would result in the loss of approximately 16 acres of forested land and nearly 18 acres of forest interior, leaving 93% interior remaining. Cumulative impacts when added to the loss from other current and planned construction projects on FGGM cannot be directly related to forest interior habitat loss, since many forested areas contain no forest interior habitat. Therefore, cumulative impacts of this Proposed Action and other projects on FGGM would not be significant.

4.2.3.4 Mitigation

New construction of the Proposed Action would follow all applicable federal, state laws, and regulations to control erosion during construction. All construction equipment should be treated according to BMPs in a manner that would minimize the spread of any invasive plant species either onto or from the project site.

The following guidelines would be incorporated into the site design to help minimize the project's impacts on FIDS and other native forest plants and wildlife: (*see DNR correspondence – Appendix B*)

1. Since forest loss or disturbance is unavoidable given the project area, development is restricted to the following areas:
    a. the perimeter of the forest (i.e. within 300 feet of the forest edge)
    b. thin strips of upland forest less than 300 feet wide (hedgerows)
    c. portions of the forest with low quality FIDS habitat, (i.e. areas that are already heavily fragmented, relatively young, exhibit low structural diversity, etc.
2. Maximized the amount of forest "interior" (forest area > 300 feet from the forest edge) within each forest tract (i.e., minimize the forest edge: area ratio). Circular forest tracts are ideal and square tracts are better than rectangular or long linear forests.
3. Minimized forest isolation. Generally, forests that are adjacent, close to, or connected to other forests provide higher quality FIDS habitat than more isolated forests.

To protect Great Blue Heron colonies the following guidelines would be followed:

1. Established a protection area of ¼-mile radius from the colony's estimated outer boundary.
2. During the Great Blue Heron breeding season, 15 February through 31 July, no construction or timber harvesting activities should occur within the ¼-mile protection area.
3. The Proposed Action has been designed to avoid all impact to the ¼-mile protection area.

None of the proposed facilities and infrastructure improvements will impact the Great Blue Heron rookery. At the time of construction, the Great Blue Heron rookery will be physically verified in the field in order to establish the exact location in order to verify avoidance.

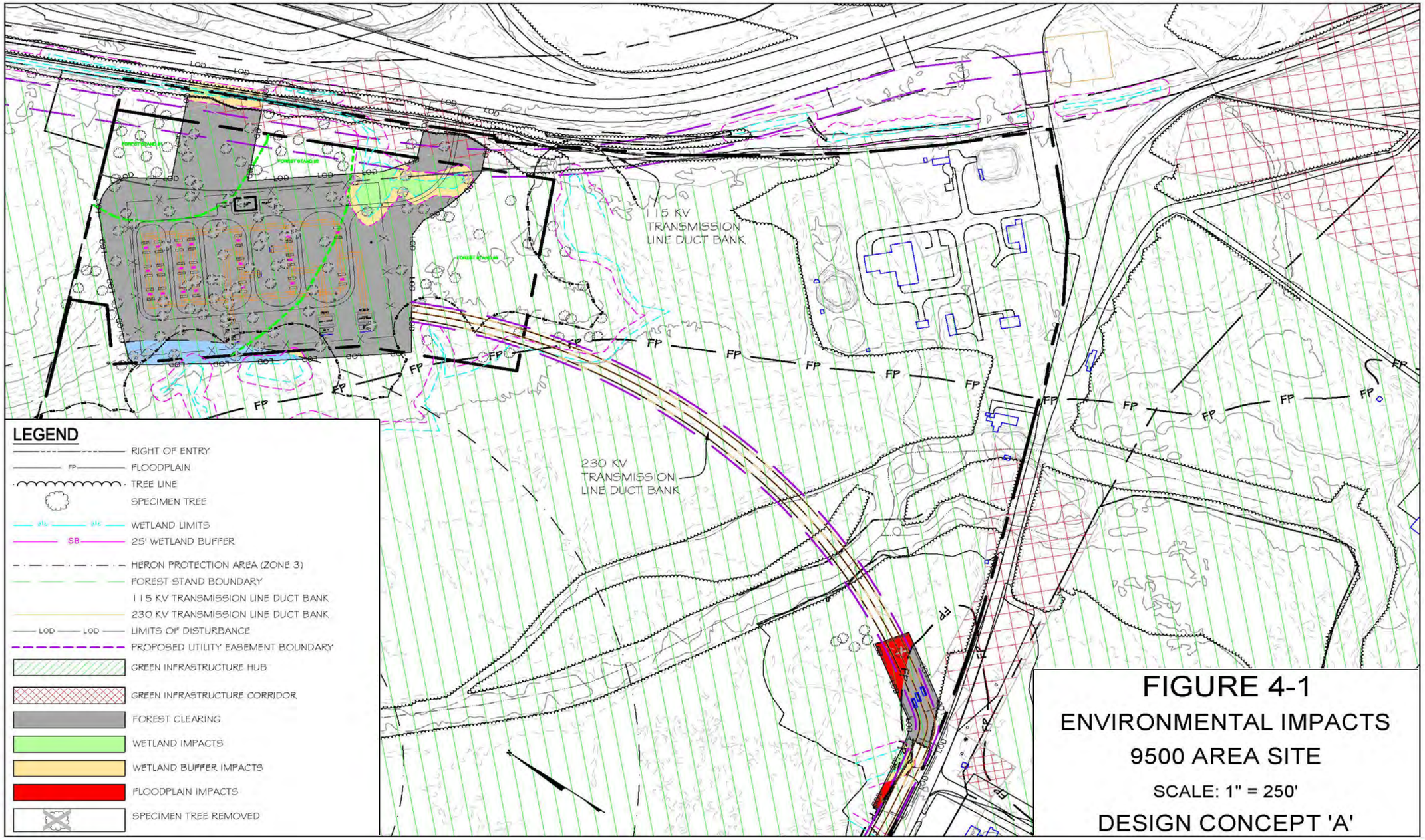

FIGURE 4-1
ENVIRONMENTAL IMPACTS
9500 AREA SITE
SCALE: 1" = 250'
DESIGN CONCEPT 'A'

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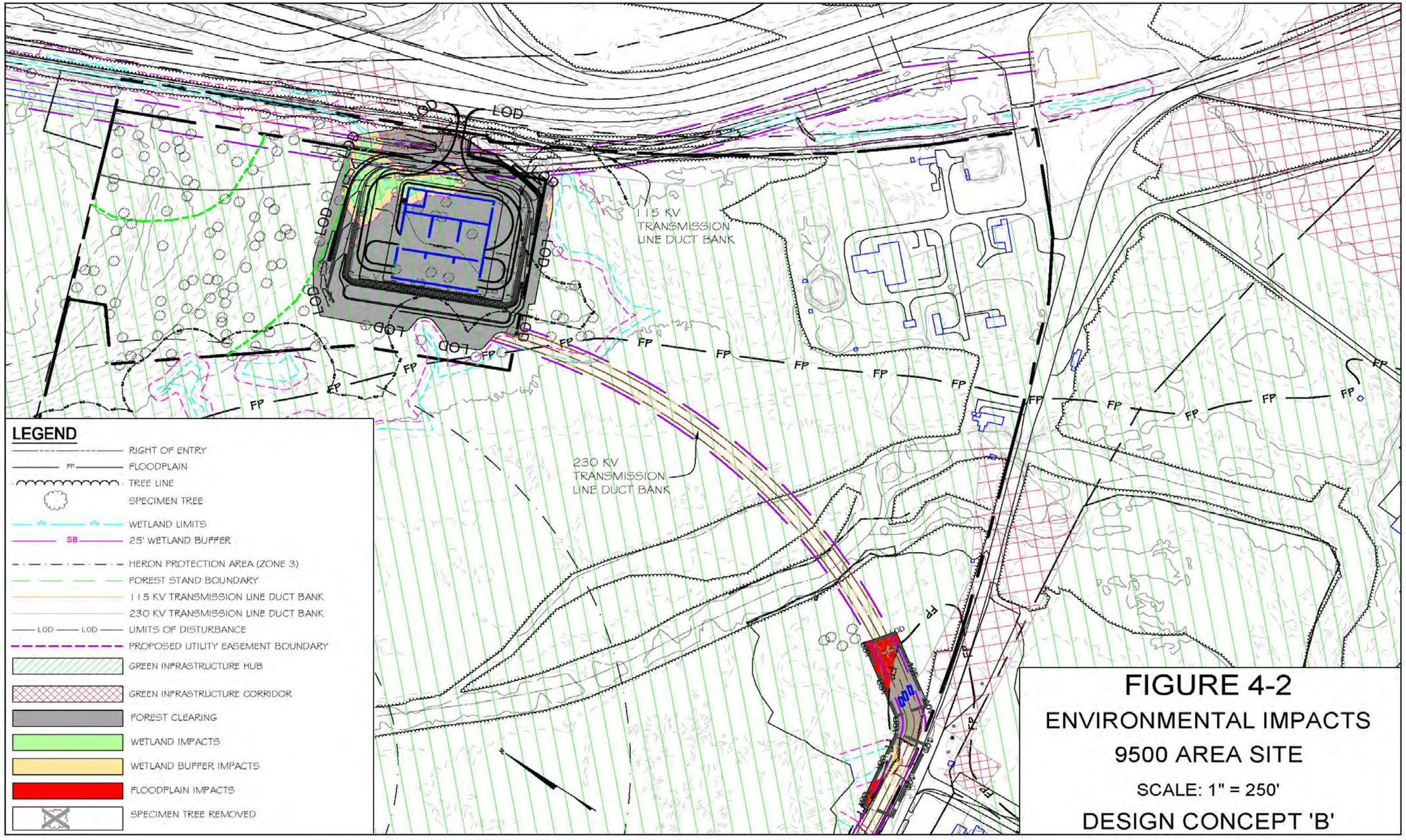
LEGEND
RIGHT OF ENTRY
FP FLOODPLAIN
TREE LINE
SPECIMEN TREE
WETLAND LIMITS
SB 25' WETLAND BUFFER
HERON PROTECTION AREA (ZONE 3)
FOREST STAND BOUNDARY
115 KV TRANSMISSION LINE DUCT BANK
230 KV TRANSMISSION LINE DUCT BANK
LOD LOD LIMITS OF DISTURBANCE
PROPOSED UTILITY EASEMENT BOUNDARY
GREEN INFRASTRUCTURE HUB
GREEN INFRASTRUCTURE CORRIDOR
FOREST CLEARING
WETLAND IMPACTS
WETLAND BUFFER IMPACTS
FLOODPLAIN IMPACTS
SPECIMEN TREE REMOVED
LOD
115 KV TRANSMISSION LINE DUCT BANK
230 KV TRANSMISSION LINE DUCT BANK
FP
FIGURE 4-2
ENVIRONMENTAL IMPACTS
9500 AREA SITE
SCALE: 1" = 250'
DESIGN CONCEPT 'B'

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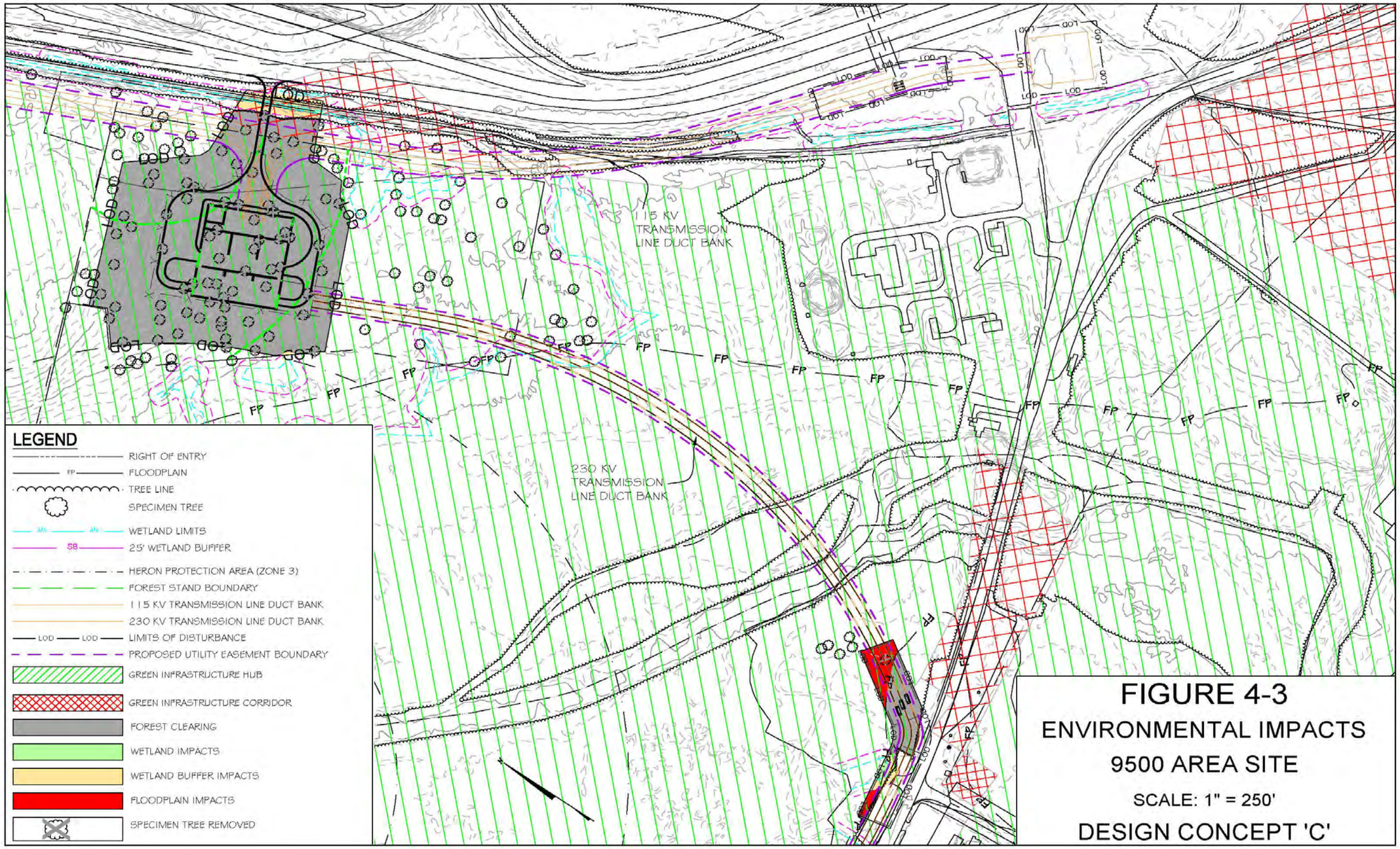

FIGURE 4-3
ENVIRONMENTAL IMPACTS
9500 AREA SITE
SCALE: 1" = 250'
DESIGN CONCEPT 'C'

4.3 GEOLOGY AND SOILS

Naturally occurring levels of the contaminants in soils represent a potential future liability to the U.S. Army. This can be avoided by managing all soils on the installation or by testing requirements for offsite disposal/reuse. The preferred option for all FGGM projects is to balance all soils on-site in lieu of transporting excess soil off the installation. For projects that cannot meet this requirement, soil that is transported off the installation must be tested. (Fort Meade Directorate of Public Works Environmental Division, 2009) Erosion and Sediment Control, Stormwater Management, and NPDES permits will be pursued from the MDE through the FGGM Environmental Office for this project. The Erosion and Sediment Control Plan will be designed in accordance with MDE regulations as published in the "2010 Standards and Specifications for Soil Erosion and Sediment Control."

Best management practices (BMPs) would be incorporated and maintained as part of the proposed action. BMPs at construction sites typically consist of various erosion and sediment control measures. At the proposed site, silt fences, straw bales, and other temporary measures could be placed in ditches and along parts of the site perimeter to control erosion during construction activities. These temporary erosion prevention measurements would be maintained in place until the replanted site vegetation is firmly established and the soil has stabilized. Daily inspections of the erosion and sediment control measures and inspections following storm events would be performed by qualified personnel, and as required in the NPDES General Permit.

Disturbed areas would be stabilized and re-vegetated with native plant vegetation following construction activities. Proper seed selection would result in native plants with deep root systems, which would increase local times of concentration and reduce site outflows. A minor loss of pervious soils within the project site will result in increased surface runoff, but will be controlled by stormwater features within the project site.

4.3.1 Proposed Action

The Udonthents and Zekiah and Issue Silt Loam on site have high erosion potential, therefore construction should avoid creating or using areas of steep slopes when composed of these native soils. There are no existing steep slopes on site. Soils at the site should not be left in an un-vegetated state, where wind and water can easily strip the soil. Once cleared, these soils should be conserved through practices approved by the Soil Conservation District, such as covering during periods of inactivity with temporary seed mixtures.

Although soil characteristics at the proposed project site can be quite variable with depth, they are generally well suited to building sites except in wetland areas. Layers that restrict permeability and buried objects may hinder deep excavations. In accordance with construction best management practices, construction contractors will be instructed to halt work should they encounter suspected soil or groundwater contamination so that appropriate soil/groundwater sampling, analysis, and remediation may be performed.

4.3.2 No-Action Alternative

Under the No-Action Alternative, the new substation would not be constructed. No additional impacts to geology and soils would occur.

4.3.3 Cumulative Impacts

The use of BMPs during and after construction would minimize the potential for cumulative impacts to area soils.

4.3.4 Mitigation

At the proposed site, anti-erosion procedures could include silt fences, straw bales, and other temporary measures placed in ditches and along parts of the site perimeter to control erosion during construction activities. These temporary erosion prevention measurements would be maintained in place until the replanted site vegetation or seeding is firmly established and the soil has stabilized. All permanent seed mixes used on site should be native.

4.4 HAZARDOUS MATERIALS AND WASTE

4.4.1 Proposed Action

As mentioned in *Section 3.4*, there were two sites located within the project area that were identified within the USEPA's Facility Registration System as registered MD-RCRA sites of interest. Neither the former Laurel Auto Body site nor the Forest Haven site within the DC Children's Center property are located within or adjacent to the potential limit of disturbance area for the duct bank construction.

One site of interest as identified in field visits is the Fort Meade Service Center, located at 3244 Fort Meade Road (MD 198), within the commercial area along the north side of MD 198. The site has gasoline pumps that are currently not in use. A determination of the exact locations of the underground gasoline storage tanks is needed prior to the HDD operations beginning. Impacts to these tanks should be avoidable and will be carefully monitored during construction operations.

Implementation of the Proposed Action would not result in an increase in the production or use of hazardous material or waste. There would be no impacts on above-ground storage.

Due to the possibility of naturally occurring metal arsenic soil at the site, soils will remain at the site during grading. This will require additional movement of earth material and the possibility of temporary retaining walls. Additional measures may include disposing of several feet of existing soil and replacing it with clean soil.

Army policy mandates that all new construction, renovation, and demolition projects include contract performance requirements to divert at a minimum 50 percent of non-hazardous construction and demolition debris from landfill disposal. The contract performance requirements must include removal and disposal of building materials through demolition, recovery, reuse, and recycling techniques. (U.S. Department of the Army, 2006) Measures to control airborne asbestos and lead dust would be implemented. (FGGM, 2007)

4.4.2 No-Action Alternative

Under the No-Action Alternative, a new substation would not be constructed. The existing hazardous materials management for the current mission would remain unchanged.

4.4.3 Cumulative Impacts

The construction and operation of a new substation at the 9500 Area would not add to the cumulative impacts of hazardous materials and waste within FGGM and vicinity.

4.4.4 Mitigation

Minor construction-related hazardous substance release would be avoided using standard BMPs. No other mitigation measures would be necessary. Potential hazardous material impacts from the Proposed Action was considered in conjunction with other ongoing and proposed actions within FGGM, yielding no increases to cumulative impacts.

4.5 CULTURAL RESOURCES

This section discusses the potential environmental consequences of the Proposed Action on historic and archeological sites.

Historic Sites

Coordination with the Maryland Historical Trust (MHT), serving as the State Historical Preservation Office (SHPO) did not reveal any registered historic sites within the 9500 Area of FGGM (*see Appendix B*).

Archaeological Sites

Archival research did not reveal any documented archeological sites within the 9500 Area and MHT concurs with this finding. However, a 1919 FGGM Installation map vaguely identifies a small "cemetery" plot area between FGGM monuments #44 and #45 within the westernmost section of the 9500 Area. Investigations revealed the land within the vicinity of the cemetery plot to be owned by the Leland Dyke family, but no evidence of graves within the subject site area were discovered through field visits. Additionally, FGGM staff conducted numerous deed and field surveys and completed an extensive search using ground penetrating radar (GPR) technology but found no evidence of a family cemetery. Despite FGGM's due diligence to locate the cemetery, FGGM could not confirm the metes and bounds of the potential cemetery site.

Century Engineering completed a deed search and site survey dated June 15, 2012 to further define the cemetery plot within the Leland Dyke property. The survey resulted in the determination that the Dyke cemetery is located north of the project area, however, the approximate location of a much smaller burial lot within the 9500 Area had been identified in a similar location as shown in the 1919 FGGM Installation map.. The Proposed Action does not encroach on the burial lot.

4.5.1 Proposed Action

Design Concept C is the only design concept that encroaches on the location where the "cemetery" plot was identified on the 1919 map. However, through the Section 106 coordination process, MHT has concurred with FGGM's assessment that there are no cultural resources of concern within the 9500 Area. Therefore, no adverse effects will occur as a result of the substation construction.

4.5.2 No-Action Alternative

Under the No-Action Alternative, a new substation would not be constructed and no disruption of existing site conditions would occur.

4.5.3 Cumulative Impacts

Despite the efforts made by FGGM, the cemetery identified in the 1919 FGGM Installation Map could not be located or confirmed. By locating the substation outside a reasonable stand-off distance from FGGM property monuments #44 and #45, any impacts to the potential cemetery are minimized to the maximum extent possible.

4.5.4 Mitigation

Since no cultural resources could be identified within the project area and the construction of the substation will be outside a reasonable stand-off distance from FGGM property monuments #44 and #45, no mitigation is required. However, if an archaeological resource or evidence of human remains are discovered during construction activities, all work in the area would immediately cease and desist. FGGM will follow the guidelines and notification procedures provided in the 2011 Implementation of the Cultural Resources Management Plan, Fort George G. Meade. Furthermore, any vegetation that is removed within the estimated location of the cemetery site due to construction activities will be replaced with new tree plantings, as discussed in *Section 4.2*.

4.6 INFRASTRUCTURE

This section discusses the potential environmental consequences of the Proposed Action on utilities, potable water, wastewater, and transportation.

4.6.1 Proposed Action

Electricity and Potable Water

As stated in *Section 3.6*, FGGM is in the process of privatizing and upgrading all on-Installation electrical facilities with all aboveground distribution facilities being relocated underground. The Proposed Action will provide the additional distribution circuits needed to improve the capacity of the overall FGGM system. This improvement, combined with the new feeders, diverse supply points and underground transmission construction will result in an overall distribution system that is substantially more robust than the existing system at FGGM.

The new substation, switching station, transmission station and supporting duct bank connections will support the planned expansion at FGGM. The Proposed Action will meet the Installations' reliability and capacity needs for the foreseeable future without impacting power supply redundancy. During construction, temporary power will be supplied through the existing overhead 34kV line, in lieu of using generators.

The proposed substation will require new water connections as part of a fire suppression system.

Stormwater Drainage

An area has been designated for stormwater management within the design layout footprint of limit of disturbance areas for each of the electrical substation build alternatives. For substation design Concept A, this area is within the southeastern portion of the limit of disturbance, and must capture runoff from approximately 3.7 acres of new impervious surface area (substation building and surrounding access road). The designated area for the stormwater management features are within the western portion of the limit of disturbance for Concepts B and C, and must capture runoff from approximately 3.2 acres of new impervious surface area. The exact design layouts of the stormwater management facilities will be established as more detailed design is undergone.

As the project advances into construction, permeable materials will be used where possible within

the substation fence to potentially decrease the amount of new impervious surface area and limit the size of the stormwater management features. However, additional short-term impacts to stormwater could result from construction activities, to include erosion and sedimentation. These impacts should not be of a major nature, and mitigation procedures would be implemented. Stormwater runoff requirements are discussed in more detail in *Section 3.6*.

Wastewater

The proposed substation would not require new wastewater connections.

Transportation

Construction of the Proposed Action may increase the volume of traffic on MD 32 and MD 198 in the short term due to on-road use by construction and grading equipment, construction workforce vehicles, and vehicles delivering construction materials. No major impacts to existing traffic operations along MD 32 or MD 198 during the construction phase are expected. Major impacts would include full roadway or lane closures. Construction and worker vehicles are expected to have sufficient parking space, which would avoid further disturbance to main roads.

The primary means of accessing the substation site during and following construction will be directly from the eastbound travel lanes of MD 32. A stabilized construction entrance will be constructed from the shoulder of eastbound MD 32 across the de-commissioned railroad right-of-way (owned by the SHA) to the substation site. This will be the same for all three build alternatives. The SHA has been consulted regarding this plan and commented that the proposed use is very similar to high voltage transmission line crossings of limited access state highways, and it did not see any reason why the appropriate permits could not be obtained. The stabilized construction entrance would be converted into a permanent access roadway after construction, through a permit issued by the SHA. A locked vehicle barrier would be installed at the approximate location of the old railroad right-of-way to prevent unauthorized vehicles from approaching the station. The vehicle barrier would be very similar to those used at high voltage transmission line crossings.

The Proposed Action does not require any manned personnel in order to operate so any increase in traffic generated as a result of the ongoing operations of the Proposed Action would be negligible.

4.6.2 No-Action Alternative

Under the No-Action Alternative, there would be no impacts to infrastructure systems within the project area, as there would be no construction of a new substation.

4.6.3 Cumulative Impacts

The implementation of the Proposed Action would not impact the average daily traffic on roadways on FGGM or off-installation, and therefore would not add to cumulative traffic impacts within the FGGM vicinity. The SHA is currently conducting a project planning study to evaluate alternatives that would widen existing MD 198 from two lanes to four lanes along the segment adjacent to the proposed receiving pit location for duct installations, as part of all three build alternatives for construction of the Proposed Action. Potential widening of MD 198 would occur at some time after the installation of the transmission line ducts, and construction of the these ducts would not preclude any roadway widening since all of the MD 198 improvement options show widening to occur on the south side of existing MD 198. Coordination between BGE, FGGM and the SHA will continue as both projects advance into design.

Negligible additions to cumulative impacts are anticipated from the additional electricity consumption or on the wastewater system from operation of the proposed substation.

4.6.4 Mitigation

The proposed substation will be designed and constructed to promote energy efficiency. The use of gas-insulated technology instead of air-insulated technology eliminates the need for the use of transformer oil as part of the operating system, therefore negating the potential for oil spills. Stormwater BMPs associated with the new facility will mitigate negative changes in overall water quality. Surface water and water quality mitigation is discussed in more detail in *Section 4.9*.

4.7 LAND USE

Impacts to land use were evaluated based on whether conflicts with adjacent land use, zoning, or other planning regulations, or incompatibility with existing land use, would result from any potential construction and operations of the proposed facilities within the Proposed Action. During the siting process for the substation, site constraints, including but not limited to any negative impact to adjacent buildings (WWTP), the adjacent DC Children's Center property, and future land designations were taken into consideration.

4.7.1 Proposed Action

The 9500 Area has a current land use designation of 'industrial', as defined in the *Real Property Master Plan – Long Range Component, Fort Meade, MD.* While the construction of the substation would limit the future use of the impacted land, this would not alter the proposed designated future land use of the 9500 Area, which is recommended to remain 'industrial', as designated within the October, 2011 *Real Property Master Plan Update*.

The receiving pit drilling operations associated with the HDD construction to install the 230kV transmission lines and associated ducts may cause temporary physical impacts to the baseball fields adjacent to intersection of MD 198 and Bald Eagle Drive. As stated in *Section 3.7*, the baseball fields are owned and operated by the Patuxent Research Refuge (U.S. Fish and Wildlife Service – Department of the Interior) and are open to the general public at all times during the year through a permit. The Army classifies this land use as 'outdoor recreation'. An adjacent area used for overflow parking to the baseball fields is owned by FGGM and may also be temporarily impacted by construction operations. Construction activities may prohibit the use of one or more of the baseball fields as well as the overflow parking area temporarily. As the project progresses into final design, continued coordination will occur with the Patuxent Wildlife Refuge and FGGM to develop a design that avoids or minimizes the temporary impacts to the baseball fields and adjacent parking lot.

Concept A

Alternative A consists of an Air Insulated Switchgear substation, an access road, duct banks and transmission line connections, disrupting up to 15.5 acres of the 'industrial' use. There would be no zoning or development conflicts associated with the proposed project. Operation of the proposed substation facility is consistent with the existing land use designation.

Concept B

Alternative B consists of a Gas Insulated Switchgear substation, an access road, duct banks and transmission line connections, disrupting up to 10.3 acres of the 'industrial' use. Operation of this type of substation facility is consistent with the existing land use designation.

Concept C (Chosen Concept)

Concept C consists of a Gas Insulated Switchgear substation (identical to the technology and layout shown in Concept B), an access road, duct banks and transmission line connections. However, due to a longer access road and additional site grading needs, this alternative disrupts up to 11.3 acres of the 'industrial' use. Similar to Concepts A and B, operation of this type of substation facility is consistent with the existing land use designation.

Construction of the transmission line duct banks will only require utility easements and areas where the bore pits and manholes will be constructed will not affect the current land use designations of 'open space – mature, deciduous, riparian forest', 'brush', 'pasture', 'institutional', 'commercial' and 'industrial'. Potential impacts due to the construction of the bore pit at the MD 198 and Bald Eagle Drive intersection are discussed in the following section.

4.7.2 No-Action Alternative

Under the No-Action Alternative, there would be no impacts to land use within the project vicinity, as there would be no construction or removal of trees associated with a new substation.

4.7.3 Cumulative Impacts and Master Plan Consistency

The potential implementation of the Proposed Action is consistent with future land use recommendations as designated within the 2011 Long Range Component of the *Real Property Master Update*. The Plan designates the 9500 Area to remain as an 'industrial' designation and also as an area planned for 'utilities expansion and wetland preservation'. The Proposed Action does not alter the land use patterns of adjacent property or on FGGM.

4.7.4 Mitigation

Implementation of the Proposed Action would not affect land use within the region of influence because no adverse land use impacts were identified. However, there will be the potential for temporary land use impacts to the commercial properties along MD 198 during HDD drilling operations associated with the bore pit construction. Any potential temporary physical impacts to the baseball fields and adjacent parking lot as a result of the transmission line connection and receiving pit drilling operations will be repaired and restored to its original condition at the full cost of BGE. Construction staging and drilling operations will occur during the months with the least amount of recreational activity on the baseball fields, to minimize impacts to the recreational activities. Coordination will be on-going with the Patuxent Wildlife Refuge regarding the baseball fields and with FGGM regarding the parking lot off of Bald Eagle Drive.

4.8 SOCIOECONOMICS

4.8.1 Proposed Action

Construction of the Proposed Action is expected to last up to one year and will require temporary construction workers. The construction phase could have a temporary positive effect on the local economy through the employment of some sectors of the local construction community. On the

negative side, temporary access impacts to the three operating businesses along MD 198 are expected. One of the drilling and receiving pit locations for the 230kV transmission line installation is proposed to be within the parking lot of the Southern Style BBQ and Casey's Crab Company businesses. Portions of the paved parking areas may be closed off and access to MD 198 may be affected. The parking areas to both the Fort Meade Service Center and the Elite Autoservice Center are not anticipated to be impacted, but temporary access closures to MD 198 may occur due to construction staging.

The operation of the proposed substation does not require any permanent personnel. No decrease in FGGM employees are anticipated so therefore, there would not be an impact on the socioeconomic conditions (demographics, housing, and income) of FGGM.

4.8.2 No-Action Alternative

Under the No-Action Alternative, there would be no impacts to the social environment within the project area, as there would be no construction of a new substation.

4.8.3 Cumulative Impacts

Overall impacts to socioeconomics from the Proposed Action are temporary and moderate in magnitude in the short-term and inconsequential in the long-term. However, through the BRAC 2005 Federal mandate, FGGM was a primary site for the relocation and consolidation of several DoD organizations, which will have a greater positive impact in the long-term. The relocation was completed in September of 2011, with a net gain of over 5,705 positions on the Installation.

4.8.4 Mitigation

Construction of the drilling and receiving pit within the parking lots of both the Casey's Crab Company and Southern Style BBQ eateries would require mitigation in the form of a relocated parking area during construction and possibly a new parking area or aesthetic treatments to the property following construction activities. Restrictions on construction hours may be warranted as well due to potential noise and dust impacts. Dialog between the project team and the owners of all four of the businesses along MD 198 is recommended throughout the final design and construction phases.

4.9 WATER RESOURCES

4.9.1 Surface Water

Surface water includes temporary and permanent surface drainage impacts such as perennial, intermittent, and ephemeral streams, and erosion and sediment control.

4.9.1.1 Proposed Action

General construction impacts associated with the Proposed Action could affect water resources by increased stormwater runoff from the site carrying sediment and contamination loads into surface water during times of heavy rain. However, impacts to streams and channels were avoided by using HDD technology and no impacts to surface water from on-going operations of the proposed substation are anticipated.

4.9.1.2 No-Action Alternative

The No-Action Alternative will have no effect on surface water within the Proposed Action except for normal changes in hydrology due to storms and other natural causes.

4.9.1.3 Cumulative Impacts

The cumulative impact to surface waters is negligible on FGGM due to the avoidance and minimization of surface water impacts.

4.9.1.4 Mitigation

The construction contractor would be required to comply with the *Maryland Erosion and Sediment Control Guidelines for State and Federal Projects* (Maryland Department of the Environment, 2010a) and the *Stormwater Management Guidelines for State and Federal Projects* (Maryland Department of the Environment, 2010b) to avoid and minimize erosion at the construction site and sediment runoff to any nontidal wetlands in the vicinity of the proposed construction site. An MDE-approved stormwater management plan and erosion and sediment control plan must be obtained prior to any earth disturbance.

4.9.2 Wild and Scenic Rivers

There are no impacts to Wild and Scenic Rivers by the Proposed Action.

4.9.3 Water Quality

FGGM would continue to adhere to all appropriate and applicable water quality regulations including but not limited to Section 303(d) of the CWA, the Antidegradation Policy Implementation Procedure, Code of Maryland Regulation (COMAR) 26.08.02.04-1 and the general protection of the Chesapeake Bay tributaries and all groundwater aquifers that underlie FGGM.

4.9.4 Groundwater

4.9.4.1 Proposed Action

General construction impacts associated with the Proposed Action could affect water resources by contamination from construction activities infiltrating area soils and percolating down into the groundwater.

The preferred design concept for the substation uses Gas Insulated Switchgear Technology which halves the footprint of the substation and enables several other environmental benefits noted in specific subsections in this document, including reduced potential for oil spills into groundwater (from oil coolants used in air insulated substations).

The Proposed Action is not expected to impact groundwater resources, aquifers, or wells during construction or permanently.

4.9.4.2 No-Action Alternative

The no-action alternative will have no effect on groundwater within the Proposed Action.

4.9.4.3 Cumulative Impacts

The cumulative impact to groundwater is negligible on FGGM due to no impact by the proposed action.

4.9.4.4 Mitigation

Impacts to groundwater were avoided by choosing to utilize the Gas Insulated Switchgear Technology as the preferred option.

4.9.5 Coastal Zone

To abide by the policies set forth within the Maryland Coastal Zone Program, a consistency determination and supporting materials will be provided to Maryland DNR prior to the start of construction. The displays will show that impacts to wetlands are being avoided; and impacts to floodplains and forested areas are being minimized and preserved to the maximum extent possible.

4.9.6 Wetlands

Updated wetland delineations were performed for the project's area of potential impact in March and April of 2012.

4.9.6.1 Proposed Action

The construction of the new substation (Design Concept A) would cause approximately 0.5 acre of impacts to the nontidal palustrine forested wetlands within the 9500 Area (WL005, WL014, WL015, and WL018), as shown in *Figures 3-4 and 4-1*. A small percentage of these impacts are to WL014 and WL018, which are high quality wetlands directly associated with the Little Patuxent River (*see Table 3-9*). Additional direct wetland impacts to non-FGGM property are less than 0.1 acre. Wetland WL001, which is currently fragmented and culverted beneath an existing access road, would be impacted by the construction of the proposed switching station and drilling operations for the 230kV transmission duct banks. There would also be approximately 1.1 acre of impacts to the 25-foot wetland buffer caused by Design Concept A, of which 0.9 acre is FGGM property.

Design Concept B would cause approximately 0.5 acre of impacts to the nontidal palustrine forested wetlands within the 9500 Area (WL005 and WL015), as shown in *Figures 3-4 and 4-2*. These impacts are primarily to WL015, an isolated wetland which begins along SHA's MD 32 and the B & O Railroad right-of-way and extends southward. Additional direct wetland impacts to non-FGGM property (WL001) are less than 0.1 acre. There would also be approximately 0.9 acre of impacts to the 25-foot wetland buffer, of which 0.7 acre is FGGM property.

Design Concept C would cause approximately 0.1 acre of impacts to the nontidal palustrine forested wetlands within the 9500 Area (WL005 and WL015), as shown in *Figures 3-4 and 4-3*. Additional direct wetland impacts to non-FGGM property (WL001) are less than 0.1 acre. Design Concept C decreases impacts to the 25-foot wetland buffer to approximately 0.5 acre, of which 0.3 acre is FGGM property.

Table 4.4 compares the wetland and stream impacts by design concept and type of system.

Table 4-4 Impacts to Wetlands and Streams by Design Concept +

Impact	Design Concept A	Design Concept B	Design Concept C
Priority, Nontidal Wetlands *(Palustrine Forested, Mixed Deciduous and Evergreen, Persistent, Seasonally Flooded/Saturated)*	< 0.1 ac.	< 0.1 ac.	< 0.1 ac
Lower quality, Nontidal Wetland Impacts	0.5 ac.	0.5 ac.	0.1 ac.
Total Direct Wetland Impact *	< 0.6 ac.	< 0.6 ac.	< 0.2 ac.
Total 25-foot Wetland Buffer Impacts	1.1 ac.	0.9 ac.	0.5 ac.
Perennial Streams (LF)	0	0	0
Ephemeral Channels (LF)	0	0	0

+ Includes transmission connections and assumes Horizontal Directional Drilling (HDD) for duct bank corridors

* Less than 0.1 of the total impacts are on non-FGGM property

4.9.6.2 No-Action Alternative

Without the construction of a new substation, no impacts would occur to nontidal wetlands or their buffers.

4.9.6.3 Cumulative Impacts

Construction activities due to the implementation of the substation (Design Concept C) and the transmission connections could result in the loss of less than 0.2 acre of isolated nontidal wetlands and up to 0.5 acre of their associated 25-foot buffers. Almost all of these potential impacts are on FGGM property, but the cumulative impact to the amount of wetlands and wetland buffers is negligible on FGGM due to the avoidance and minimization of wetland impacts on all projects.

4.9.6.4 Mitigation

Any proposed impacts to the wetlands and/or 25' buffer will require a Joint-Permit Application to be submitted to the MDE and USACE. Avoidance and minimization would be demonstrated to regulators to justify any potential impacts to wetland resources. Mitigation for impacts is generally not required for less than 5,000 square feet of nontidal wetland impacts in a Use I-P watershed designation. Mitigation for greater than 5000 square feet of impacts would be required, either by creating wetlands on FGGM property, purchasing credit in an existing wetland mitigation bank, or paying into the MDE Nontidal Wetland Compensation Fund.

With Alternative C, a 100 foot buffer to wetlands abutting the Little Patuxent River could be self-imposed to the maximum extent practical as mitigation and for protection of water resources to ensure no impacts to the Wetland of Special State Concern downstream. Impacts over 5,000 square feet of nontidal wetlands are not expected therefore no mitigation for nontidal wetland impacts over 5,000 square feet is necessary.

Any impacts that occur off of FGGM property would be addressed separately by BGE, off of the installation.

4.9.7 Floodplains

4.9.7.1 Proposed Action

No permanent impacts to floodplains from the proposed project are anticipated. The 230kV transmission lines will be installed using HDD technology, which avoids surface disturbance to the Little Patuxent River tributaries and its associated 100-year floodplain. The limit of disturbance causes approximately 0.3 acre of temporary impacts to the 100-year floodplain, within the vicinity of the MD 198/Bald Eagle Drive bore pit, which is entirely on FGGM property. None of the design concept footprints of the proposed substation impact the floodplain.

FGGM would continue to adhere to all appropriate and applicable water quality regulations.

4.9.7.2 No-Action Alternative

Under the No-Action Alternative, there would be no additional impacts to water (surface water, groundwater, wetlands, and floodplains) within the project area, as there would be no construction of a new substation.

4.9.7.3 Cumulative Impacts

Implementation of the proposed action would not result in measurable cumulative impacts on floodplains.

4.9.7.4 Mitigation

Impacts to floodplains are being minimized or avoided to the maximum extent possible. Horizontal Directional Drilling has been proposed to avoid most of the floodplain of the Little Patuxent River. Proper erosion and sediment control regulations and stormwater management regulations will be followed. We propose expanding the forest buffer to the Little Patuxent River to 100 feet wherever possible to further protect resources. We have proposed and designed a much higher cost facility that greatly reduces environmental impacts.

The incorporation of these mitigation measures and BMPs into the design phase of the project reduces impacts to water resources below the level of significance. Under all circumstances, sediment runoff from the site will be captured and prevented from entering area surface water bodies, especially the Little Patuxent River.

5.0 CONCLUSION

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

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5.0 CONCLUSION

The Proposed Action is expected to disturb approximately 21.9 acres of land, of which 13.1 acres is FGGM property. The majority of the land is previously undisturbed with mature trees and other woody growth, requiring a total of 15.8 acres of forest cover to be removed. There would be minor impacts (less than 0.2 acre) to jurisdictional wetlands and less than 0.5 acre to the 25-foot wetland buffer. The installation of transmission line duct banks underneath the Little Patuxent River and MD 32 would not cause any impacts due to the use of HDD technology. There are no other impacts to stream crossings within the project area. Minor impacts to the 100-year floodplain (0.3 acres) may occur during construction operations only, and would be temporary. Short-term impacts to traffic, business access, and air quality and noise levels could be expected during construction of the project. The Proposed Action would not displace any residences or businesses, nor would it require private right-of-way acquisition. No adverse cultural resource impacts are anticipated and neither of the two identified potential hazardous sites within the project area would be impacted by the proposed construction activities or ongoing operations.

Mitigation for the environmental impacts for the Proposed Action would include the utilization of gas insulated switchgear (GIS) technology to reduce the footprint of the new substation and corresponding impacts on vegetation, water resources and habitat. The project includes the voluntary establishment of a 100-foot expanded buffer to nontidal wetlands adjacent to the Little Patuxent River (where possible) and contractors would preserve existing vegetation where possible and adhere to best management practices (BMP's) during construction. Any reforestation that may be required will be in accordance with the most recent FGGM Forest Conservation Act (FCA) and Tree Management Policy.

The Proposed Action is not expected to have any significant adverse effects on environmental resources or socioeconomic conditions at FGGM. All agency coordination and permitting requirements for the Proposed Action would be completed prior to construction of the project. Based on the evaluation of environmental consequences by this EA, an Environmental Impact Statement will not be needed and a Finding of No Significant Impacts (FNSI) will be prepared.

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6.0 REFERENCES

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

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7.0 AGENCIES AND INDIVIDUALS CONTACTED

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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The following agencies and individuals were consulted or provided information during the preparation of the EA:

US Army - FGGM
Michael Butler, Chief
Directorate of Public Works, Environmental Division
Fort Meade, Maryland 20755-7068

Ms. Suzanne Teague, Environmental Scientist,
Directorate of Public Works, Environmental Division
Fort Meade, Maryland 20755-5115

Mr. John Houchins, Natural Resources Program Manager,
Directorate of Public Works, Environmental Division
Fort Meade, Maryland 20755-5115

Mr. Jerald Glodek, Environmental Protection Specialist
Directorate of Public Works, Environmental Division
Fort Meade, Maryland 20755-7068

National Security Administration
Mr. Edward Molen, NSA Facilities Liaison to FGGM

Maryland Department of Natural Resources
Ms. Lori Byrne,
Tawes States Office Building
580 Taylor Avenue
Annapolis, MD 21401

U.S. Environmental Protection Agency- Region 3
Mr. Bill Arguto,
1650 Arch Street
Philadelphia, PA 19103

Maryland Office of Planning
Ms. Linda C. Janey, Maryland State Clearinghouse
301 West Preston Street – Room 1104
Baltimore, Maryland 21201-2365

Maryland Department of the Environment
Ms. Brigid Kenny, Office of the Secretary
1800 Washington Boulevard
Baltimore, MD 21230

U.S. Department of the Interior Fish and Wildlife Service
Mr. Leopoldo Miranda
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

Maryland Historical Trust
Ms. Elizabeth J. Cole
State Historic Preservation Office
100 Community Place
Crownsville, MD 21032-2023

APPENDIX A:
DISTRIBUTION LIST

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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State and Federal Agencies

Maryland Dept. of Natural Resources
Ms. Lori Byrne,
Tawes State Office Building
580 Taylor Avenue
Annapolis, MD 21401

U.S. Environmental Protection Agency Region 3
Mr. William Arguto,
1650 Arch Street
Philadelphia, PA 19103-2029
Mailcode EA30

Maryland Office of Planning
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301 West Preston Street – Room 1104
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U.S. Department of the Interior Fish and Wildlife Service
Mr. Leopoldo Miranda
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177 Admiral Cochrane Drive
Annapolis, MD 21401

Regional and Local Offices

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Ms. Brigid Kenny, Office of the Secretary
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U.S. Department of the Interior Fish and Wildlife Service
ATTN: Devin Ray
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401

Anne Arundel County Maryland Office of Environmental & Cultural Res.
ATTN: Ms. Ginger Ellis
2664 Riva Road
Annapolis, MD 21401

Anne Arundel Soil Conservation District
Mr. Joseph A. Haamid,
Resource Conservationist
Heritage Office Center
2662 Riva Road, Suite 150, MS #7001
Annapolis, MD 21401-7377

Maryland Department of Housing & Community Development
Maryland Historical Trust Division of Historical and Cultural Programs
ATTN: Elizabeth J. Cole
100 Community Place
Crownsville, MD 21032-2023

Maryland Dept. of Agriculture
ATTN: Joe Oberg,
Public Information Officer
50 Harry S. Truman Parkway
Annapolis, MD 21401

Maryland Dept. of Planning
ATTN: Bob Rosenbush, Planner
301 West Preston Street, Suite 1101
Baltimore, MD 21201

Maryland Dept. of Transportation
State Highway Administration
ATTN: Lee Johnston, Mail Stop C303
707 North Calvert Street
Baltimore, MD 21202

Libraries

Medal of Honor Memorial Library
Building 4418
4418 Llewellyn Avenue
Fort Meade, MD 21401

West County Area Library
ATTN: Ms. Cynthia Bischoff
1325 Annapolis Road
Odenton, MD 21113

Newspapers

The Annapolis Capital

The Baltimore Sun

The Maryland Gazette

The SoundOff

APPENDIX B:
AGENCY COORDINATION AND CORRESPONDENCE

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

14 SEP 2011

Dave Manly
Century Engineering, Inc
10710 Gilroy Road
Hunt Valley, MD 21031

RE: Tipton Substation, Fort George G Meade, Anne Arundel County, Maryland

Dear Mr. Manly:

EPA has received and reviewed your August 5, 2011 letter regarding the Tipton Substation and any potential environmental issues that may need to be considered during the preparation of an Environmental Assessment (EA). The proposed project involves the construction of an electrical substation to provide increased electrical capacity to the Fort George G. Meade. Based on the limited information provided in your letter, we are unable to provide a comprehensive set of comments.

Information regarding the purpose and need, alternatives analyzed, avoidance and minimization of resources, and cumulative effects for the proposed project should be included in the EA. The alternatives analysis should include alternate site layouts and alternative parcels.

Adverse impacts to natural resources, especially wetlands and other aquatic resources should be avoided and minimized wherever possible. The EA should describe the total size of the wetlands, and impact amount proposed by each build alternative. The type of wetlands, in addition to functions and values should be provided. Upon a cursory review of the project location, it appears that wetlands and streams may be present within the study area. Based on information available to EPA, it appears that the Little Patuxent River immediately adjacent to the study area is listed on the Clean Water Act 303(d) list for biological, metals- mercury, nutrients and sediment. The proposed project includes the construction of drainage facilities. Stormwater ponds and best management practices (BMPs) should not be located in wetlands and streams.

Another area of potential concern is the project's affect on air quality in the study area. Based on information available to EPA, the study area is located within non-attainment areas for both ozone and PM-2.5. EPA also suggests coordinating with appropriate federal, state and local official regarding potential forest loss and any affects on rare, threatened or endangered species. It would also be recommended to coordinate with these agencies on possible impacts to forest interior dwelling species and habitat. The area may be a wildlife hub or corridor as defined by Maryland Department of Natural Resources' Green Infrastructure assessment. Consider ways to minimize impacts to wildlife passage.

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EPA is aware of several other past, present, and reasonably foreseeable projects occurring in the area of the proposed project, including improvements to Maryland Route 198. EPA strongly encourages a thorough cumulative impact analysis for past, present and reasonably foreseeable projects occurring in the project area. EPA is concerned about the potential for indirect and cumulative effects in this area.

Thank you for coordinating with EPA on this project. We look forward to working with you on this project as more information becomes available. If you have any questions and would like to discuss our comments, the staff contact for this project is Ms. Alaina DeGeorgio; she can be reached at 215-814-2741 or degeorgio.alaina@epa.gov.

Sincerely,

Barbara Rudnick
NEPA Team leader
Office of Environmental Programs

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DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, UNITED STATES ARMY GARRISON
4551 LLEWELLYN AVENUE, SUITE 5000
FORT GEORGE G. MEADE, MARYLAND 20755-5000

REPLY TO
ATTENTION OF:

FEB 2 1 2012

Directorate of Public Works

Mrs. Elizabeth J. Cole
State Historic Preservation Office
Maryland Historical Trust
100 Community Place
Crownsville, Maryland 21032-2023

Dear Mrs. Cole:

The purpose of this letter is to supply your office with a brief description of our efforts to avoid effects on historic resources at a proposed BG&E Substation construction project at Fort George G. Meade, Anne Arundel County, Maryland. The project area is located immediately south of Route 32 in a heavily wooded area between Route 198 and Baltimore Washington Parkway. The majority of the project will take place on the former westernmost section of the Leland Dyke family parcel. An early 1917 Post map indicates a "Cemetery" parcel between Fort Meade monuments #44 and # 45 with deed research indicating two parcels totaling approximately one acre as still belonging to the Leland Dyke family.

The proposed Action is the construction of a BG&E substation to be located on the 9500 area which BG&E may also refer to as the Tipton area. This planned substation will serve the National Security Agency (NSA) campus. The new substation will provide additional capacity and improved reliability.

Efforts to avoid historic resources have entailed previous desktop research that did not reveal any documented archaeological sites within the 9500 area. An extensive search to locate the Leland Dyke family graveyard as depicted on the Fort Meade 1917 Post map, using GPR technology in conjunction with ancestry research, resulted in locating the Dyke family burial sites in Woodlawn Cemetery in Baltimore County, Maryland. Additionally, Fort Meade conducted numerous field and deed surveys in its efforts to locate the "cemetery" as depicted on Fort Meade's 1917 Post map. No evidence of a family cemetery was ever found.

In closing, Fort Meade has relocated the construction project footprint to avoid conflict with the potential "cemetery" parcels.

Questions concerning this issue may be directed to Mr. Jerald Glodek, Cultural Resource Manager, at (301) 677-9179.

Sincerely,

Michael P. Butler

Michael P. Butler
Chief, Environmental Division

MDP

Maryland Department of Planning

Martin O'Malley
Governor
Anthony G. Brown
Lt. Governor

Richard Eberhart Hall
Secretary
Matthew J. Power
Deputy Secretary

August 15, 2011

Mr. Michael Perrotta, P.E.
Chief Engineer
Century Engineering, Inc.
10710 Gilroy Road
Hunt Valley, MD 21031

STATE CLEARINGHOUSE REVIEW PROCESS

State Application Identifier: MD20110810-0635
Reply Due Date: 09/14/2011
Project Description: Scoping prior to E.A.: proposed electrical substation to increase Army base's electrical capacity: site preparation; prepare transmission duct banks; access roads, and drainage facilities
Project Address: Fort George G. Meade
Project Location: County of Anne Arundel
Clearinghouse Contact: Bob Rosenbush

Dear Mr. Perrotta:

Thank you for submitting your project for intergovernmental review. Your participation in the Maryland Intergovernmental Review and Coordination (MIRC) process helps to ensure that your project will be consistent with the plans, programs, and objectives of State agencies and local governments.

We have forwarded your project to the following agencies and/or jurisdictions for their review and comments: the Maryland Departments of Natural Resources, the Environment, Transportation, Business and Economic Development; the Maryland Military Department; the County of Anne Arundel; and the Maryland Department of Planning; including the Maryland Historical Trust. A composite review and recommendation letter will be sent to you by the reply due date. Your project has been assigned a unique State Application Identifier that you should use on all documents and correspondence.

Please be assured that we will expeditiously process your project. The issues resolved through the MIRC process enhance the opportunities for project funding and minimize delays during project implementation.

If you need assistance or have questions, contact the State Clearinghouse staff noted above at 410-767-4490 or through e-mail at brosenbush@mdp.state.md.us. Thank you for your cooperation with the MIRC process.

Sincerely,

Linda C. Janey

Linda C. Janey, J.D., Assistant Secretary
for Clearinghouse and Communications

LCJ:BR

11-0635_NRR.NEW2.doc

301 West Preston Street • Suite 1101 • Baltimore, Maryland 21201-2305
Telephone: 410.767.4500 • Fax: 410.767.4480 • Toll Free: 1.877.767.6272 • TTY Users: Maryland Relay
Internet: Planning.Maryland.gov

Maryland Department of Planning

Martin O'Malley
Governor
Anthony G. Brown
Lt. Governor

Richard Eberhart Hall
Secretary
Matthew J. Power
Deputy Secretary

March 19, 2012

Mr. Michael Perrotta, P.E.
Chief Engineer
Century Engineering, Inc.
10710 Gilroy Road
Hunt Valley, MD 21031

STATE CLEARINGHOUSE RECOMMENDATION

State Application Identifier: MD20110810-0635
Applicant: Century Engineering, Inc.
Project Description: Scoping prior to E.A.: proposed electrical substation to increase Army base's electrical capacity: site preparation; prepare transmission duct banks; access roads, and drainage facilities
Project Address: Fort George G. Meade
Project Location: Anne Arundel County
Approving Authority: U.S. Department of Defense (ARMY)

Recommendation: Consistent with Qualifying Comments and Contingent Upon Certain Actions

Dear Mr. Perrotta:

In accordance with Presidential Executive Order 12372 and Code of Maryland Regulation 34.02.01.04-.06, the State Clearinghouse has coordinated the intergovernmental review of the referenced project. This letter, with attachments, constitutes the State process review and recommendation based upon comments received to date. This recommendation is valid for a period of three years from the date of this letter.

Review comments were requested from the Maryland Departments of Natural Resources, the Environment, Transportation, Business and Economic Development, the Maryland Military Department, Anne Arundel County, and the Maryland Department of Planning, including the Maryland Historical Trust. As of this date, Anne Arundel County has not submitted comments. **This recommendation is contingent upon the applicant considering and addressing any problems or conditions that may be identified by their review. Any comments received will be forwarded.**

The Maryland Historical Trust stated that their finding of consistency is contingent upon the Applicant's completion of the review process required under Section 106 of the National Historic Preservation Act. The Maryland Historical Trust commented that Section 106 consultation between the Maryland Historical Trust, and the Federal agency is required.

The Maryland Departments of Transportation, and the Environment found this project to be generally consistent with their plans, programs, and objectives, but included certain qualifying comments summarized below.

The Maryland Department of Transportation stated that as far as can be determined at this time, the subject has no unacceptable impacts on plans or programs.

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Internet: Planning.Maryland.gov

The Maryland Department of the Environment submitted these qualifying comments.

1. Any solid waste including construction, demolition and land clearing debris, generated from the subject project, must be properly disposed of at a permitted solid waste acceptance facility, or recycled if possible. Contact the Solid Waste Program at (410) 537-3318 for additional information.

2. The proposed project involves rehabilitation, redevelopment, revitalization, or property acquisition of commercial, industrial property. Accordingly, MDE's Brownfields Site Assessment and Voluntary Cleanup Programs may provide valuable assistance to you in this project. These programs involve environmental site assessment in accordance with accepted industry and financial institution standards for property transfer. For specific information about these programs and eligibility, please contact James Carroll, Program Administrator, Land Restoration Program at (410) 537-3437.

The Maryland Department of the Environment also submitted the enclosed comments concerning water-quality standards, and a map.

The remaining review agencies found this project to be consistent with their plans, programs, and objectives.

Any statement of consideration given to the comments should be submitted to the approving authority, with a copy to the State Clearinghouse. The State Application Identifier Number must be placed on any correspondence pertaining to this project. The State Clearinghouse must be kept informed if the approving authority cannot accommodate the recommendation.

Please remember, you must comply with all applicable state and local laws and regulations. If you need assistance or have questions, contact the State Clearinghouse staff person noted above at 410-767-4490 or through e-mail at brosenbush@mdp.state.md.us.

Thank you for your cooperation with the MIRC process.

Sincerely,

Linda C. Janey

Linda C. Janey, J.D., Assistant Secretary

LCJ:BR
Enclosures

cc: Beth Cole - MHT
Greg Golden - DNR
Joane Mueller - MDE
Melinda Gretsinger - MDOT
Tammy Edwards - DBED
Lawrence Leone - MILT
John Dodds - ANARP

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Maryland Department of the Environment - Science Services Administration

REVIEW FINDING: **R1 Consistent with Qualifying Comments (MD2011 0810-0635)**

The following additional comments are intended to alert interested parties to issues regarding water quality standards. The comments address:

A. Water Quality Impairments: Section 303(d) of the federal Clean Water Act requires the State to identify impaired waters and establish Total Maximum Daily Loads (TMDLs) for the substances causing the impairments. A TMDL is the maximum amount of a substance that can be assimilated by a waterbody such that it still meets water quality standards.

Planners should be aware of existing water quality impairments identified on Maryland's 303(d) list. The Project is situated in the Little Patuxent River watershed, identified by the 8-digit code 02131105 which is currently impaired by several substances and subject to regulations regarding the Clean Water Act.

Planners may find a list of nearby impaired waters by entering the 8-digit basin code into an on-line database linked to the following URL: http://www.mde.state.md.us/programs/Water/TMDL/Integrated303dReports/Pages/303d.aspx.

This list is updated every even calendar year. Planners should review this list periodically to help ensure that local decisions consider water quality protection and restoration needs. **Briefly, the current impairments that are relevant to the Project include the following:**

Little Patuxent River (02131105)

Sediments:	**Non-tidal. A TMDL has been written and submitted to EPA.**
Metals:	**Non-tidal. A TMDL for Cadmium is pending development.**
Biological:	**Non-tidal. A TMDL is pending development.**

B. TMDLs: Development and implementation of any Plan should take into account consistency with TMDLs developed for the impaired waterbodies referenced above. Government decisions made prior to the development of a TMDL should strive to ensure no net increase of impairing substances. TMDLs are made available on an updated basis at the following web site: http://www.mde.state.md.us/programs/Water/TMDL/CurrentStatus/Pages/Programs/WaterPrograms/TMDL/Sumittals/index.aspx

Special protections for high-quality waters in the local vicinity, which are identified pursuant to Maryland's anti-degradation policy;

C. Anti-degradation of Water Quality: Maryland requires special protections for waters of very high quality (Tier II waters). The policies and procedures that govern these special waters are commonly called "anti-degradation policies." This policy states that "proposed amendments to county plans or discharge permits for discharge to Tier II waters that will result in a new, or an increased, permitted annual discharge of pollutants and a potential impact to water quality, shall evaluate alternatives to eliminate or reduce discharges or impacts." These permitted annual discharges are not just traditional Point Sources, it can include all discharges such as Stormwater.

Currently, Tier II waters are not present in the area surrounding the project.

Planners should be aware of legal obligations related to Tier II waters described in the Code of Maryland Regulations (COMAR) 26.08.02.04 with respect to current and future land use plans. Information on Tier II waters can be obtained online at: http://www.dsd.state.md.us/comar/getfile.aspx?file=26.08.02.04.htm and policy implementation procedures are located at http://www.dsd.state.md.us/comar/getfile.aspx?file=26.08.02.04-1.htm

Planners should also note that since the Code of Maryland Regulations is subject to periodic updates. A list of Tier II waters pending Departmental listing in COMAR can be found, with a discussion and maps for each county, at the following website:
http://www.mde.state.md.us/programs/researchcenter/EnvironmentalData/Pages/researchcenter/data/waterqualitystandards/antidegradation/index.aspx

ADDITIONAL COMMENTS

Chesapeake Bay TMDL
With the completion of the Chesapeake Bay TMDL, the Chesapeake Bay Program Office (CBPO) will be able to provide loading data at a more refined scale than in the past. MDE will be able to use the CBPO data to estimate pollution allocations at the jurisdictional level (which will include Federal Facilities) to provide allocations to the Facilities. These allocations, both Wasteload (WLA) and Load Allocation (LA) could call for a reduction in both Point Sources and Nonpoint Sources.

Stormwater
The project should consider all Maryland Stormwater Management Controls. Site Designs should consider all Environmental Site Design to the Maximum Extent Practicable and "Green Building" Alternatives. Designs that reduce impervious surface and BMPs that increase runoff infiltration are highly encouraged.

Further Information:
http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/Pages/Programs/WaterPrograms/SedimentandStormwater/swm2007.aspx

Environmental Site Design (Chapter 5):
http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/MarylandStormwaterDesignManual/Documents/www.mde.state.md.us/assets/document/chapter5.pdf

Redevelopment Regulations:
http://www.dsd.state.md.us/comar/comarhtml/26/26.17.02.05.htm

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John R. Griffin, Secretary
Joseph P. Gill, Deputy Secretary

March 28, 2011

Ms. Martha Stauss
Human & Rohde, Inc.
512 Virginia Avenue
Towson, MD 21286

RE: Environmental Review for NSA/Fort Meade Tipton Substation, along Patuxent Freeway (MD 32) near Laurel Fort Meade Road (MD 198), Anne Arundel County, Maryland.

Dear Ms. Stauss:

The Wildlife and Heritage Service has determined that there are no State or Federal records for rare, threatened or endangered species within the boundaries of the project site as delineated. However, we would like to bring to your attention that the Wildlife and Heritage Service's database indicates that there is a Great Blue Heron colony documented within approximately ¼-mile of the project site. This colony was documented as being active in 2003 but there is no recent data available as to its current status. If the colony utilizes this site during the breeding season, then we would encourage the applicant to follow these guidelines:

The approximate location of the colony site is indicated on the attached map. Heronries of this type are a rare resource. Significant mortality of chicks or eggs resulting from disturbance of the colony during the breeding season is also a violation of the U.S. Migratory Bird Treaty. Disturbance includes actions such as cutting nest trees, cutting nearby trees or nearby construction that causes abandonment of chicks by the adults.

Great Blue Herons establish nesting colonies in forested areas that are relatively predator- and disturbance-free. Colony sites are often adjacent to water, in forested non-tidal wetlands and/or floodplains. Colony sites are rare; all of Maryland's Great Blue Heron population nests at fewer than 50 locations. As Maryland continues to grow and develop, secure nest sites for Great Blue Herons will become scarcer. Whenever possible Great Blue Heron colony sites should be conserved as part of responsible land stewardship. To protect Great Blue Heron colonies we use the following guidelines:

1. Establish a protection area of ¼ mile radius from the colony's outer boundary. Within this area establish three zones of protection: Zone 1 extends from the outer boundary of the colony to a radius of 330 feet, Zone 2 extends from 330 feet to 660 feet in radius, and Zone 3 extends from 660 feet to ¼ mile (1320 feet).

2. During the breeding season, 15 February through 31 July, all human entry into Zone 1 should be restricted to only that essential for protection of the colony. Human disturbance of colony sites that results in significant mortality of eggs and/or chicks is considered a prohibited taking under various state and federal regulations.

3. No land use changes, including development or timber harvesting, should occur in Zone 1.

4. Construction activities, including clearing, grading, building, etc., should not occur within Zones 1 and 2.

5. Selective timber harvesting may occur in Zone 2, but clearcutting should be avoided.

Tawes State Office Building – 580 Taylor Avenue – Annapolis, Maryland 21401
410-260-8DNR or toll free in Maryland 877-620-8DNR – www.dnr.maryland.gov – TTY Users Call via the Maryland Relay

6. No construction or timber harvesting activities should occur within the ¼ mile protection area during the Great Blue Heron breeding season.

The Wildlife and Heritage Service provides assistance to those interested in protecting this resource. The above guidelines are usually suitable for protection of most Great Blue Heron colonies. Specific protection measures depend upon site conditions, planned activities, colony site type and history, and other factors.

It is also important to note that the nearby Little Patuxent River is known to support occurrences of the state-listed threatened fish Glassy Darter (*Etheostoma vitreum*) and the following odonate species:

Scientific Name	Common Name	State Status
Celithemis ornata	Faded Pennant	Historical*
Celithemis martha	Martha's Pennant	Rare
Cordulegaster obliqua	Arrowhead Spiketail	Rare
Epitheca costalis	Slender Baskettail	Rare
Gomphaeschne antilope	Taper-tailed Darner	Rare
Gomphus rogersi	Sable Clubtail	In Need of Conservation
Helocordulia selysii	Selys' Sunfly	Threatened
Libellula flavida	Yellow-sided Skimmer	Rare
Stylurus laurae	Laura's Clubtail	Rare
Nehalennia integricollis	Southern Sprite	Rare
Nehalennia gracilis	Sphagnum Sprite	Rare
Ophiogomphus incurvatus incurvatus	Appalachian Snaketail	Endangered
Somatochlora filosa	Fine-lined Emerald	Rare
Somatochlora provocans	Treetop Emerald	Endangered

* Official status is Historical, although its Maryland state status is likely to change in the near future.

A portion of the Little Patuxent River downstream of the project site is designated in state regulations as a Wetland of Special State Concern. In order to reduce the likelihood of adverse impacts to these important species that are supported by the Little Patuxent River and its associated wetlands, we offer the following:

PROTECTION MEASURES FOR AQUATIC HABITATS SUPPORTING RARE, THREATENED AND ENDANGERED SPECIES

1) Pursue environmentally sensitive design to address stormwater runoff by promoting the use of nonstructural best management practices to the maximum extent. The goal is to mimic natural infiltration patterns across the site in order to maintain natural hydrology.
   a) Methods to pursue include the use of sheet flow to buffers, vegetated channels to convey road runoff (i.e. roadside swales), disconnection of roof and non-roof runoff, methods of bioretention such as rain gardens.
   b) Reduce impervious cover as outlined in the MDE stormwater management manual section 5.3, available online at their website: http://www.mde.state.md.us/programs/Water/StormwaterManagementProgram/MarylandStormwaterDesignManual/Pages/Programs/WaterPrograms/SedimentandStormwater/stormwater_design/index.aspx. In addition to these methods, options to pursue include the use of shared parking/driveways and pervious materials wherever possible.
   c) Locate impervious surfaces as far as possible from permanent and intermittent streams and their floodplains.

2) In order to minimize risk of sedimentation in the aquatic and wetland habitats and to minimize changes to the hydrology of these habitats:
   a) Minimize clearing and retain forest - The limits of disturbance should be the minimum needed to build homes, allow access and provide fire protection. Conduct clearing and construction in phases in order to avoid having large areas cleared at one time. Pursue clustered development in order to allow retention of large blocks of contiguous upland forest along streams and wetlands.
   b) Stabilize soil - Stabilization should occur immediately (within 24 hours). Special effort should be made to retain fine particle silt, sand and clay sediments including the incorporation of redundant/additional control measures in the sediment and erosion control plan to ensure maximum filtration of any sediment-laden runoff (e.g., accelerated stabilization, super silt fence instead of silt fence, etc.).
   c) Inspect frequently - All measures should be inspected daily to ensure that they are functional from the very initial stages through final construction, and any problems should be corrected immediately.
   d) Provide a minimum 100 ft undisturbed forested upland buffer to permanent and intermittent streams and nontidal wetlands.
   e) Avoid disturbing steep slopes (15% slope or greater) and areas of highly erodible soils.
3) Where instream work is unavoidable, provide adequate passage for fish, reptiles and amphibians. Further consultation with the Natural Heritage Program should be sought in order to minimize impacts from instream work in or upstream from rare species' aquatic and wetland habitats.

In addition, our analysis of the information provided also suggests that the forested area on the project site contains Forest Interior Dwelling Bird habitat. Populations of many Forest Interior Dwelling Bird species (FIDS) are declining in Maryland and throughout the eastern United States. The conservation of FIDS habitat is strongly encouraged by the Department of Natural Resources. In order to do so, the following guidelines could be incorporated into the site design to help minimize the project's impacts on FIDS and other native forest plants and wildlife:

1. Restrict development to nonforested areas.
2. If forest loss or disturbance is unavoidable, concentrate or restrict development to the following areas:
   a. the perimeter of the forest (i.e., within 300 feet of existing forest edge)
   b. thin strips of upland forest less than 300 feet wide
   c. small, isolated forests less than 50 acres in size
   d. portions of the forest with low quality FIDS habitat, (i.e., areas that are already heavily fragmented, relatively young, exhibit low structural diversity, etc.)
3. Maximize the amount if forest "interior" (forest area >300 feet from the forest edge) within each forest tract (i.e., minimize the forest edge:area ratio). Circular forest tracts are ideal and square tracts are better than rectangular or long linear forests.
4. Minimize forest isolation. Generally, forests that are adjacent, close to, or connected to other forests provide higher quality FIDS habitat than more isolated forests.
5. Limit forest removal to the "footprint" of houses and to that which is necessary for the placement of roads and driveways.
6. Minimize the number and length of driveways and roads.
7. Roads and driveways should be as narrow and as short as possible; preferably less than 25 and 15 feet, respectively
8. Maintain forest canopy closure over roads and driveways.
9. Maintain forest habitat up to the edges of roads and driveways; do not create or maintain mowed grassy berms.
10. Maintain or create wildlife corridors.

11. Do not remove or disturb forest habitat during April-August, the breeding season for most FIDS. This seasonal restriction may be expanded to February-August if certain early nesting FIDS (e.g., Barred Owl) are present.
12. Landscape homes with native trees, shrubs and other plants and/or encourage homeowners to do so.
13. Encourage homeowners to keep pet cats indoors or, if taken outside, kept on a leash or inside a fenced area.
14. In forested areas reserved from development, promote the development of a diverse forest understory by removing livestock from forested areas and controlling white-tailed deer populations. Do not mow the forest understory or remo woody debris and snags.
15. Afforestation efforts should target a) riparian or streamside areas that lack woody vegetative buffers, b) forested riparian areas less than 300 feet wide, and c) gaps or peninsulas of nonforested habitat within or adjacent to existing FIDS habitat.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

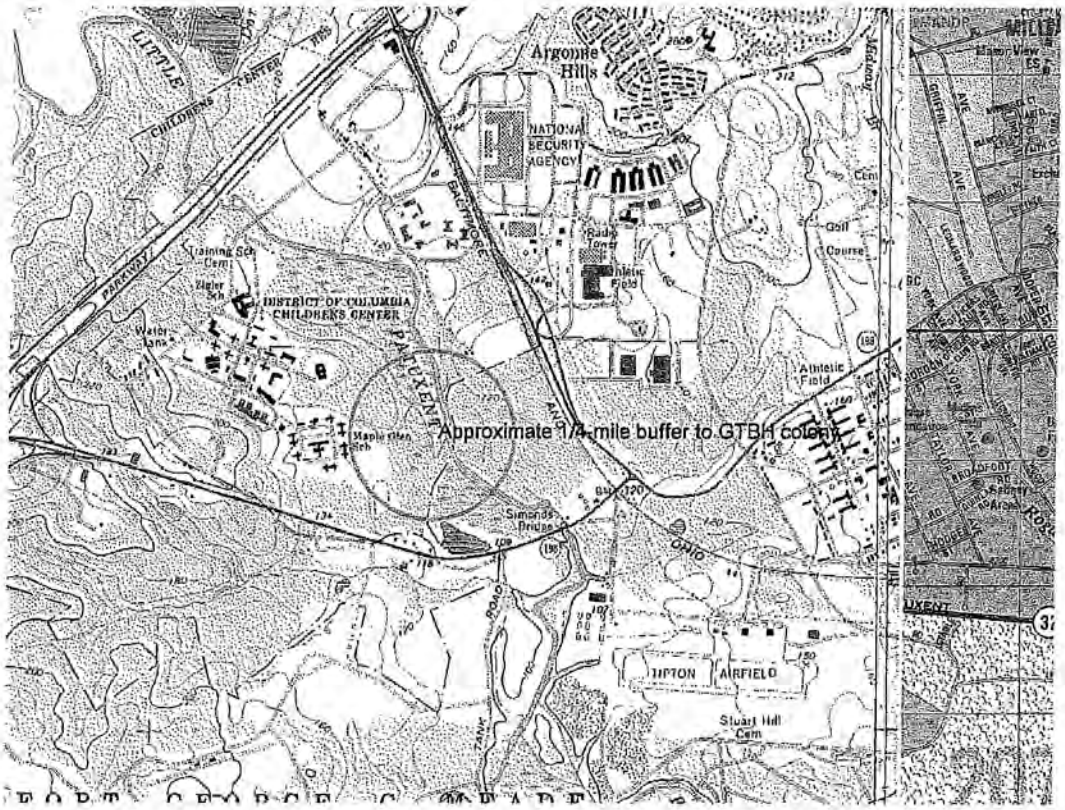
Sincerely,

Lori A. Byrne

Lori A. Byrne
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER # 2011.0177.aa
Cc: K. McCarthy, DNR
Attachment

Anne Arundel County



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N
W E
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Col. Wbird Buffers
7.5' Quad Grid
County Boundary

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, Maryland 21401
http://www.fws.gov/chesapeakebay

June 13, 2012

Century Engineering
10710 Gilroy Road
Hunt Valley, MD 21031

RE: BGE Encased Ductbank Projects – Russett Switching Station to Tipton Substation &Tipton Substation to North & South Stations Laurel, Anne Arundel County MD

Dear Eleanor T. Wilson:

This responds to your letter, received May 14, 2012, requesting information on the presence of species which are federally listed or proposed for listing as endangered or threatened within the vicinity of the above reference project area. We have reviewed the information you enclosed and are providing comments in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*).

Except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project impact area. Therefore, no Biological Assessment or further section 7 Consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. For information on the presence of other rare species, you should contact Lori Byrne of the Maryland Wildlife and Heritage Division at (410) 260-8573.

Effective August 8, 2007, under the authority of the Endangered Species Act of 1973, as amended, the U.S. Fish and Wildlife Service (Service) removed (delist) the bald eagle in the lower 48 States of the United States from the Federal List of Endangered and Threatened Wildlife. However, the bald eagle will still be protected by the Bald and Golden Eagle Protection Act, Lacey Act and the Migratory Bird Treaty Act. As a result, starting on August 8, 2007, if your project may cause "disturbance" to the bald eagle, please consult the "National Bald Eagle Management Guidelines" dated May 2007.

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If any planned or ongoing activities cannot be conducted in compliance with the National Bald Eagle Management Guidelines (Eagle Management Guidelines), please contact the Chesapeake Bay Ecological Services Field Office at 410-573-4573 for technical assistance. The Eagle Management Guidelines can be found at:
http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf.

In the future, if your project can not avoid disturbance to the bald eagle by complying with the Eagle Management Guidelines, you will be able to apply for a permit that authorizes the take of bald and golden eagles under the Bald and Golden Eagle Protection Act, generally where the take to be authorized is associated with otherwise lawful activities. This proposed permit process will not be available until the Service issues a final rule for the issuance of these take permits under the Bald and Golden Eagle Protection Act.

An additional concern of the Service is wetlands protection. Federal and state partners of the Chesapeake Bay Program have adopted an interim goal of no overall net loss of the Basin's remaining wetlands, and the long term goal of increasing the quality and quantity of the Basin's wetlands resource base. Because of this policy and the functions and values wetlands perform, the Service recommends avoiding wetland impacts. All wetlands within the project area should be identified, and if construction in wetlands is proposed, the U.S. Army Corps of Engineers, Baltimore District, should be contacted for permit requirements. They can be reached at (410) 962-3670.

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interests in these resources. If you have any questions or need further assistance, please contact Devin Ray at (410) 573-4531.

Sincerely,

G. La Rouche

Genevieve LaRouche
Supervisor

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APPENDIX C:
VEGETATION SUMMARY

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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Linear Corridor from Russett to the 9500 Area

This linear corridor extends from the terminus of Old Portland Road, continuing east along MD 198 traversing the Little Patuxent River to the 9500 area. Except for the roadways and a small commercial development, the linear corridor is heavily wooded with a mix of young to mature forest. Topography is moderate to gently sloping to the northeast as it transitions to nearly level floodplain in the vicinity of the Little Patuxent River. One forest stand sample plot was taken in each stand in accordance with MD DNR criteria for linear projects. A total of twenty-three specimen trees were recorded throughout the southwestern portion of the project area. Forested areas were classified into nine stands in accordance with the DNR *State Forest Conservation Technical Manual*.

Site visits occurred during March 2012, at which time one sample plot was taken in each stand in accordance with MD DNR criteria for linear projects. These sample plots were chosen at random and each was 1/10 acre in size. Within each plot all plant species were identified, along with their relative size, diameter at breast height, maturity, dominance (occurrence) and basal area in square feet per acre. The percentage of canopy closure was estimated, along with the percentage of understory and herbaceous coverage. The following is a brief summary of each of the forest stands.

Forest Stand #1

Forest Stand #1, a mixed deciduous hardwood-conifer forest, occupies approximately 5.5 acres within the western part of the project area. It is bounded by Old Portland Road to the northeast and continues to the southwest outside of the project area. Topography associated with this stand is gently sloping to the southwest.

This late mid-successional stand has a canopy layer dominated by chestnut oak (*Quercus prinus*), Virginia pine (*Pinus virginiana*), red oak (*Quercus rubra*), and white oak (*Quercus alba*) in the 12 to 19.9-inch size class. Co-dominant species consist of Virginia pine, red maple (*Acer rubrum*), red oak and white oak in the 6 to 11.0-inch size class; and black gum (*Nyssa sylvatica*) in the 12 to 19.9-inch size class. Virginia pine, white oak, sweet gum (*Liquidambar styraciflua*), red maple, flowering dogwood (*Cornus florida*) and black oak (*Quercus velutina*) are the common understory and shrub species. Minimal herbaceous cover was noted within the forest stand. Greenbrier (*Smilax rotundifolia*) and Japanese honeysuckle (*Lonicera japonica*) make up the herbaceous layer.

No specimen trees were located in the portion of Stand #1 that lies within the project area. Canopy closure within the stand is estimated at approximately 75% and basal area is 120 square feet per acre. Two standing dead trees, one each in the 2 to 5.9-inch and 6 to 11.9-inch size classes were identified. The forest floor contains approximately 1.5-inches of leaf litter and downed woody debris is estimated at 5%. Overall, the stand is in good health with good regeneration potential.

Forest Stand #2

Forest Stand #2, a deciduous hardwood forest, occupies approximately 0.70 acre within the project area, which is bound by Old Portland Road to the southwest, buildings to the northwest, and forest stand #3 to the southeast. This late mid-successional, good quality stand continues to

the northeast outside of the project area. Topography slopes gently away from the project area to the northeast at 5-10%.

Stand #2 is dominated by black oak in the 20 to 29.9-inch size class and chestnut oak in the 12 to 19.9-inch size class. Co-dominant species include tulip poplar (*Liriodendron tulipfera*), in the 6 to 11.9-inch size class. Chestnut oak, black gum, black oak, red maple, dogwood, black cherry, tulip poplar, highbush blueberry (*Vaccinium corybosum*), and American holly (*Ilex opaca*) make up the understory species within the stand. Herbaceous cover is estimated at approximately 30% and is comprised mainly of greenbrier and blueberry species.

Canopy closure is estimated at approximately 80% and basal area is 150 square feet per acre. Downed woody debris is estimated at 5% with two standing dead trees within the sample plot. Leaf litter depth is less than a half inch. Disturbance, including cut trees and tire tracks were noted during the field investigation. Stand #2 is in priority health; however, disturbance from utilities is evident adjacent to the roadway.

Forest Stand #3

Forest Stand #3 is a 0.53 acre early successional conifer forest. The forest stand is dominated by Virginia pine in fair condition located to the northeast of Old Portland Road. It is bordered by forest stand #2 to the northwest and west, an open area to the southeast, and Old Portland Road to the southwest. Topography slope gently to the northeast.

The stand is dominated and co-dominated by Virginia pine in the 2 to 5.9-inch and 6 to 11.9-inch size classes. Virginia pine, black cherry, white pine, black gum, red maple and white oak compose the understory and shrub species within the stand. Japanese honeysuckle, American holly, blueberry, and grass species compose the herbaceous species layer. No specimen trees were identified in this early successional stand. Canopy closure is estimated at approximately 80% and basal area is estimated at 130 square feet per acre. Leaf litter during field activities was approximately one-inch and downed woody debris is 10-15% based on plot location within the stand. Minimal invasive species coverage was noted within the stand. Overall, the stand is in fair condition due to invasive species and open canopy areas.

Forest Stand #4

Forest Stand #4, a mid-successional bottomland hardwood deciduous forest dominated by tulip poplar and black oak in the 12 to 19.9-inch size class and tulip poplar in the 20 to 29.9-inch size class. The stand is located to the north of MD 198 and is bounded by MD 198 to the south; forest stand #2 to the west, stand #5 to the east and continues out of the project area to the north. Approximately 5.5 acres of the stand is located within the project area. Co-dominant species include sweet gum and white oak species in the 12 to 19.9-inch size class range. Common understory and shrub layer species consist of American holly, tulip poplar, sweet gum, white oak, red maple, and ironwood (*Carpinus caroliniana*). Greenbrier and blueberry comprise the limited herbaceous layer within the stand, which is estimated at 5% coverage. No invasive species were noted during the field investigation. Leaf litter is less than one-half inch and downed woody debris is estimated at 10%. Canopy coverage is approximately 80% and basal area is estimated at 160 square feet per acre. The stand is in priority health and has good regeneration potential.

Forest Stand #5

Forest Stand #5 is an early successional hardwood forest located adjacent to MD 198. The stand is bordered by MD198 to the south, stands #4 and #6 to the west and east, and continues out of the project area to the north. The portion of the stand within the project area comprises approximately 1.13 acres. Size classes of dominant species, including white oak, sweet gum, and American beech (*Fagus grandifolia*) are 6 to 11.9-inches and 12 to 19.9-inches. Understory species include white oak, beech, sweet gum, red maple, red cedar (*Juniperus virginiana*) and pin oak (*Quercus palustris*). Canopy coverage within the stand is estimated at approximately 90%. Little to no herbaceous vegetation (5% coverage) was noted during the field investigation. Basal area for the stand is calculated at 100 square feet per acre. This stand is in fair health due to vine growth and the presence of invasive species.

Forest Stand #6

Forest Stand #6 is a 0.82 acre early successional hardwood forest that is bordered by MD 198 to the south, sparsely vegetated areas to the north, development to the west and an open area to the east. Dominant species, including green ash (*Fraxinus pennsylvanica*) and cottonwood (*Populus deltoides*) are in the 12 to 19.9-inch size class. Predominant understory and shrub species include green ash, sweetgum, red maple, box elder (*Acer negundo*), slippery elm (*Ulmus rubra*), ironwood, and cottonwood. Canopy coverage is estimated at 75% and basal area is calculated at 110 square feet per acre. Herbaceous species include spring beauty (*Claytonia virginica*), greenbrier, grass species, and Japanese honeysuckle. Overall, the stand is in fair health due to the presence of invasive species and vine growth.

Forest Stand #7

Forest Stand #7 is a mid-successional mixed hardwood floodplain forest located at the eastern most point of the alignment and continues outside of the project area. Dominant species within the stand include tulip poplar, red oak, and American sycamore (*Platanus occidentalis*) in the 20 to 29.9-inch and greater than 30-inch size classes. The portion of the stand within the project area is approximately 1.5 acres and is bordered by MD 198 to the south the Little Patuxent River to the northeast, and forest/wetland areas to the west and east. Common understory and shrub species include American beech, ironwood, and box elder. Canopy coverage is estimated at 95% and basal area is calculated at 120 square feet per acre. Herbaceous species within the stand include poison ivy (*Toxicodendron radicans*), fox grape (*Vitis labrusca*), Japanese honeysuckle, spring beauty, and grasses. Invasive coverage is low at 2%, consisting mainly of Japanese honeysuckle. This stand is in good condition with large mature trees, a closed canopy and good regeneration potential.

Forest Stand #8

Forest Stand #8 is a mid-successional mixed deciduous hardwood forest located parallel to MD 198. It is bordered by MD 198 to the north, development to the south, and forested areas to the east and west. The stand continues to the south outside of the project area. The portion of the stand within the project area comprises approximately 0.92 acre. Dominant canopy species include red oak in the 20 to 29.9-inch size class; and white oak and sweet gum in the 12 to 19.9-inch size class. Common understory and shrub species include American beech, white oak, sweet gum, and dogwood. Canopy coverage is calculated at 90% and basal area is estimated at 130 square feet per acre. Herbaceous species coverage is estimated at 25%, with Japanese

honeysuckle representing the lone invasive species noted. Leaf litter within the stand is approximately two-inches and downed woody debris is estimated at 5%. The portion of stand #8 within the project area is in fair condition due to disturbance from right of ways, vine growth and invasive species.

Forest Stand #9

Forest Stand #9 is a mid-successional conifer-hardwood deciduous stand is bounded by Forest Stand 10 to the north, a railway easement to the east, and a waste water treatment plant to the south. The stand continues southwest beyond the limits of the proposed action. The portion of the stand within the project area comprises approximately 0.25 acre. Dominant canopy species include sweetgum, Virginia pine, tulip poplar, and American beech in the 6 to 29.9-inch size class. American beech, tulip poplar, and sweetgum are the dominant understory and shrub species. The herbaceous layer, which is sparse, is dominated by various fescue species and Japanese stiltgrass.

No specimen trees were found during the field survey. Canopy closure within the stand was estimated at approximately 70% and basal area was determined to be 220 square feet per acre. There was moderate downed woody debris between 4 to 16 inch DBH with good decay rate. Litter depth was 1 to 1.5 inches. This area has good regeneration potential with little to no invasive cover.

The topography in the stand is level. Forest Stand 9 is a priority 1 retention forest due to the regeneration potential, good structural diversity and health, lack of invasive cover, and good canopy closure. This is a mid-successional stand with a low amount of invasive species coverage.

9500 Area

Except for the railroad bed, the 9500 Area of FGGM is a heavily wooded, mature forest, with a mix of flat and gentle rolling terrain with a total elevation change of 22 feet and maximum slopes of seven (7) percent (*see Figure 3-2*). Forested areas were classified into three stands in accordance with the DNR *State Forest Conservation Technical Manual*.

Site visits occurred during February and early March, 2011, at which time eight sample plots were inventoried. These sample plots were chosen at random and each was 1/10 acre in size. Within each plot all plant species were identified, along with their relative size, diameter at breast height, maturity, dominance (occurrence) and basal area in square feet per acre. The percentage of canopy closure was estimated, along with the percentage of understory and herbaceous coverage. The following is a brief summary of each stand.

Forest Stand #10

The forest stand is located on the southern half of the 9500 area. The canopy layer is composed of mixed oaks including White Oak, Northern Red Oak, Willow Oak, Pin Oak and Black Oak. The most common size class of the dominant species is twenty to thirty inches. The stand is in good condition with an age of about 200 years. The understory consists of American Beech, Sweetgum, Red Maple, and Hornbeam. Shrub cover is fairly dense and includes saplings of the canopy and Paw Paw, Poison Ivy, and Highbush Blueberry. Forest floor plants include Stiltgrass and some forest sedge. There are 2-3 standing snags. The groundcover layer is sparse and about

half of the layer is invasive with Japanese Stiltgrass, however no other invasive plants were in this stand. The acorns of most oaks are highly palatable to many species of birds and mammals. They are an important food source for bobwhite, red-headed woodpecker, red-bellied woodpecker, blue jay, tufted titmouse, grackle, white-breasted nuthatch, sapsuckers, quail, northern flicker, thrasher, ruffed grouse and a particularly important food source for wild turkey. Cavities in oaks are important nesting sites for a large variety of birds and mammals. Oaks are also larval host plants for hairstreaks and duskywing butterflies. There are thirty-nine specimen trees in the stand. Forest stand #3 rates highest in a structural analysis of the 9500 area stands, with the least number and amount of invasive species, the most number of different native species of trees and shrubs, thickest cover of leaf litter, and mid to late successional forest stage.

Forest Stand #11

This stand is located in the north central portion of the site and along the northwestern border. This stand is a Tulip Poplar - Sweetgum dominated forest stand in good condition. The stand is mid-to late successional The canopy consists of Tulip Poplar, Red Maple, Sweetgum and American Beech. This stand differs from Forest Stand #12 due to the presence of American Beech, a slow growing climax species and with few Sycamore in the stand along with several other factors. The diameter at breast height of the dominant species is approximately thirty inches. The understory layer is primarily saplings of the canopy and Boxelder, Green Ash and Paw Paw. The shrub layer is about 65% and is composed of Spicebush, Paw Paw, Barberry and some American Holly. The herbaceous and low woody plant cover is about 55% cover and consists of Poison Ivy, Japanese Honeysuckle, Stiltgrass, and Greenbriar. There is evidence of previous logging in the stand and an old road, with the approximate stand age of 180 years old, however older trees may have been logged. Standing snags are common within the stand, providing habitat for woodpeckers and other cavity dwelling species. Habitat provided by Tulip Poplar and Sweetgum is similar to Forest Stand #12. Beech mast is eaten by a variety of birds and mammals, including mice, squirrels, chipmunks, deer, foxes, ruffed grouse, ducks, and bluejays. Invasive plant cover is about half of the groundcover but scarce in other layers. Forty-nine specimen trees are located within this stand.

Forest Stand #12

This forest stand is located on the northeast corner of the project lease area, west of the railroad bed/utility easement. This stand is a Tulip Poplar – Sweetgum - Sycamore stand in good health. No insect damage or disease was noted. The canopy layer is composed of Sycamore, Tulip Poplar, Sweetgum, and Red Maple. The average diameter at breast height of the dominant species is over thirty inches, with some individual trees measuring up to fifty-four inches. The understory consists of a large amount of Paw Paw, with Red Maple, Sweetgum, Willow Oak, and Tulip Poplar. The shrub layer is dense and contains a mixture of Barberry, Spicebush, Paw Paw and Grape. Forest floor plants include Japanese Honeysuckle, Stiltgrass, and wild onion. Invasive plants make up about ten percent of the shrub layer and the herbaceous layer. The stand age is approximately 200 years old. Tulip Poplar and Sweetgum are shade intolerant, pioneer species. They often invade open sites, therefore this stand is considered mid-successional. Seeds of both trees are eaten by birds, squirrels and chipmunks. Northern bobwhites, purple finches, cardinals, robins, chickadees, cottontails, squirrels, and white-footed mice consume the samaras of Tulip Poplar. Ruby-throated hummingbirds and bees consume nectar from the flowers. Paw Paw trees are the only host plant of the Zebra Swallowtail butterfly caterpillar. Standing snags

are common in the stand, providing food and habitat for woodpeckers. Twenty-seven specimen trees (over thirty inches in diameter at breast height) are located within forest stand #12.

Linear Corridor parallel to MD 32

This linear corridor extends from the 9500 area north to the undisclosed MPO entry points south of the Baltimore Washington Parkway. This Except for the maintained utility right-of-ways and the area surrounding Oak Hill Drive, the linear corridor is heavily wooded with mature forest. Topography is generally sloping southwest toward the Little Patuxent River with moderate to nearly level terrain. One forest stand sample plot was taken in each stand in accordance with MD DNR criteria for linear projects. A total of eighteen specimen trees were recorded throughout the linear corridor. Forested areas were classified into five stands in accordance with the DNR *State Forest Conservation Technical Manual*.

Site visits occurred during May 2012, at which time one sample plot was taken in each stand in accordance with MD DNR criteria for linear projects. These sample plots were chosen at random and each was 1/10 acre in size. Within each plot all plant species were identified, along with their relative size, diameter at breast height, maturity, dominance (occurrence) and basal area in square feet per acre. The percentage of canopy closure was estimated, along with the percentage of understory and herbaceous coverage. The following is a brief summary of each of the forest stands.

Forest Stand #13

This stand is an early-successional mixed hardwood deciduous forest with black cherry (*Prunus serotina*), southern red oak (*Quercus falcata*), tulip poplar, sweet gum, and black locust (*Robinia pseudoacacia*) making up its dominant and co-dominant species. The size class of dominant species ranges between 12 and 19.9-inches. Common understory species include box elder, red maple, white oak, tulip poplar, green ash, and barberry (*Berberis vulgaris*). Approximately 25% of the understory trees were in the 3 to 10 foot tall range. Herbaceous species include garlic mustard (*Alliaria petiolata*), clover species, fox grape, Japanese stiltgrass (*Microstegium vimineum*), phalaris (*Phalaris arundinacea*), and green brier. Stand #13, which continues out of the project area to the west occupies approximately 1.25 acres within the project corridor. Canopy closure is estimated at 70% and basal area is calculated at 130 square feet per acre. Invasive species include Japanese stiltgrass and phalaris. Little to no leaf litter was evident on the forest floor and a moderate amount of woody debris was noted. Overall, stand #13 is in fair condition due to open areas of the canopy and vine growth. This has good regeneration potential.

Forest Stand #14

This stand is a mid-late successional mixed oak/American beech forest located to the west of MD 32. This stand abuts stand 4 to the south, continues out of the project area to the west, and terminates near Oak Hill Drive. The portion of the stand within the project area comprises approximately 4.4 acres. An approximately 1.1 acre stand (Forest Stand #15) associated with a floodplain/wetland system bisects a portion of stand #14 that is located within the project area. Dominant species within the stand include white oak, southern red oak, American beech, tulip poplar, sweet gum, and black oak in the greater than 20-inch size class. Canopy closure associated with this mature stand is estimated at 90% and basal area is 140 square feet per acre.

Common understory and shrub species include American beech, red maple, white oak, sweet gum, southern red oak and box elder. Approximately 75% of the understory trees are 3 to 10 feet in height. Common herbaceous species include lady fern (*Athyrium filix-femina*), green brier, and grass species. Invasive cover is estimated at less than 5%. Leaf litter on the forest floor measured two inches with little woody debris present. Forest stand #14 is in good condition with mature trees, a closed canopy, and has good regeneration potential.

Forest Stand #15

This stand, an early-mid successional, hardwood, bottomland deciduous forest. The portion of the stand within the project area comprises approximately 1.1 acre. Stand #15 is located to the west of MD 32 and bisects stand #14. Dominant species within the stand include red maple, swamp tupelo (*Nyssa biflora*) and sweet gum in the greater than 20-inch size class. Common understory species include red maple, swamp tupelo, and viburnum species. Canopy cover is estimated at 60% and basal area is calculated at 120 square feet per acre. The herbaceous layer is made up of lady fern, bladder sedge (*Carex intumescens*), green brier, small spike sedge (*Carex nardina*), and fibrous root sedge (*Carex communis*). Invasive species include Japanese honeysuckle and Japanese stiltgrass. Leaf litter measured one-half inch and downed woody debris covered approximately 5% of the stand. Stand #15, which is a wetland forest, is in good condition with a healthy canopy, and has good regeneration potential.

Forest Stand #16

This stand is a mid-successional mixed hardwood forest located to the west of MD 32 near the Canine Road ramp. Approximately 0.9 acre of the stand, which continues offsite to the west and northwest is located within the project area. Dominant species include white oak, southern red oak, tulip poplar, American beech, river birch and red maple, in the 12 to 19.9-inch size class. Canopy closure is estimated at 90% and basal area is calculated at 110 square feet per acre. Common understory species include younger specimens of those listed in the dominant canopy layer. Herbaceous species include grass species, meadow garlic (*Allium canadensis*), lady fern, clover species, poison ivy, and one invasive; Japanese honeysuckle, which covers 5% of the stand. A severely eroded stream that lacks floodplain connection meanders through the stand. Leaf litter within the stand is estimated at less than one-inch and a moderate amount of woody debris covers the forest floor. Stand #16 is in fair condition due to open areas of the canopy, invasive species, and mature trees with declining health.

Hedgerow adjacent to Stand #10

This is a less than one-acre treed area located west of MD 32 and south of stand #10. The basal area, calculated at 60 square feet per acre lacks the density to meet the criteria of a forest stand. Species include sweet gum, elm, and red maple in the 2 to 5.9-inch size class. The canopy coverage is estimated at 70%; however, many openings in the canopy were noted. Common herbaceous species include various grass species and Japanese stiltgrass. The hedgerow is in fair condition due to utility line disturbance and a sparse canopy. This area does have good regeneration potential.

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APPENDIX D:
WETLANDS &
WATERWAY SUMMARY

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

A Constellation Energy Company

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Linear Corridor from Russett to the 9500 Area

Site visits for linear corridor for the south duct bank were conducted during March 2012. The weather on the days of the field visits was sunny, with temperatures between 74 and 81 degrees Fahrenheit. There were at least 4 days of dry weather prior to the field investigation. During the field investigation, five (5) nontidal wetlands, one (1) perennial stream, one (1) intermittent stream and two (2) ephemeral channels were identified within this linear corridor of the project area.

Nontidal Wetlands

Wetland WL001 is a palustrine, forested, broad-leaved deciduous, saturated (PFO1B) wetland within the western extent of the Component 1 corridor, located east of the proposed Russett East Switching Station. Approximately 0.03 acre of this wetland is within the project area. This wetland extends north to south through the project area. Wetland WL001 continues north and south outside of the project area. Wetland WL001 receives hydrology from groundwater and overland flow. The wetland conveys flow south beneath an existing access road through a 12" CMP and outlets in a southerly direction towards an unnamed tributary to the Little Patuxent River. During the field investigation, the hydrologic indicators included surface water, high water table, saturation within the top 12 inches, drainage patterns, and geomorphic position. Vegetation within the wetland is dominated by red maple, swamp white oak, blackgum, highbush blueberry, and roundleaf greenbrier. Hydric soil indicators included matrix and low chroma soils. This wetland is not identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002).

Wetland WL002 is a palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E) wetland beginning approximately 200 feet east of the intersection of Old Portland Road and MD 198 at a headwater seep. The wetland is bounded by the westbound lane of MD 198 to the south and Center Avenue to the east. Approximately 2.34 acres of this wetland is within the project area. This wetland extends east along MD 198, and continues north outside of the project area. Wetland WL002 receives hydrology from groundwater and overland flow and outlets in an easterly direction through a culvert beneath Center Avenue to a perennial stream, WUS WL003. During the field investigation, the hydrologic indicators included saturation, inundation, high water table, and water-stained leaves. Vegetation within the wetland is dominated by red maple, sweetgum, American hornbeam, greater bladder sedge, and Japanese honeysuckle. Hydric soil indicators at the time of the field investigation included organic bodies, depleted matrix, and low chroma soils. This wetland is not identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002).

Wetland WL005 is a palustrine, forested, broad-leaved deciduous/emergent, persistent, seasonally flooded/saturated (PFO/EM1E) wetland within the eastern extent of the Component 1 corridor, located north of MD 198, east of the Fort Meade Service Center, and west of Bald Eagle Drive. Approximately 2.17 acres of this wetland is within the project area. This wetland extends north, and continues outside of the project area. Wetland WL005 receives hydrology from groundwater and overland flow and outlets in a northerly direction towards the Little Patuxent River. During the field investigation, the hydrologic indicators included inundation, saturation, high water table, water-stained leaves, reduced iron, drainage patterns, and watermarks. Vegetation within the wetland is dominated by black willow, sweetgum, red maple, reed canarygrass, and common soft rush. Hydric soil indicators at the time of the field

investigation included muck presence, iron-manganese masses, depleted matrix, and low chorma soils. This wetland is identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002) as a palustrine, forested/scrub-shrub, broad-leaved deciduous, seasonally flooded (PFO/SS1C) wetland.

Wetland WL008 is a palustrine, scrub-shrub, broad-leaved deciduous, temporarily flooded (PSS1A) wetland located south of the intersection of Old Portland Road and MD 198. Approximately 0.16 acre of this wetland is within the project area. This wetland extends south, and continues outside of the project area. Wetland WL008 receives hydrology from groundwater and overland flow and outlets in a southerly direction towards an unnamed tributary to the Little Patuxent River. During the field investigation, the hydrologic indicators included high water table, saturation, water-stained leaves, algal mats, oxidized rhizospheres, and reduced iron. Vegetation within the wetland is dominated by sweetgum and Nepalese browntop. Hydric soil indicators at the time of the field investigation included low chroma soils. This wetland is not identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002).

Wetland WL009 is a palustrine, forested/scrub-shrub, broad-leaved deciduous, temporarily flooded (PFO/SS1A) wetland within southeastern extent of the Component 1 corridor. The wetland is located south of MD 198 and west of Bald Eagle Drive. Approximately 0.18 acre of this wetland is within the project area. This wetland extends south, and continues outside of the project area. Wetland WL009 receives hydrology from groundwater and overland flow and outlets in a northerly direction to Wetland WL005 through a culvert beneath MD 198. During the field investigation, the hydrologic indicators included saturation, inundation, high water table, water-stained leaves, drainage patterns, and geomorphic position. Vegetation within the wetland is dominated by river birch, red maple, green ash, blackberry, and reed canarygrass. Hydric soil indicators at the time of the field investigation included low chroma soils. This wetland is identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002) as a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland.

Waterways

WUS WL003 is a nontidal, intermittent stream located east of center Avenue and north of MD 198. WUS WL003 enters the project area from a culvert draining excess hydrology to the east that originates from Wetland WL005. The stream conveys flows east and north beyond the project area toward the Little Patuxent River. Approximately 312 linear feet (LF) of this stream is within the project area. This intermittent stream had an approximate bankfull width of five (5) feet with an average bankfull height of one (1) foot and an observed average water depth of two (2) inches at the time of the site investigation. The morphology of this stream has been altered by culverts beneath Center Avenue, a sewer crossing and concrete channel stabilization. WUS WL003 is not identified on the *NWI Laurel quadrangle* (USFWS, 1981-2002). Based on the field investigation, the Cowardin Classification for this system is riverine, intermittent, streambed, cobble/gravel/sand (R4SB3/4).

Waterway WL004 is a 52-linear foot segment of a riprap lined ephemeral channel that conveys stormwater drainage from a culvert beneath MD 198 north to WUS WL003. This system receives hydrology as drainage from the surrounding roads and uplands. This channel has an approximate bankfull width of three (3) feet with an average bankfull depth of six (6) inches. Flow within the channel was less than one (1) inch during the site investigation. A Cowardin classification is not applicable due to the ephemeral nature of the channel.

WUS WL006, the Little Patuxent River, is a nontidal, perennial stream located within the northeastern extent of the Component 1 corridor at the proposed ductbank river crossing. WUS WL006 enters the project area from the northwest and conveys flows southeast beyond the limits of the project area. Approximately 535 linear feet (LF) of this stream is within the project area. This perennial stream has an approximate bankfull width of seventy (70) feet with an average bankfull height of three and one- half (3.5) feet and an observed water depth of eight (8) inches at the time of the site investigation. The morphometry of the channel has been altered through the addition of a stormdrain outlet channel along the right bank. WUS WL006 is identified on the *NWI Laurel quadrangle* (USFWS, 1981-2002) as part of a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) system. Based on the field investigation, the Cowardin Classification for this system is riverine, lower perennial, unconsolidated bottom, sand (R2UB4) system.

Waterway WL007 is a 20-linear foot segment of an ephemeral stormdrain outlet channel that conveys stormwater drainage to WUS WL006 (Little Patuxent River). This system receives hydrology as drainage from the surrounding roads and uplands. This channel has an approximate bankfull width of three (3) feet with an average bankfull depth of six (6) inches. Flow within the channel was approximately one (1) inch during the site investigation. A Cowardin classification is not applicable due to the ephemeral nature of the channel.

9500 Area

Five areas of interest/systems were identified in or adjacent to the study area. These include three wetland drainage channels that are present along the eastern edge of the BGE's proposed project Lease area within Area 9500. The channels form a concave system located in a toe of slope geomorphic position in the western central portion of the lease area, and the nontidal wetlands associated with the floodplain of the Little Patuxent River.

Nontidal Wetlands

Wetland WL014 – This system defines the western edge of the 9500 Area as well as the eastern edge of the Little Patuxent River floodplain. The main portion of this large, high quality wetland was dominated by obligate and facultative wetland vegetation and is a palustrine forested broad-leaved deciduous system (PFO1) greater than 50 acres. Pockets of surface water including drainage patterns were present as well as saturated soils. Vegetation along the edge of the wetland included Red Maple, Hornbeam, Sweetbay Magnolia, Spicebush, with Skunk cabbage, and Christmas fern. Soils were sandy silt with a dark surface, showing evidence of prolonged saturation and sedimentation.

Wetland WL015 - This nontidal man-made wetland is an isolated system within the swale next to the railroad bed. It encompasses 0.206 acres of palustrine emergent persistent wetland (PEM1). During ephemeral events the system flows southward to where the swale matches existing grade in the eastern central portion of the project lease area, where the wetland becomes 0.07 acres of isolated palustrine forested broad-leaved deciduous system (PFO1). Vegetation along the length of the channel includes Reed canary grass and Deer-tongue grass, with some Greenbriar and Japanese Stiltgrass. Some Sweetgum samplings are beginning to colonize the edges of the swale and slope. Soil samples within the swale show evidence of prolonged inundation and seasonal groundwater influence by exhibiting a depleted matrix with soft redox

masses and oxidized root channels. The wetland contained pockets of standing water and saturated soils.

Wetland WP016 & WP017 - These isolated man-made nontidal systems are located just east of the railroad ballast and are roadside swales along MD 32. Wetland #2 is similar to Wetland #3 but is physically disconnected by the railroad bed. Both wetlands exhibit colonizing by immature saplings of Sweetgum, demonstrating their succession from emergent to palustrine broad-leaved deciduous scrub-shrub wetlands. Wetland #2 is 0.02 acres of palustrine scrub-shrub broad-leaved deciduous system (PSS1) and wetland #3 is 0.04 acres of palustrine scrub-shrub broad-leaved deciduous system (PSS1). Both wetlands had soil samples with a depleted matrix below dark surface. Vegetation was also similar with Sweetgum colonizing the tree, sapling, and shrub layers, with several invasive species colonizing each layer. Trash and roadside sediment were very commonly mixed with the water-stained leaves of the litter layer.

Wetland WP018 - This system is a small pocket nontidal palustrine forested broad-leaved deciduous (PFO1) wetland just outside the proposed project Lease area on the western-central side. This 0.17 acre wetland lies in a concave area at the toe of slope from the project lease area. The system exhibited prolonged inundation, with buttressed tree trunks, surficial roots, and moss trim lines. Vegetation includes Red Maple and Sweetgum in the canopy, Highbush blueberry in the shrub layer, and Skunk Cabbage, Royal Fern, and New York Fern in the herbaceous groundcover. The soil samples showed a depleted matrix with soft masses of redox features. This system may be hydrologically connected to wetland #5 by subsurface flow.

Linear Corridor Parallel to MD 32

Site visits for the linear corridor from the 9500 area to the Baltimore Washington Parkway were conducted during April 2012. The weather on the days of the field visits was sunny to partly cloudy, with temperatures between 64 and 76 degrees Fahrenheit. There were two weeks of dry weather prior to the initial site visit on April 19th and approximately 1.27 inches of precipitation prior the second field visit on April 24th, 2012. During the field investigation, nine (9) nontidal wetlands, two (2) perennial streams, and three (3) ephemeral channels were identified within the project corridor.

Nontidal Wetlands

Wetland WL010 is a palustrine, forested, broad-leaved deciduous, artificially flooded (PFO1K) wetland within southern extent of the linear corridor. Wetland WL010 is a manmade swale which parallels an access road located west of MD 32 and north of MD 198. Approximately 0.16 acre of this wetland is within the project area. This wetland originates at an ephemeral drainage channel (Waterway WL011) to the north and extends south paralleling the east side the access road through a culvert beneath a private drive, and continues outside of the project area. Wetland WL010 receives hydrology from groundwater and overland flow and outlets in a southerly direction towards an unnamed tributary to the Little Patuxent River (identified as WUS WL006). During the field investigation, the hydrologic indicators included saturation, high water table, sparsely vegetated concave surface, geomorphic position, and surface soil cracks. Vegetation within the wetland is dominated by sweetgum, red maple, green ash, and slippery elm. Hydric soil indicators at the time of the field investigation included low chroma soils and reduced iron.

This wetland is not identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002).

Wetland WL011 is a 0.09 acre palustrine, emergent, persistent, temporarily flooded (PEM1E) wetland within the southern extent of the Component 3 corridor. Wetland WL011 is a manmade swale, located west of MD 32, east of an access road, and north of MD 198 and Wetland WL010. This wetland extends south from the confluence of WUS WL013 to the confluence with Waterway WL011. Wetland WL011 receives hydrology from groundwater and overland flow. During the field investigation, the hydrologic indicators included saturation, inundation, high water table, reduced iron, water-stained leaves, and drainage patterns. Vegetation within the wetland is dominated by narrowleaf cattail and common reed. Hydric soil indicators at the time of the field investigation included oxidized rhizospheres, low croma soils and the presence of muck. This wetland is not identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002).

Wetland WL019 is a palustrine, forested, broad-leaved deciduous, seasonally flooded/saturated (PFO1E) wetland located north of Wetland WP015, south of Wetland WP020 and WUS WL021 (an unnamed tributary to the Little Patuxent River), east of the Little Patuxent River (WUS WL006), and west of MD 32. Approximately 0.57 acre of this wetland is within the project area. This wetland extends west, and continues outside of the project area. Wetland WL019 receives hydrology from groundwater and overland flow and outlets in a westerly direction towards the Little Patuxent River. During the field investigation, the hydrologic indicators included inundation, saturation, high water table, water-stained leaved, and drainage patterns. Vegetation within the wetland is dominated by red maple, swamp tupelo, sweetgum, slippery elm, and greater bladder sedge. Hydric soil indicators at the time of the field investigation included saturation, high water table, water-stained leaves, and drainage patterns. This wetland is not identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002).

Wetland WP020 is a 0.04 acre palustrine, scrub-shrub, broad-leaved deciduous, saturated (PSS1B) wetland located north of Wetland WL019, south of WUS WL021, and east of MD 32. This wetland extends north from a headwater seep located at the toe-of-slope of a roadway berm to the west of a utility access road west of MD 32. Wetland WP008 receives hydrology from groundwater and overland flow; and outlets in a northerly direction towards WUS WL021, an unnamed tributary to the Little Patuxent River. During the field investigation, the hydrologic indicators included water-stained leaves, saturation, high water table, and drainage patterns. Vegetation within the wetland is dominated by sweetgum saplings, lady fern, and greater bladder sedge. Hydric soil indicators at the time of the field investigation included low chroma soils. This wetland is not identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002).

Wetland WP023 is a 0.01 acre isolated manmade palustrine, emergent, persistent, temporarily flooded (PEM1A) wetlands located west of MD 32 and east of the utility access road. Wetland WP023 is located east of Wetland WP020. This wetland is a manmade isolated depressional wetland within the maintained roadway right-of-way of MD 32. The wetland receive hydrology from overland flow from the surrounding uplands and roadway. During the field investigation, the hydrologic indicators included water-stained leaves, inundation, saturation, and a sparsely vegetated concave surface. Vegetation within the wetlands is dominated by narrowleaf cattail, sweetgum saplings, and common soft rush. Hydric soil indicators at the time of the field

investigation included low chroma soils. These wetlands are not identified on the *National Wetland Inventory Map for Laurel, Maryland* (USFWS, 1981-2002).

Waterways

Waterway WL011 is an 84-linear foot segment of an ephemeral channel that originates at a culvert beneath MD 32 and conveys stormwater runoff and surface water drainage from Wetland WL012 south to Wetland WL010. This system receives hydrology as drainage from the surrounding roads, uplands, and wetland. This channel has an approximate width of four (4) feet and an average bankfull depth of five (5) inches. There was no water present in the channel during the site investigation. A Cowardin classification is not applicable due to the ephemeral nature of the channel.

Waterway WL013 is a 529-linear foot segment of an ephemeral channel that originates at a culvert beneath MD 32 and conveys stormwater drainage south. This system receives hydrology as drainage from the surrounding roads and uplands. This channel has an approximate width of four (4) feet and an average bankfull depth of six (6) inches. There was less than one inch of stream flow present in the channel during the site investigation. A Cowardin classification is not applicable due to the ephemeral nature of the channel.

WUS WL021 is a severely eroded nontidal, perennial stream located south of Oak Hill Drive, west of MD 32, east of the Little Patuxent River (WUS WL006), and north of Wetland WP020. WUS WL021 enters the project area from a culvert beneath MD 32 and conveys flow southwest beyond the project area toward the Little Patuxent River. Approximately 296 linear feet (LF) of this stream is within the project area. This perennial stream has an approximate bankfull width of thitry-five (35) feet with an average bankfull height of four (4) feet and an observed water depth of six (6) inches at the time of the site investigation. WUS WL021 is not identified on the *NWI Laurel quadrangle* (USFWS, 1981-2002). Based on the field investigation, the Cowardin Classification for this system is riverine, lower perennial, unconsolidated bottom, sand/cobble/gravel (R2UB3/4).

Waterway WL022 is a 62-linear foot segment of an ephemeral channel that conveys stormwater drainage south to WUS WL021. This system receives hydrology as drainage from the surrounding uplands and an unidentified outlet pipe. This channel has an approximate width of three (3) feet and an approximate depth of one (1) foot. There was less than one inch of stream flow present in the channel during the site investigation A Cowardin classification is not applicable due to the ephemeral nature of the channel.

WUS WL024 is a severely eroded nontidal, perennial stream located south of the Baltimore Washington Parkway (MD 295) at the northern extent of the project area. WUS WL024 enters the project area from a culvert beneath MD 32 and conveys flows southwest beyond the limits of the project area. Approximately 2,020 linear feet (LF) of this stream is within the project area. This perennial stream had an approximate bankfull width of eighteen (18) feet with an average bankfull height of two (2) feet and an observed water depth of four (4) inches at the time of the site investigation. WUS WL024 is not identified on the *NWI Laurel quadrangle* (USFWS, 1981-2002). Based on the field investigation, the Cowardin Classification for this system is riverine, lower perennial, unconsolidated bottom, sand/cobble/gravel (R2UB3/4).

APPENDIX E:
RECORD OF NON-APPLICABILITY (RONA) & AIR QUALITY CALCULATIONS

Fort George G. Meade, BGE Substation - 9500 Area
Final Environmental Assessment

Fort George G. Meade

Baltimore Gas & Electric

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RECORD OF NON-APPLICABILITY (RONA)

FOR CLEAN AIR ACT CONFORMITY

Fort George G. Meade, Anne Arundel County MD

The proposed action falls under the Record of Non-Applicability (RONA) category and is documented with this RONA.

Project/Action Name: BGE Substation - 9500 Area, Fort George G. Meade, Anne Arundel County, Maryland

Project/Action Point of Contact: Michael P. Butler
Chief, Environmental Division
Fort George G. Meade

The Baltimore Gas and Electric Company (BGE), in cooperation with Fort George G. Meade (FGGM), proposes to construct a new switching station, substation, overhead to underground transition station, and associated transmission line duct bank connections to provide electricity to three separate electrical power facilities within the FGGM boundary, for the Maryland Procurement Office (MPO). The construction of the 230kV to 115kV electrical substation will be comprised of the substation building, the access road to MD 32, stormwater management facilities, site grading, and construction of a fence to enclose the substation building and access road. The transmission line duct banks will be installed using a combination of open-cut trenching and horizontal directional drilling (HDD) technology. HDD is a trenchless method of installing underground cables and lines with minimal impact to the surface and surrounding areas. The Proposed Action also includes providing an easement to BGE for the construction of these facilities.

General Conformity under the Clean Air Act, Section 176, has been evaluated for the project described above according to the requirements of 40 CFR 93, Subpart B. The General Conformity Rule applies to Federal actions occurring in regions designated as being in nonattainment for the NAAQS or attainment areas subject to maintenance plans (maintenance areas). Threshold (*de minimis*) rates of emissions have been established for Federal actions with the potential to have significant air quality impacts. If a project/action located in an area designated as a non-attainment or maintenance exceeds these *de minimis* levels, a general conformity determination is required. Anne Arundel County is designated as a moderate ozone (8-hour) non-attainment area and a non-attainment area for the annual PM2.5 standard. Because ozone forms from other emissions, the analysis focuses on ozone precursors which include volatile organic compounds (VOCs), sulfur oxides (SOx), and nitrogen oxides (NOx), as well as PM2.5. The region is in attainment for other criteria pollutants.

A General Conformity applicability analysis of this project/action was performed to assess the air emissions associated with the proposed action to determine if the maximum annual direct and indirect emissions from this project/action would exceed the *de minimis* thresholds. *Table 1* identifies the calculated emissions and compares them to the thresholds.

Table 1 - Comparison of Construction and Operation Emissions to General Conformity Rule *de Minimis* Thresholds in Tons per Year.

Activity	Emissions in Tons/Year			
	NOx	VOCs	PM2.5	SOx
2013 Construction Emissions	16.36	2.30	0.74	0.65
Annual Operation Emission	0	0	0	0
***De Minimis* Thresholds**	100	*50	100	100

*VOC *de minimis* established for nonattainment areas located in ozone transport region.

The result of the applicability analysis concludes that the proposed action is exempt from General Conformity requirements.

Anne Arundel County is in attainment for all other criteria pollutants (carbon monoxide, lead, PM10, PM2.5 (24-hr), and sulfur dioxide and, therefore, these pollutants are not subject to conformity review. Supporting documentation and emission estimates can be found in *Appendix E* of the Environmental Assessment document.

Michael P. Butler

MICHAEL P. BUTLER
Chief, Environmental Division
Directorate of Public Works

10 OCT 2012

Date

AIR QUALITY CALCULATIONS

Air Quality Analysis Methodology Summary

Air pollutant emissions associated with the project's operational activities would be too minimal to analyze since the substation will be enclosed in a building and would be unmanned. In addition, the completed facility will require only occasional maintenance and will not generate regular vehicular use or other operational activities. For the construction phase emissions evaluation, the project was broken into nine construction tasks because each task utilizes different equipment types and has significantly different construction methods. Electrical substation construction consists of site clearing and grading, construction of foundations, and then installation of equipment. These types of activities tend to be intensive for short periods of time. Alternately, construction of duct banks tend to be less intensive activities that extend for longer periods of time, characteristic of a linear utility project. Therefore, analysis on a task by task basis was needed to avoid making assumptions that could result on under or overestimating the emissions associated with each task.

The tasks are listed as follows:

Task 1: Overhead Tap for the MPO South Substation
Task 2: 230kV Tap for the existing Russett Substation
Task 3: 230kV Supply to the proposed Area 9500 Substation
Task 4: Area 9500 Substation
Task 5: 115KV Tap to Area 9500 Substation
Task 6: Underground Circuits to the MPO North Substation
Task 7: Underground Circuits to the MPO South Substation
Task 8: Underground Circuits to MPO East Campus
Task 9: 230kV Russett East Switching Station

Descriptions of the construction tasks are on *pages E-4 through E-5*.

All air emissions considered are direct emissions caused by the running of heavy equipment during construction for each task and the delivery of construction materials (primarily concrete). The estimated construction emissions were generated by considering the duration of construction for each task (assuming an 8 hour work day, 5 days per week), the construction equipment used during the task, the estimated number of days each piece of equipment would be used, and the estimated portion of each day that the piece of equipment will be running. The construction equipment considered for each task is listed below:

1. Front End Loader
2. Dump Truck
3. Water Truck
4. Excavator
5. Concrete Truck
6. Compactor
7. Concrete Pump Truck
8. Dozer
9. Slurry Truck
10. Water Pump
11. Pile Driving Crane
12. Jet Grouting
13. Hydro Seeder
14. Crane
15. Horizontal Directional Drilling Rig

Standard factors were applied to calculate the source emissions from the above equipment for each task. The outputs were calculated in both pounds per day and pounds for the entire duration of construction for each task. *The calculation tables for each task are shown on pages E-6 through E-14*. The totals were then used to determine total emissions per year for the entire project, which were then compared to the *de*

minimis thresholds and the major source thresholds for conformity determination applicability (*see Table E-1*).

Description of Factors and Units for Emissions Calculations

- Equipment Power: Rated equipment power in horsepower
- Utilization Factor: Represents the portion of an 8-hour workday that the equipment will be running
- Quantity of Equipment Set-ups: Number of equipment rigs running at any given time during the workday
- Emission Factor: Characteristic of each piece of equipment in grams/hp-hr. The factors were obtained from two sources: 1) a similar project in Dallas, Texas (reference the *Environmental Assessment for the Proposed Pavano Plumbing Plant Improvements – Appendix D, June 2010*; and *EPA's Exhaust Emission Factors for Non-Road Engine Modeling-Compression-Ignition Report No. NR-009A. June 1998* - *(*Available on-line at http://www.epa.gov/oms/models/nonrdmdl/nr-009a.pdf and also at http://www.dieselnet.com/standards/us/nonroad.php)
- Total Equipment days: The number of days for each task that each piece of equipment will be used
- Total Project Emissions: Sum of emissions for each of the 9 tasks
- Total Emissions per Year: Total per year emissions based on the complete project duration

Formula's used in Emissions Calculations

The formulas used in the emissions calculations are provided below:

Emissions in lbs/day per Task = Equipment Power (hp) x Utilization Factor x Quantity of Equipment Set-ups x Emission Factor (g/hp-hr) x .00220462(lbs/g) x Total Equipment Days x 8(hrs/day)

Total Emissions in lbs/day per Task = Emissions per day x Total Equipment Days

Total Emissions in Tons = Total Project Emissions /2000lbs

Total Emissions per Year = Total Emissions in Tons x (Total Project Workdays/365)

Table E-1 - Results

Total Emissions								
Construction Task	**CO**	**VOC**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**	**CH4**
1) OH Tap for MPO South Substation (lbs)	252.79	76.66	659.75	17.57	33.02	30.11	61205.96	6.68
2) 230KV Tap for existing Russett Substation (lbs)	238.59	72.18	616.00	17.52	30.69	28.04	56735.67	6.28
3) 230KV Supply for 9500 Area Substation (lbs)	6266.26	2080.38	13313.01	552.48	652.25	593.44	1489405.28	188.31
4) 9500 Area Substation (lbs)	5409.87	1514.46	14151.71	437.20	732.49	675.91	1263991.12	131.29
5) 115kV Tap to Area 9500 Substation (lbs)	1100.95	359.81	2389.02	96.13	112.77	102.76	261667.65	32.49
6) UG Circuits to MPO North Substation (lbs)	3997.93	1292.00	8394.23	367.75	396.31	362.48	922133.78	116.96
7) UG Circuits to MPO South Substation (lbs)	2848.38	953.38	5962.32	263.83	274.94	250.42	683203.50	86.56
8) UG Circuits to MPO East Campus (lbs)	5085.25	1638.96	11266.52	514.73	527.17	484.86	1189750.14	146.40
9) 230KV Russett East Switching Station (lbs)	2122.60	664.41	4734.39	166.47	260.51	237.44	464344.44	59.00
Total Emissions for Overall Project (lbs)	27322.62	8652.24	61486.94	2433.68	3020.15	2765.45	6392437.55	773.96

Total Emissions for Project (Tons)	13.66	4.33	30.74	1.22	1.51	1.38	3196.22	0.39
Total Emissions (tons/yr)	7.27	2.30	16.36	0.65	0.80	0.74	1700.61	0.21
de minimis Threshold (tons/yr)		50*	100	100		100	N/A	N/A
Major Source Threshold (tons/yr)	250				250		N/A	N/A
Exceed Threshold?	No	No	No	No	No	No	N/A	N/A

CO = carbon monoxide
VOC = volatile organic compounds
NOx = nitrogen oxides
SOx = sulfur oxides
PM2.5 = particulate matter (up to 2.5 micrometers in size); PM10 (up to 10 micrometers)
CO2 = carbon dioxide
CH4 = methane

* = VOC *de Miminis* established for nonattainment areas located in ozone transport region

Construction Task Descriptions

Task 1: OH Tap for the MPO South Substation
The purpose of this task is to provide a temporary overhead 115kV feed from an existing transmission line to the MPO South Substation while the Area 9500 Substation is under construction. The estimated duration of construction for this task is 6 weeks (5 days a week) for a total of 30 work days. The activities will consist of installing tower foundations for new monopole towers, installing the monopoles, and making the high voltage connections.

Task 2: 230KV Tap for the existing Russett Substation
The purpose of this task will be to provide two 230kV overhead circuits to the proposed Russett East Switching Station. An existing overhead transmission line will be extended to the vicinity of the new station by installing a new transmission tower. The existing transmission line will be extended to the new tower and then down to new switching structure where the feeders will transition from overhead to underground going into the proposed switching station. The estimated duration of construction for this task is 6 weeks (5 days a week) for a total of 30 work days.

Task 3: 230KV Supply to the proposed Area 9500 Substation
The purpose of this task is to extend conduit and 230kV underground feeders from the proposed Russett East switching station to the proposed Area 9500 Substation. Three bundles of high density polyethylene conduits will be installed between the proposed Russett East Switching Station and the proposed Area 9500 Substation. The bundles will be separated by a minimum of twenty feet and each will include (5) 10" DR 9 HDPE Ducts. Each bundle will carry a circuit with (3) ducts carrying 230KV rated XLPE insulated high voltage cables, (1) duct carrying communication cables and a grounding conductor, and (1) duct to remain empty as a spare. The total distance between the proposed Russett East Switching Station and the proposed Area 9500 Substation is 9,580'. The distance will be broken into segments by installing 10'x26'x10' manholes periodically along this route. For the directional drilling portion of the work the construction activities consist of excavating drilling pits, drilling a bore path between the drill pits (approximately 2000 feet) and pulling the ducts back through the bore path. Manhole installation consists of excavating a pit for the manhole and installing a pre-cast manhole in the pit. Portions of the duct bank in close proximity to the manholes will be concrete encased, requiring open cut trenching, installation of PVC duct, and encasement by concrete. The manholes, concrete encased duct, and bore pits will require surface restoration. The directional drilled portion of the route, which is the vast majority of the route, does not disturb the surface and does not require surface restoration. The estimated duration of construction for this task is approximately 65 weeks (5 days a week) for a total of 325 work days.

Task 4: Area 9500 Substation
The purpose of this task is the complete construction of Area 9500 Substation. The estimated duration of construction for this task is 77 weeks (5 days a week) for a total of 385 work days. The construction activities consist of three discrete actions, clearing and grading the substation site, construction equipment foundations, and installing manufactured components on the foundations (transformers and switchgear). Although the total duration of the project is long, the periods of intensive construction activities are brief. Clearing and grading of the substation site is expected to take less than 12 weeks, and foundation construction will require a comparable time period. After these activities are completed, the use of construction equipment will be limited to cranes to set the transformers and switchgears and erection of a prefabricated steel building.

Task 5: 115KV tap to the Area 9500 Substation
The purpose of this task is to install two circuits between the proposed Area 9500 Substation and an underground to overhead transition station. The purpose of these circuits is to provide a 115kV feed to Area 9500 Substation that will ultimately serve as a back-up in the event that the 230kV feed fails at any

point. The work will include both concrete encased ductbank and HDPE bundles installed by horizontal directional drilling as well as a series of manholes rated for high voltage cable. The bundles will also include (5) ducts each (3 ducts for high voltage conductors, 1 duct for communications and grounding, 1 duct to remain a spare). This task will also require surface restoration. The estimated duration of construction for this task is 13 weeks (5 days a week) for a total of 65 work days.

Task 6: Underground Circuits to the MPO North Substation
The purpose of this task is to install two circuits between the Area 9500 Substation and the MPO North Substation. The circuits will be in be in (2) separate bundles of HDPE conduit installed using horizontal directional drilling with each bundle including (5) 8" ducts. In each bundle, (3) ducts will contain 115kV current carrying conductors, (1) duct will contain communications cables and a grounding conductor, and (1) duct will be left as a spare. This work will also include the periodic installation of manholes along the route. Because the conduits will be installed using horizontal directional drilling, temporary drilling pits will need to be installed surface restoration will be required. The estimated duration of construction for this task is 52 weeks (5 days a week) for a total of 260 work days.

Task 7: Underground Circuits to the MPO South Substation
Circuits will also be installed between the Area 9500 Substation and the MPO South Substation along the same route as the MPO North Substation. The same construction activities apply. The estimated duration of construction for this task is 63 weeks (5 days a week) for a total of 315 work days.

Task 8: Underground Circuits to the MPO East Campus
The purpose of this task is to install four circuits between the Area 9500 Substation and the MPO's East Campus. The East Campus consists of two substations. At this time, two circuits will extend all the way to the site of a future East Campus Substation. The other two circuits will end in a manhole adjacent to the entrance of the East Campus access road. These circuits will be in both a combination of HDPE conduit installed with horizontal directional drilling and concrete encased ductbank. The section of ductbank installed with horizontal drilling will have four separate bundles of conduit. In each bundle, (3) ducts will contain 115kV current carrying conductors, (1) duct will contain communications cables and a grounding conductor, and (1) duct will be left as a spare. At the intersection of perimeter road and O'Brien road, the four bundles of ducts will transition to two 10-way (5 wide by 2 high) ductbanks with 6" ducts. At this time, two circuits (one concrete encased ductbank) will extend all the way to the site of a future East Campus Substation. The other two circuits will end in a proposed manhole adjacent to the entrance of the East Campus access road. This work will also include the periodic installation of manholes along the conduit route. Because some of the conduits will be installed using horizontal directional drilling, temporary drilling pits will need to be installed and surface restoration will be required. The estimated duration of construction for this task is 44 weeks (5 days a week) for a total of 220 work days.

Task 9: 230kV Russett East Switching Station
The purpose of this task is the complete construction of the 230kV Russett East Switching Station. The estimated duration of construction for this task is 76 weeks (5 days a week) for a total of 380 work days. The activities include clearing and grading the site, pouring equipment foundations, installing pre-manufactured electrical equipment, and erecting a pre-manufactured steel building.

TASK #1
OH TAP FOR MPO SOUTH SUBSTATION
CONSTRUCTION START DATE: 6 MARCH 2013
CONSTRUCTION COMPLETION DATE: 16 APRIL 2013
CONSTRUCTION DAYS: 30 DAYS (6 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor(2)	Emission Factors in g/bhp-hr(1)								Quantity of Equipment Set-ups(4)	Total Equipment Days(3)	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	1	10	3.88	1.13	6.82	0.01	0.62	0.55	541.25	0.10	38.76	11.33	68.19	0.07	6.23	5.54	5412.47	1.03
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	10	5.62	1.76	17.13	0.02	0.91	0.81	1754.04	0.16	56.17	17.59	171.30	0.19	9.11	8.12	17540.40	1.57
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	30	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	24.07	7.54	73.41	0.08	3.90	3.48	7517.31	0.67
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	10	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	48.28	13.01	135.58	0.13	5.05	4.50	12528.86	1.17
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	5	7.98	2.01	24.76	1.58	1.18	1.15	1678.87	0.15	39.88	10.04	123.78	7.90	5.91	5.73	8394.33	0.75
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	1	5	0.05	0.01	0.06	0.00	0.00	0.00	8.02	0.00	0.24	0.05	0.31	0.00	0.02	0.02	40.09	0.00
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	5	3.57	0.90	11.08	0.71	0.53	0.51	751.73	0.07	17.86	4.50	55.42	3.54	2.65	2.57	3758.66	0.34
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	10	2.75	1.26	3.17	0.57	0.02	0.02	601.39	0.11	27.51	12.59	31.75	5.66	0.16	0.16	6013.85	1.14
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
																		Total Emissions for this Task:				252.79	76.66	659.75	17.57	33.02	30.11	61205.96	6.68

Referenced Notes:

(1) Emission factors for all equipment except the slurry truck, crane and horizontal directional drilling rig were obtained from the Environmental Assessment for the Proposed Pavano Pumping Plant Improvements, Dallas, Texas (Appendix D, June 2010). The emission factors for the slurry truck, crane, and horizontal drilling rig were obtained from EPA's Exhaust Emission Factors for Non-Road Engine Modeling-Compression-Ignition Report No. NR-009A, June 1998. Available on-line at: http//www.epa.gov/oms/models/nonrdmdl/nr-009a.pdf and http://www.dieselnet.com/standards/us/nonroad.php.

(2) Utilization factor gives the percentage of the equipment day that each piece of equipment will be in operation. An equipment day is considered to be 8 hours.

(3) Total equipment days provides the number of days each piece of equipment is expected to be operating to complete each task.

(4) Quantity of equipment set-ups gives the number of full equipment rigs that will be required on each day of construction.

TASK #2
230KV TAP FOR EXISTING RUSSETT SUBSTATION
CONSTRUCTION START DATE: 1 JULY 2014
CONSTRUCTION END DATE: 12 AUG 2014
CONSTRUCTION DAYS: 30 DAYS (6 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor	Emission Factors in g/bhp-hr								Quantity of Equipment Set-ups	Total Equipment Days	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	1	10	3.88	1.13	6.82	0.01	0.62	0.55	541.25	0.10	38.76	11.33	68.19	0.07	6.23	5.54	5412.47	1.03
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	10	5.62	1.76	17.13	0.02	0.91	0.81	1754.04	0.16	56.17	17.59	171.30	0.19	9.11	8.12	17540.40	1.57
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	10	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	8.02	2.51	24.47	0.03	1.30	1.16	2505.77	0.22
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	10	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	48.28	13.01	135.58	0.13	5.05	4.50	12528.86	1.17
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	5	7.98	2.01	24.76	1.58	1.18	1.15	1678.87	0.15	39.88	10.04	123.78	7.90	5.91	5.73	8394.33	0.75
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	1	10	0.05	0.01	0.06	0.00	0.00	0.00	8.02	0.00	0.49	0.10	0.61	0.00	0.04	0.03	80.18	0.01
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	5	3.57	0.90	11.08	0.71	0.53	0.51	751.73	0.07	17.86	4.50	55.42	3.54	2.65	2.57	3758.66	0.34
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	2	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	1.60	0.50	4.89	0.01	0.26	0.23	501.15	0.04
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	10	2.75	1.26	3.17	0.57	0.02	0.02	601.39	0.11	27.51	12.59	31.75	5.66	0.16	0.16	6013.85	1.14
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
																		Total Emissions for this Task:				238.59	72.18	616.00	17.52	30.69	28.04	56735.67	6.28

TASK #3
230KV SUPPLY TO 9500 AREA SUBSTATION
CONSTRUCTION START DATE: 1 APRIL 2013
CONSTRUCTION END DATE: 30 JUNE 2014
CONSTRUCTION DAYS: 325 DAYS (65 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor	Emission Factors in g/bhp-hr								Quantity of Equipment Set-ups	Total Equipment Days	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	1	200	3.88	1.13	6.82	0.01	0.62	0.55	541.25	0.10	775.25	226.67	1363.83	1.33	124.57	110.86	108249.31	20.57
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	200	5.62	1.76	17.13	0.02	0.91	0.81	1754.04	0.16	1123.47	351.86	3425.98	3.70	182.10	162.35	350807.95	31.48
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	200	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	160.50	50.27	489.43	0.53	26.01	23.19	50115.42	4.50
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	75	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	362.11	97.55	1016.88	0.99	37.86	33.73	93966.42	8.76
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	75	7.98	2.01	24.76	1.58	1.18	1.15	1678.87	0.15	598.22	150.66	1856.71	118.54	88.63	85.97	125915.00	11.30
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	1	200	0.05	0.01	0.06	0.00	0.00	0.00	8.02	0.00	9.79	1.92	12.22	0.03	0.77	0.69	1603.69	0.17
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	1	120	3.26	0.30	2.47	0.14	0.35	0.34	501.15	0.04	391.54	35.77	296.30	16.93	42.33	41.06	60138.51	5.40
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	1	120	0.52	0.06	0.99	0.00	0.07	0.07	125.29	0.01	61.91	7.67	118.78	0.16	8.47	8.20	15034.63	1.35
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	200	4.01	1.26	12.24	0.01	0.65	0.58	1252.89	0.11	802.48	251.33	2447.13	2.65	130.07	115.96	250577.11	22.49
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	120	2.75	1.26	3.17	0.57	0.02	0.02	601.39	0.11	330.16	151.11	380.96	67.94	1.90	1.90	72166.21	13.71
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	120	13.76	6.30	15.87	2.83	0.08	0.08	3006.93	0.57	1650.82	755.57	1904.79	339.69	9.52	9.52	360831.04	68.57
																		Total Emissions for this Task:				6266.26	2080.38	13313.01	552.48	652.25	593.44	1489405.28	188.31

TASK #4
9500 AREA SUBSTATION CONSTRUCTION
CONSTRUCTION START DATE: 28 SEPTEMBER 2012
CONSTRUCTION END DATE: 28 MARCH 2014
CONSTRUCTION DAYS: 385 DAYS (77 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor	Emission Factors in g/bhp-hr								Quantity of Equipment Set-ups	Total Equipment Days	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	2	90	7.75	2.27	13.64	0.01	1.25	1.11	1082.49	0.21	697.73	204.00	1227.45	1.20	112.12	99.77	97424.38	18.51
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	2	90	11.23	3.52	34.26	0.04	1.82	1.62	3508.08	0.31	1011.13	316.67	3083.38	3.33	163.89	146.11	315727.16	28.33
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	90	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	72.22	22.62	220.24	0.24	11.71	10.44	22551.94	2.02
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	180	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	869.06	234.13	2440.51	2.38	90.87	80.95	225519.40	21.03
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	2	90	15.95	4.02	49.51	3.16	2.36	2.29	3357.73	0.30	1435.74	361.59	4456.10	284.49	212.70	206.32	302195.99	27.12
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	2	180	0.10	0.02	0.12	0.00	0.01	0.01	16.04	0.00	17.63	3.45	21.99	0.05	1.39	1.24	2886.65	0.31
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	90	3.57	0.90	11.08	0.71	0.53	0.51	751.73	0.07	321.43	80.95	997.63	63.69	47.62	46.19	67655.82	6.07
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	1	90	3.26	0.30	2.47	0.14	0.35	0.34	501.15	0.04	293.66	26.83	222.23	12.70	31.75	30.79	45103.88	4.05
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	90	4.01	1.26	12.24	0.01	0.65	0.58	1252.89	0.11	361.12	113.10	1101.21	1.19	58.53	52.18	112759.70	10.12
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	120	2.75	1.26	3.17	0.57	0.02	0.02	601.39	0.11	330.16	151.11	380.96	67.94	1.90	1.90	72166.21	13.71
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
																		Total Emissions for this Task:				5409.87	1514.46	14151.71	437.20	732.49	675.91	1263991.12	131.29

TASK #5
115KV TAP TO AREA 9500 SUBSTATION
CONSTRUCTION START DATE: 3 MARCH 2014
CONSTRUCTION END DATE: 29 MAY 2014
CONSTRUCTION DAYS: 65 DAYS (13 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor	Emission Factors in g/bhp-hr								Quantity of Equipment Set-ups	Total Equipment Days	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	1	30	3.88	1.13	6.82	0.01	0.62	0.55	541.25	0.10	116.29	34.00	204.57	0.20	18.69	16.63	16237.40	3.09
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	30	5.62	1.76	17.13	0.02	0.91	0.81	1754.04	0.16	168.52	52.78	513.90	0.56	27.32	24.35	52621.19	4.72
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	30	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	24.07	7.54	73.41	0.08	3.90	3.48	7517.31	0.67
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	30	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	144.84	39.02	406.75	0.40	15.15	13.49	37586.57	3.51
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	15	7.98	2.01	24.76	1.58	1.18	1.15	1678.87	0.15	119.64	30.13	371.34	23.71	17.73	17.19	25183.00	2.26
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	1	30	0.05	0.01	0.06	0.00	0.00	0.00	8.02	0.00	1.47	0.29	1.83	0.00	0.12	0.10	240.55	0.03
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	1	20	3.26	0.30	2.47	0.14	0.35	0.34	501.15	0.04	65.26	5.96	49.38	2.82	7.05	6.84	10023.08	0.90
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	1	20	0.52	0.06	0.99	0.00	0.07	0.07	125.29	0.01	10.32	1.28	19.80	0.03	1.41	1.37	2505.77	0.22
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	30	4.01	1.26	12.24	0.01	0.65	0.58	1252.89	0.11	120.37	37.70	367.07	0.40	19.51	17.39	37586.57	3.37
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	20	2.75	1.26	3.17	0.57	0.02	0.02	601.39	0.11	55.03	25.19	63.49	11.32	0.32	0.32	12027.70	2.29
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	20	13.76	6.30	15.87	2.83	0.08	0.08	3006.93	0.57	275.14	125.93	317.47	56.61	1.59	1.59	60138.51	11.43
																		Total Emissions for this Task:				1100.95	359.81	2389.02	96.13	112.77	102.76	261667.65	32.49

TASK #6
UG CIRCUITS TO MPO NORTH SUBSTATION
CONSTRUCTION START DATE: 1 MARCH 2013
CONSTRUCTION END DATE: 3 MARCH 2014
CONSTRUCTION DAYS: 260 DAYS (52 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor	Emission Factors in g/bhp-hr								Quantity of Equipment Set-ups	Total Equipment Days	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	1	120	3.88	1.13	6.82	0.01	0.62	0.55	541.25	0.10	465.15	136.00	818.30	0.80	74.74	66.52	64949.59	12.34
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	120	5.62	1.76	17.13	0.02	0.91	0.81	1754.04	0.16	674.08	211.11	2055.59	2.22	109.26	97.41	210484.77	18.89
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	120	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	96.30	30.16	293.66	0.32	15.61	13.92	30069.25	2.70
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	120	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	579.37	156.09	1627.01	1.59	60.58	53.97	150346.27	14.02
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	60	7.98	2.01	24.76	1.58	1.18	1.15	1678.87	0.15	478.58	120.53	1485.37	94.83	70.90	68.77	100732.00	9.04
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	1	120	0.05	0.01	0.06	0.00	0.00	0.00	8.02	0.00	5.88	1.15	7.33	0.02	0.46	0.41	962.22	0.10
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	1	90	3.26	0.30	2.47	0.14	0.35	0.34	501.15	0.04	293.66	26.83	222.23	12.70	31.75	30.79	45103.88	4.05
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	1	90	0.52	0.06	0.99	0.00	0.07	0.07	125.29	0.01	46.43	5.75	89.09	0.12	6.35	6.15	11275.97	1.01
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	30	4.01	1.26	12.24	0.01	0.65	0.58	1252.89	0.11	120.37	37.70	367.07	0.40	19.51	17.39	37586.57	3.37
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	0	90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	90	13.76	6.30	15.87	2.83	0.08	0.08	3006.93	0.57	1238.11	566.68	1428.59	254.77	7.14	7.14	270623.28	51.43
																		Total Emissions for this Task:				3997.93	1292.00	8394.23	367.75	396.31	362.48	922133.78	116.96

TASK #7
UG CIRCUITS TO MPO SOUTH SUBSTATION
CONSTRUCTION START DATE: 1 APRIL 2013
CONSTRUCTION END DATE: 23 JUNE 2014
CONSTRUCTION DAYS: 315 DAYS (63 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor	Emission Factors in g/bhp-hr								Quantity of Equipment Set-ups	Total Equipment Days	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	1	60	3.88	1.13	6.82	0.01	0.62	0.55	541.25	0.10	232.58	68.00	409.15	0.40	37.37	33.26	32474.79	6.17
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	60	5.62	1.76	17.13	0.02	0.91	0.81	1754.04	0.16	337.04	105.56	1027.79	1.11	54.63	48.70	105242.39	9.44
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	60	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	48.15	15.08	146.83	0.16	7.80	6.96	15034.63	1.35
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	60	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	289.69	78.04	813.50	0.79	30.29	26.98	75173.13	7.01
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	30	7.98	2.01	24.76	1.58	1.18	1.15	1678.87	0.15	239.29	60.27	742.68	47.41	35.45	34.39	50366.00	4.52
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	1	60	0.05	0.01	0.06	0.00	0.00	0.00	8.02	0.00	2.94	0.58	3.67	0.01	0.23	0.21	481.11	0.05
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	1	60	3.26	0.30	2.47	0.14	0.35	0.34	501.15	0.04	195.77	17.88	148.15	8.47	21.16	20.53	30069.25	2.70
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	1	60	0.52	0.06	0.99	0.00	0.07	0.07	125.29	0.01	30.95	3.84	59.39	0.08	4.23	4.10	7517.31	0.67
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	120	4.01	1.26	12.24	0.01	0.65	0.58	1252.89	0.11	481.49	150.80	1468.28	1.59	78.04	69.58	150346.27	13.49
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	60	2.75	1.26	3.17	0.57	0.02	0.02	601.39	0.11	165.08	75.56	190.48	33.97	0.95	0.95	36083.10	6.86
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	60	13.76	6.30	15.87	2.83	0.08	0.08	3006.93	0.57	825.41	377.78	952.40	169.84	4.76	4.76	180415.52	34.29
																		Total Emissions for this Task:				2848.38	953.38	5962.32	263.83	274.94	250.42	683203.50	86.56

TASK #8
UG CIRCUITS TO MPO EAST CAMPUS
CONSTRUCTION START DATE: 25 JUNE 2013
CONSTRUCTION END DATE: 29 APRIL 2014
CONSTRUCTION DAYS: 220 DAYS (44 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor	Emission Factors in g/bhp-hr								Quantity of Equipment Set-ups	Total Equipment Days	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	1	120	3.88	1.13	6.82	0.01	0.62	0.55	541.25	0.10	465.15	136.00	818.30	0.80	74.74	66.52	64949.59	12.34
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	120	5.62	1.76	17.13	0.02	0.91	0.81	1754.04	0.16	674.08	211.11	2055.59	2.22	109.26	97.41	210484.77	18.89
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	120	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	96.30	30.16	293.66	0.32	15.61	13.92	30069.25	2.70
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	120	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	579.37	156.09	1627.01	1.59	60.58	53.97	150346.27	14.02
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	120	7.98	2.01	24.76	1.58	1.18	1.15	1678.87	0.15	957.16	241.06	2970.73	189.66	141.80	137.55	201464.00	18.08
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	1	120	0.05	0.01	0.06	0.00	0.00	0.00	8.02	0.00	5.88	1.15	7.33	0.02	0.46	0.41	962.22	0.10
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	1	90	3.26	0.30	2.47	0.14	0.35	0.34	501.15	0.04	293.66	26.83	222.23	12.70	31.75	30.79	45103.88	4.05
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	1	90	0.52	0.06	0.99	0.00	0.07	0.07	125.29	0.01	46.43	5.75	89.09	0.12	6.35	6.15	11275.97	1.01
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	120	4.01	1.26	12.24	0.01	0.65	0.58	1252.89	0.11	481.49	150.80	1468.28	1.59	78.04	69.58	150346.27	13.49
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	90	2.75	1.26	3.17	0.57	0.02	0.02	601.39	0.11	247.62	113.34	285.72	50.95	1.43	1.43	54124.66	10.29
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	90	13.76	6.30	15.87	2.83	0.08	0.08	3006.93	0.57	1238.11	566.68	1428.59	254.77	7.14	7.14	270623.28	51.43
																		Total Emissions for this Task:				5085.25	1638.96	11266.52	514.73	527.17	484.86	1189750.14	146.40

TASK #9
230KV RUSSETT EAST SWITCHING STATION
CONSTRUCTION START DATE: 10 JAN 2013
CONSTRUCTION END DATE: 30 JUNE 2014
CONSTRUCTION DAYS: 380 DAYS (76 WEEKS AT 5 DAYS/WEEK)

Proposed Action Alternative	Fuel	HP	Utilization Factor	Emission Factors in g/bhp-hr								Quantity of Equipment Set-ups	Total Equipment Days	Emissions in lbs/day								Total Emissions in lbs							
Equipment				CO	VOC	Nox	SOx	PM10	PM2.5	CO2	CH4			CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4	CO	VOC	NOx	SOx	PM10	PM2.5	CO2	CH4
Front End Loader	Diesel	108	0.5	4.070	1.190	7.160	0.007	0.654	0.582	568.300	0.108	1	150	3.88	1.13	6.82	0.01	0.62	0.55	541.25	0.10	581.44	170.00	1022.87	1.00	93.43	83.14	81186.98	15.43
Dump Truck	Diesel	350	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	50	5.62	1.76	17.13	0.02	0.91	0.81	1754.04	0.16	280.87	87.96	856.49	0.93	45.53	40.59	87701.99	7.87
Water Truck	Diesel	250	0.1	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	50	0.80	0.25	2.45	0.00	0.13	0.12	250.58	0.02	40.12	12.57	122.36	0.13	6.50	5.80	12528.86	1.12
Excavator	Diesel	250	0.5	2.190	0.590	6.150	0.006	0.229	0.204	568.300	0.053	1	30	4.83	1.30	13.56	0.01	0.50	0.45	1252.89	0.12	144.84	39.02	406.75	0.40	15.15	13.49	37586.57	3.51
Concrete Truck	Diesel	335	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	25	7.98	2.01	24.76	1.58	1.18	1.15	1678.87	0.15	199.41	50.22	618.90	39.51	29.54	28.66	41971.67	3.77
Compactor	Diesel	8	0.1	3.470	0.680	4.330	0.009	0.274	0.244	568.300	0.061	1	50	0.05	0.01	0.06	0.00	0.00	0.00	8.02	0.00	2.45	0.48	3.05	0.01	0.19	0.17	400.92	0.04
Concrete Pump Truck	Diesel	400	0.1	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dozer	Diesel	150	0.5	2.700	0.680	8.380	0.535	0.400	0.388	568.300	0.051	1	50	3.57	0.90	11.08	0.71	0.53	0.51	751.73	0.07	178.57	44.97	554.24	35.38	26.46	25.66	37586.57	3.37
Slurry Truck	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Pump	Diesel	25	0.5	2.340	0.290	4.490	0.006	0.320	0.310	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pile Driving Crane	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	1	25	3.26	0.30	2.47	0.14	0.35	0.34	501.15	0.04	81.57	7.45	61.73	3.53	8.82	8.55	12528.86	1.12
Jet Grouting	Diesel	100	0.5	3.700	0.338	2.800	0.160	0.400	0.388	568.300	0.051	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Seeder	Diesel	250	0.5	1.820	0.570	5.550	0.006	0.295	0.263	568.300	0.051	1	50	4.01	1.26	12.24	0.01	0.65	0.58	1252.89	0.11	200.62	62.83	611.78	0.66	32.52	28.99	62644.28	5.62
Crane	Diesel	300	0.2	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	1	150	2.75	1.26	3.17	0.57	0.02	0.02	601.39	0.11	412.70	188.89	476.20	84.92	2.38	2.38	90207.76	17.14
Horizontal Directional Drilling	Diesel	300	1	2.600	1.190	3.000	0.535	0.015	0.015	568.300	0.108	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
																		Total Emissions for this Task:				2122.60	664.41	4734.39	166.47	260.51	237.44	464344.44	59.00