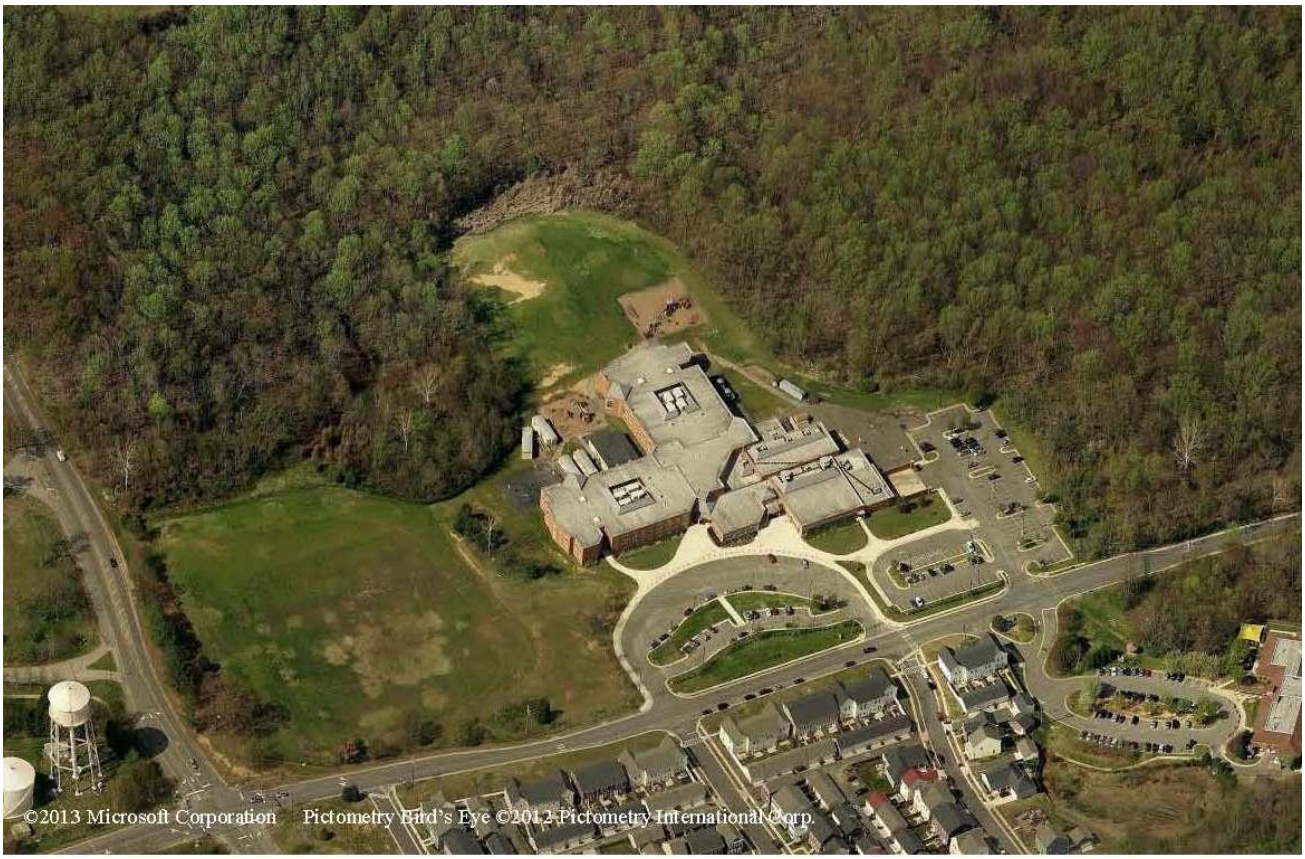
ENVIRONMENTAL ASSESSMENT
FORT BELVOIR ELEMENTARY SCHOOL EXPANSION



U.S. ARMY GARRISON FORT BELVOIR, VIRGINIA

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Finding of No Significant Impact
Fort Belvoir Elementary School Expansion
U.S. Army Garrison, Fort Belvoir
Fort Belvoir, Virginia

Name of Action: Fort Belvoir Elementary School Expansion

Description of Proposed Action and Need: The existing Fort Belvoir Elementary School (FBES) is a public school in the Fairfax County Public School (FCPS) system that is currently over program capacity. An estimated 385 students living on Fort Belvoir currently attend elementary schools within the FCPS system off-Post. On-Post public schools provide services and programs specifically tailored for children of military families that are not typically available at off-Post schools. Additionally, FBES does not meet current Anti-Terrorism Force Protection (ATFP) standards. FCPS proposes to construct a new 92,254 square foot elementary school (FBES II) adjacent to the existing school. FCPS also proposes to renovate the existing FBES so that the facility meets current ATFP standards.

The proposed action involves constructing a new building, parking areas, bus loop, necessary utilities, and stormwater best management practices (BMPs). The bus loop for the existing FBES will be reconfigured to join with the proposed bus loop for FBES II. The new FBES II is proposed to open in September 2016 with a program capacity of 492 students. Renovations to the existing FBES will include installation of structural bollards in front of the building, control of bus and vehicular traffic with automatic gates, and exterior wall reinforcement. Renovations to the existing FBES are scheduled for the summer of 2016.

The Environmental Assessment (EA) evaluated the proposed action alternative. FCPS considered expansions at the four FCPS elementary schools that serve a majority of the students who attend off-Post schools; however, the lack of acreage available at these sites, short timeframes allowed for expansion/renovation of existing schools, and limited funding available to renovate all four schools makes this alternative unsuitable. Location of a new school on a site that was previously disturbed (former Cheney Elementary School) and adjacent to an existing school minimizes new disturbances; therefore, other on-Post options were not considered. A No Action (No Build) alternative was also considered but would not meet the project purpose and need.

Environmental Consequences: The EA, which is attached hereto and incorporated by reference into this Finding of No Significant Impact, examined the potential effects of the proposed action and no action alternatives on the resource areas of land use, traffic, infrastructure and utilities, community facilities and services, socioeconomics, air quality, hazardous materials/hazardous waste, natural resources, and cultural resources. Noise and floodplains were not evaluated as the proposed project would have either no potential to affect them or the potential impacts would be negligible.

Best Management Practices (BMPs) and adherence to applicable policies/regulations to be implemented for resource protection are included with discussions of each respective resource area in the EA. No mitigation measures for effects on land use, socioeconomics, community facilities and services, air quality, or cultural resources would be required. Air pollutant emissions from the proposed action would not be significant and would be below *de minimis levels* for general conformity. Mitigation measures identified in the environmental assessment for effects to other resources included:

Traffic and Transportation Network: Traffic analysis for 2017 includes conditions for the proposed school and identifies no level of service (LOS) issues attributed to the school. The location of the proposed exit from the school may cause minor localized effects to the Woodlawn Road and Gorgas/Meeres Road intersection during arrival and dismissal times. If final design of the school anticipates localized intersection effects, mitigation measures can include reconfiguration/ relocation of planned entrances/exits, restriction of left turns, signalization timing changes, and adding dedicated turn lanes on Meeres Road. No significant impacts to traffic from construction are anticipated.

Infrastructure and Utilities: Fort Belvoir's potable water, sanitary sewer, natural gas, electrical, communications, and solid waste systems are sufficient to handle the additional load added by the new FBES II and FBES renovations. Design of FBES II will need to ensure that redundancy in the potable water system remains and that service to the tenant north of the school is not interrupted. The new facility will add 4.2 acres of impervious surface area to the site. Stormwater management strategy will include Low Impact Design (LID) to meet applicable regulations and policies including EISA 438. Potential BMPs include extended detention pond retrofits, bioretention, pervious pavement, bioswales, stepped pool outfalls, and cisterns. The proposed school will be designed to obtain Collaborative for High Performing Schools (CHPS) certification which will encourage the use of such BMPs. The CHPS certification is a building rating system similar to the Leadership in Energy and Environmental Design (LEED) but focused on schools. Solid waste management during construction will require the contractor to recycle or reuse at least 50% of construction debris.

Hazardous Materials/Hazardous Waste: No existing hazardous waste issues have been identified for the site. Construction of the new school and renovations of FBES will require small quantities of hazardous substances such as fuel, asphalt, etc. The contractor will be required to prepare a site Health and Safety Plan to ensure the safety of construction workers at the construction site and to document procedures if hazardous materials are discovered during construction.

Natural Resources: The use of a previously developed site limits the impacts to natural resources. The contractor will develop a Stormwater Pollution Prevention Plan (SWPPP) and implement erosion and sediment control measures to minimize impacts on the soil and downstream water resources.

Some of the potential options for post-construction stormwater BMPs would involve work within an intermittent stream, which is a water of the U.S. This work will require permits from the U.S. Army Corps of Engineers and/or the Virginia Department of Environmental Quality. It is expected that any proposed work could be permitted under the Nationwide Permitting program. Fort Belvoir Directorate of Public Works Environmental and Natural Resources Division (DPW ENRD) will be responsible for submitting required permit applications to the regulatory agencies. FCPS would be required to provide compensatory mitigation for any stream impacts greater than 300 linear feet.

Less than one acre of trees will need to be removed in order to construct FBES II and the associated stormwater BMPs. A tree survey has identified onsite trees greater than 4 inches diameter at breast height (dbh). Upon development of the school's final design, FCPS will submit a site plan identifying trees that require removal. Compensatory mitigation for tree removal greater than 4 inches dbh will be required per *Fort Belvoir Policy Memorandum #27, Tree Removal and Protection*. Mitigation will involve tree planting at a ratio of 2:1 or out-of-kind mitigation to be approved by DPW ENRD if sufficient area is not available for the required planting.

A habitat survey was conducted for the small whorled pogonia (*Isotria medeoloides*), a federally endangered and state threatened plant. The habitat survey identified potential habitat within the vicinity of the existing stormwater detention pond and along the slopes adjacent to the intermittent stream. No small whorled pogonia populations have been identified on Main Post; however, one population of small whorled pogonia has been located on Fort Belvoir North Area (FBNA). A site survey for small whorled pogonia was conducted on July 10, 2014 and no specimens were found on site.

Summary of Environmental Impacts: No impacts are expected to floodplains, noise, wetlands, Chesapeake Bay Resource Protection Areas, or cultural resources. Minimal impacts to land use and plans, traffic, infrastructure and utilities, socioeconomics, air quality, topography, soils, surface water, vegetation, and Partners-In-Flight priority bird species habitat will occur due to the proposed project. Mitigation measures described above would minimize those impacts. No significant cumulative or indirect impacts are anticipated. No significant impacts on human health or the environment would result from the proposed action.

Notice of Availability: The Environmental Assessment was available for public review at the Kingstowne Public Library; Lorton Public Library; Sherwood Regional Library; Fort Belvoir Van Noy Library; the Directorate of Public Works, Environmental Division, Fort Belvoir, VA and the Fort Belvoir website: https://www.belvoir.army.mil/environdocs.asp.

Newspaper notices of the availability of the EA were published in the Mount Vernon Voice, the Mt. Vernon Gazette, and the Springfield Connection newspapers. The Mt. Vernon Gazette and Springfield Connection were published on May 29, 2014 and the Mt. Vernon Voice on May 28, 2014.

Response to Comments: Comments from federal, state, and local agencies were received during the public review period and addressed by Fort Belvoir. For more information, contact the Fort Belvoir Public Works, Environmental and Natural Resource Division at 703-806-0022.

Conclusion: Pursuant to the Council on Environmental Quality (CEQ) regulations; Title 40, Code of Federal Regulations (CFR) Section 1500-1508 regarding procedural implementation of the National Environmental Policy Act (NEPA) of 1969; and most specifically Title 32 CFR 651, Environmental Analysis of Army Actions; as Installation Commander of U.S. Army Garrison, Fort Belvoir, the U.S. Army hereby concludes that the Proposed Action would not have a significant effect on the environment and issues this Finding of No Significant Impact (FONSI). An environmental impact statement (EIS) will not be prepared.

Joseph J. Barker, Deputy

13 August 2014

Michelle D. Mitchell
Colonel, U.S. Army
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Date

Environmental Assessment

Fort Belvoir Elementary School Expansion

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Acronyms and Abbreviations

ac	acre
ACS	American Community Survey
APE	Area of Potential Effect
AQCR	Air Quality Control Region
ATFP	Anti-Terrorism Force Protection
BMP	Best Management Practices
BRAC	Base Realignment and Closure
CBPA	Chesapeake Bay Preservation Act
CBPO	Fairfax County Chesapeake Bay Preservation Ordinance
CDP	Census Designated Place
CEQ	Council of Environmental Quality
CFC	chlorofluorocarbon
CFR	Code of Federal Regulations
CH_4	methane
CHPS	Collaborative for High Performing Schools
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	CO_2 equivalents
CRMP	Coastal Resource Management Plan
CWA	Clean Water Act of 1972
CZMA	Coastal Zone Management Act of 1972
CZMARA	Coastal Zone Management Act Reauthorization Amendment
dB	decibel
dbh	diameter at breast height
DLA	Defense Logistics Agency
DoD	Department of Defense
DPW	Fort Belvoir Directorate of Public Works
DPWES	Fairfax County Department of Public Works and Environmental Services
EA	Environmental Assessment
EIS	Environmental Impact Statement
EISA 438	Energy Independence and Security Act Section 438
ENRD	Environmental and Natural Resource Division
EO	Executive Order
EPCRA	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act of 1973

ESC	Erosion and Sediment Control
FBES	Fort Belvoir Elementary School
FBNA	Fort Belvoir North Area (Formerly Engineer Proving Ground)
FCPS	Fairfax County Public Schools
FEIS	Final EIS
FFPA	Farmland Protection Policy Act
FNSI	Finding of No Significant Impact
ft	feet
FWC	Fish and Wildlife Corridor
GHG	Green House Gases
gpd	gallons per day
GWP	global warming potential
HAP	Hazardous Air Pollutants
HFC	hydrofluorocarbon
HVAC	heating, ventilation, and air conditioning
HWMP	Hazardous Waste Management/Waste Minimization Plan
I-95	Interstate Highway 95
IECC	International Energy Conservation Code
INRMP	Integrated Natural Resource Management Plan
INSCOM	Army Intelligence and Security Command
IPCC	Intergovernmental Panel on Climate Change
kW	kilowatt
LEED	Leadership in Engineering and Environmental Design
LID	Low Impact Development
LOS	Level of Service
MBH	Thousand British Thermal Units per Hour
mgd	millions gallons per day
mg/m^3	milligrams per cubic meter
MOA	Memorandum of Agreement
MS-4	Municipal Separate Stormwater Sewer System
msl	mean sea level
MT	metric tons
MMT	million metric tons
MWCOG	Metropolitan Washington Council of Governments
MWR	Moral Welfare and Recreation
NAAQS	National Ambient Air Quality Standards
NCPC	National Capital Planning Commission

NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
N_2O	nitrous oxide
NOI	Notice of Intent to prepare EIS
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
O_3	ozone
OEA	Office of Economic Adjustment
PIF	Partners in Flight
PM_{10}	Course Particulate Matter
$PM_{2.5}$	Fine Particulate Matter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
PX	Main Post Exchange
QRP	Qualified Recycling Program
RCRA	Resource Conservation and Recovery Act
RMA	Resource Management Area
ROD	Record of Decision
RPA	Resource Protection Area
RPMP	Real Property Master Plan
SCRAP	School/County Recycling Action Program
SDDCTEA	Military Surface Deployment and Distribution Command Transportation Engineering Agency
SEER	Seasonal Energy Efficiency Ratio
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SOV	Single Occupant Vehicle
SPED	Special Education Services
sq ft	square feet
SWPPP	Stormwater Pollution Prevention Plan
TAZ	Transportation Analysis Zone
THPO	Tribal Historic Preservation Officer

TMP	Transportation Management Plan
TPB	National Capital Transportation Planning Board
$\mu g/m^3$	micrograms per cubic meter
U.S.	United States
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USACE ERDC	U.S. Army Corps of Engineers Engineer Research and Development Center
USACE WES	U.S. Army Corps of Engineers Waterways Experimental Station
USAG	U.S. Army Garrison
USCB	U.S. Census Bureau
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VAC	Virginia Administrative Code
VDCR	Virginia Department of Conservation and Recreation
VDCR-DNH	VDCR Division of Natural Heritage
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDOT	Virginia Department of Transportation
VOC	volatile organic compound
VR	Virginia Route
VSMP	Virginia Stormwater Management Program

Executive Summary

Fairfax County Public Schools (FCPS) proposes to construct a new elementary school and renovate the existing Fort Belvoir Elementary School (FBES) on U.S. Army Garrison Fort Belvoir, Virginia. The Proposed Action would include constructing a new elementary school building; providing paved play areas; adding additional bus, staff, and visitor parking spaces; reconfiguring the existing bus loop; adding new infrastructure, including utilities and stormwater management; and renovating the existing FBES to address Anti-Terrorism Force Protection (ATFP) deficiencies. Fort Belvoir has prepared this environmental assessment (EA) to publicly document the environmental consequences of the Proposed Action. This EA has been prepared pursuant to the Council on Environmental Quality (CEQ) regulations in 40 Code of Federal Regulations (CFR) Part 1500–1508, AR 200-2 and 32 CFR Part 651.

The purpose of the Proposed Action is to meet the educational needs of the Fort Belvoir elementary school-aged population on-Post, while addressing ATFP deficiencies at the existing FBES. The need for the project is to eliminate program capacity deficits at the existing FBES, providing programming that meets the unique needs of military children, and ensuring that the proposed and existing on-Post elementary schools meet current ATFP standards.

ES.1 Alternatives

FCPS considered the following alternative approaches to reducing the educational program capacity deficit at FBES and meeting the needs of the Fort Belvoir elementary school aged children:

- Implementing the Proposed Action.
- Renovating the four off-Post elementary schools that house a majority of the Fort Belvoir elementary school aged children for which there is no program capacity at FBES.
- No Build ("the No Action" alternative).

Of these alternatives, only the Proposed Action would meet FCPS' purpose and need. The No Action Alternative would not meet FPCS' needs, but is addressed in this EA, as required, since it provides a baseline against which to compare the impacts of the Proposed Action.

ES.2 Proposed Action

Implementing the Proposed Action would provide an additional 492 student program capacity to the on-Post elementary school system. An estimated 82 additional teachers and staff would be employed at the new school. The Proposed Action includes:

- Constructing a 92,254-square-foot (sq ft), two-story, 26-classroom elementary school building (FBES II) adjacent to the existing FBES.
- Designing the new elementary school to meet all current ATFP standards.

- Providing paved play areas.
- Constructing required parking areas for buses, staff, and visitors.
- Constructing new utilities as well as new stormwater best management practices (BMP) that meet current stormwater regulations and policies.
- Reconfiguring the bus loop at the existing FBES.
- Renovating the existing FBES to comply with current ATFP standards.

ES.3 Land Use and Plans

The proposed school is consistent with the designated land use of Community. The proposed Real Property Master Plan (RPMP) and accompanying DRAFT January 2014 Environmental Impact Statement (EIS) for Short-Term Projects and Real Property Master Plan Update has identified a new school at the site; therefore, the proposed project is consistent with Fort Belvoir planning objectives. As the school would not be a Federal workplace, policies set forth in the National Capital Planning Commission (NCPC) Comprehensive plan, *Federal Workplace: Location, Impact and the Community* (NCPC 2004) do not apply. NCPC will be given the opportunity to review and comment on this EA before the decision is made to proceed with the action. As directed by the Coastal Zone Management Act (CZMA) of 1972 (16 USC § 1451, et seq., as amended), Fort Belvoir has reviewed the proposed action and found that it is consistent with Virginia's federally approved Coastal Resources Management Program (CRMP).

ES.4 Traffic and Transportation Networks

Minor increases to traffic would occur during construction of FBES II and FBES renovations. When the school opens additional staff would commute from off-Post to the site. Analysis of 2017 traffic conditions found that levels of service (LOS) for nearby intersections remain unchanged. FCPS manages traffic in and out of the school during drop-off and dismissal times. There are currently no traffic issues for the existing FBES. If localized traffic effects are anticipated as part of the final design of the school, several mitigation measures can be implemented including:

- Reconfiguration of the proposed parking lot and travel lanes to utilize existing entrances and/or modified entrance locations that avoid the existing right turn lane from Meeres Road to Woodlawn Road.
- Relocation of the new visitor/staff parking lot entrance to Woodlawn Road subject to compliance with ATFP setback requirements.
- Restriction of the existing and/or new entrance closest to Gorgas/Woodlawn intersection to a right out only movement.
- Evaluate the feasibility of widening a portion of Meeres Road to provide dedicated turn lanes. This would ideally be conducted after the completion of Mulligan Road to determine the effect of increased outbound traffic and as part of the installation's overall Traffic Management Plan (TMP) efforts.

- Evaluate the signal timing at Gorgas and Woodlawn Roads to allow more green time for the east-west movement and monitor the signal light for adjustments, if needed, after occupancy of the new school.

Overall the existing Fort Belvoir transportation network is adequate to support the new school. Since the construction of a new school could reduce trips off-Post to transport students to off-Post schools, travel demands on off-Post roadways may be reduced.

ES.5 Infrastructure and Utilities

Construction and operation of the proposed school and existing school renovations would increase the demand for utilities (water, sewer, natural gas, communications, electricity, solid waste); however, the increase is well within the capacity of the existing infrastructure. Demands on the utilities will likely be reduced through the design of the school according to Collaborative for High Performing School (CHPS) criteria, similar to Leadership in Energy and Environmental Design (LEED) program that requires efficiencies in energy and water usage. The new facility will add 4.2 acres of impervious surface area to the site. FCPS will be required to design and implement stormwater management that meets all appropriate regulations and policies including the newly enacted Virginia Stormwater Management Program (VSMP) regulations, Section 438 of the 2007 Energy Independence and Security Act (EISA 438), and the Executive Council of the Chesapeake Bay Program Directive 01-1, *Managing Stormwater on State, Federal and District-owned Lands and Facilities*. These policies and regulations, along with the goal of obtaining CHPS certification, will include the use of Low Impact Development (LID) systems as stormwater BMPs.

ES.6 Socioeconomics including Environmental Justice and the Protection of Children

The Proposed Action would have little to no effect on area or regional populations. The 82 staff positions at the new school will be a combination of new hires and transfers from other area schools now relieved of over capacity issues. The Proposed Action has little potential to disproportionately affect minority or low income populations. The population of children on Fort Belvoir would be beneficially affected by the construction of an on-Post school.

ES.7 Community Facilities and Services

The construction of a new elementary school would have no more than minor effects on Fort Belvoir safety and security services such as police and fire services. The construction of a new school and upgrade of ATFP features at the existing school would have positive effects on the on-Post educational services. Recreational facilities utilized in Fort Belvoir Morale, Welfare and Recreation (MWR) programming will not be affected by the Proposed Action. The construction of a new elementary school will result in the loss of play fields currently utilized by students at the existing FBES; however, proposed and existing paved play areas will meet the recreational needs of students.

ES.8 Air Quality

Construction and operation of the proposed school and the existing school renovations would generate air emissions. These increases would be minor in both the short and long term. The construction and operation of the proposed project will not result in a significant increase in greenhouse gas (GHG) emissions.

ES.9 Hazardous Materials/Hazardous Waste

Construction activity would cause a short-term increase in the use of certain hazardous materials used in construction (e.g., fuel). The contractor would be required to use control measures to prevent their release and prepare a site Health and Safety Plan to ensure the safety of workers. There are no known hazardous materials issues at the proposed school location.

ES.9 Natural Resources

The proposed school will be situated on the site of the former Cheney Elementary School, which was demolished after the construction of FBES. The utilization of a formerly developed site will minimize impacts on natural resources. Some minor changes in topography will occur due to required filling and grading associated with the proposed school. Onsite soils were largely impacted by the former Cheney Elementary School development. Some soil types that are considered prime farmland may be impacted by the Proposed Action; however, these areas are not currently available for agricultural use and would therefore not qualify as prime farmland under the Farmland Policy Protection Act (FFPA). Incorporation of proper erosion and sediment control (ESC) measures will minimize the impacts to soil due to erosion.

Stormwater BMPs to be implemented by FCPS will minimize the impact on downstream waters. Incorporation of some of the potential BMPs, including work on the existing extended detention pond outfall structure and any stepped pool outfall measures, would require work within waters of the U.S. Any work within waters of the U.S. may require a permit from the U.S. Army Corps of Engineers (USACE) and/or the Virginia Department of Environmental Quality (VDEQ). Impacts to waters of the U.S. would be expected to be minor and would be limited to incised and degraded streams. Work within waters of the U.S. related to potential stormwater BMPs is expected to be authorized under the Nationwide Permit (NWP) program. Any impacts to streams greater than 300 linear feet would require compensatory mitigation.

Minor impacts would occur to forested habitat if certain stormwater BMPs are selected by FCPS. Most of these areas are early successional forest comprised of exotic and nuisance species. Some Partners in Flight (PIF) habitat for the wood thrush (*Hylocichla mustelina*) and scarlet tanager (*Piranga olivaceae*) could be impacted if stepped pool outfalls are incorporated. Performing work outside of the breeding season (April to August) and replanting lost trees or providing out-of kind replacement would mitigate impacts to this resource.

No federally or state-listed endangered or threatened species are known to occur within the project area. A habitat survey for the federally threatened small whorled pogonia (*Isotria medeoloides*) identified potential habitat in the vicinity of the stormwater pond. A detailed survey for small whorled pogonia was conducted on July 10, 2014 and no specimens were found on site.

No Resource Protection Areas (RPA), as defined by the Chesapeake Bay Preservation Act (CBPA), are located within the project area. Fort Belvoir regulates activities within 35-foot riparian buffers of intermittent streams. If FCPS chooses to incorporate stepped pool outfalls as a stormwater BMP, temporary impacts will occur within the 35-foot riparian buffers. Tree plantings to meet requirements of Fort Belvoir Policy *Memorandum #27: Tree Removal and Protection* would mitigate the temporary impacts to the riparian buffers.

ES.10 Cultural Resources

Two archeological sites have been identified within the FBES project area (44FX1942 and 44FX619). Phase II cultural resource evaluations were conducted in 1996 for both of these sites during the planning for the original FBES construction. Neither site is considered eligible for listing on the National Register of Historic Places (NRHP). Fort Belvoir has completed the Section 106 consultation process. The State Historic Preservation Officer (SHPO) and Tribal Historic Preservation Officer (THPO) concur that the project will not adversely affect cultural resources.

ES.11 Cumulative Impacts

The RPMP update has identified over 50 construction projects, including the proposed FBES II, as occurring within the next five years. These projects range from small-scale renovations of existing buildings to construction of new structures and associated parking, utilities, and other infrastructure. Additionally, there are several off-Post projects, including widening of U.S. Route 1, that have the potential to contribute to cumulative impacts. There is the potential for on-Post and off-Post construction projects to cumulatively contribute to short-term, localized impacts to traffic. The construction of FBES II is likely to contribute little to cumulative traffic, since the students currently live on-Post and had been previously attending schools off-Post. The Proposed Project is not expected to significantly contribute to other cumulative impacts such as utilities, air quality, and natural resources.

E.12 Conclusion

The construction of the new FBES II and renovations at the existing FBES are not expected to result in significant impacts on the environment. Therefore, an environmental impact statement (EIS) is not required.

1.0 PURPOSE AND NEED

Fairfax County Public Schools (FCPS) proposes to construct a new elementary school adjacent to the existing Fort Belvoir Elementary School (FBES), located on the United States (U.S.) Army Garrison Fort Belvoir, herein referred to as Fort Belvoir. In addition to the new school, FCPS intends to renovate the existing FBES to bring the facility in compliance with Anti-Terrorism Force Protection (ATFP) requirements. On September 5, 2013, FCPS submitted an initial plan to the Office of Economic Adjustment (OEA), Department of Defense (DOD) under DOD's Program for Construction, Renovation, Repair, or Expansion of Public Schools Located on Military Installations to receive funding for the on-post school development (FCPS 2013a). In response to OEA comments, FCPS submitted an updated project proposal on December 5, 2013. All construction will occur within the 19.5-acre site outgranted to FCPS on May 7, 1996 (FCPS 2013b). Although FCPS will be designing, constructing, and operating the new elementary school, Fort Belvoir is required to evaluate the proposed action under the National Environmental Policy Act of 1969 (NEPA) because the project is receiving federal funding, Fort Belvoir will approve various building plans, and Fort Belvoir will ultimately own the facility.

1.1 PURPOSE AND NEED FOR PROPOSED ACTION

FBES is an FCPS school located on Fort Belvoir in Fairfax County, Virginia. Fairfax County is located within the Commonwealth of Virginia, southwest of Washington, D.C. As the most populous county in Virginia, FCPS is the largest school district within the Commonwealth and the 11th largest school district in the country. FCPS projections show that 42 percent of all district elementary schools will be operating above capacity during the 2013-2014 school year (FCPS 2013b).

FBES replaced three on-post elementary schools (Cheney, Markham, and Barden) when it opened in September 1998. FBES is one of the largest elementary schools in FCPS and the Washington Metropolitan area, serving approximately 1,150 students in kindergarten through grade six (FCPS 2013b).

Since FBES services a large military population, it has several distinguishing characteristics. The school has the highest mobility rate in the school district. Approximately 30 percent of the FBES student population departed in the 2011-2012 school year, which is double the average mobility rate for FCPS elementary schools of 14 percent. As a military installation, Fort Belvoir also has some unique features that affect the FBES students. Deployment of soldiers from Fort Belvoir occurs most often as individual assignments, rather than units, which increases the sense of isolation for family members left behind. Secondly, soldiers living at Fort Belvoir work at various duty stations throughout the National Capital Region, such as the Pentagon. As with every post, Fort Belvoir has an Exceptional Family Member program and embraces families and students needing medical care, psychological care and therapies. The installation is also home to a Wounded Warriors Unit (FCPS 2013b).

The on-Post location of FBES provides a community of support for families and creates connections for those struggling to maintain normalcy for their children and themselves. The school serves as a gathering place where students and parents can share experiences, provide support to one another, and access agencies that offer services to families, such as Camp Cope. The school recognizes the shared experiences of deployment and military stress experienced by the students and is equipped to provide interventions to meet their needs. Counseling groups address a wide range of topics not normally offered in typical elementary schools such as deployment, reunification, single-parent soldiers, and welcoming home and adjusting to living with a Wounded Warrior (FCPS 2013b).

Recognizing that behaviors demonstrated by students in the course of the school day may reflect the stressors of military life, FBES entered into a Memorandum of Agreement (MOA) with the Medical Command/Fort Belvoir Community Hospital, establishing a School-based Behavioral Health Program. The partnership has extended the continuum of mental health services available by adding another level of more intense therapeutic services provided by a clinical mental health practitioner to students and families on the school site. The School-based Behavioral Health Program:

- Creates an expanded infrastructure to identify students and families in need.
- Allows for more efficient access for students to receive higher levels of services, keeping students in school by having the appointments in the building, and reducing parent time away from their duty station, by negating the need to transport children to appointments.
- Provides appropriate prevention and intervention efforts, which can improve military child and family functioning, making the soldier duty-ready.
- Generates school-based data which indicates education gains by students receiving services, improved work habits, grades, and behavioral functioning in the classroom. (FCPS 2013b)

The need for an additional building to accommodate the growing student population must include modifications to normal school construction to allow for the special counseling and mental health resources that should occur on site to decrease school absences and to involve the deployed parent through video conferencing. These can occur without incurring additional costs if they are planned for in advance rather than retrofitting a building (FCPS 2013b).

The existing FBES cannot support the number of students living on-Post or the special programming that they are receiving in other off-Post school sites. Currently, Fort Belvoir elementary age children attend twelve other FCPS off-Post facilities. Off-Post placements occur due to capacity and program issues. The addition of a new school facility would allow many of these programs (special education programs such as autism, emotional disabilities, and special education pre-school), as well as advanced academic programs to move back on-post, making the community more aligned, while relieving parent issues associated with changing schools or driving to other off-post school locations to support their children or be actively involved in the school community (FCPS 2013b).

As of September 2013, there were 1,518 elementary age students who reside within the boundaries of Fort Belvoir. The current enrollment of students at Fort Belvoir is 1,133 students, which is about 75 percent of the number of total elementary students that live on-post. About 25 percent of elementary age students living on-Post, or 385 students, are attending school at off-Post FCPS facilities. In this total, there are 154 elementary age students who reside within Fort Belvoir that require special educational services (SPED). Of these students, 103 (67%) attend FBES while the remaining 51 (33%) attend school off-Post at five existing FCPS facilities. The existing FBES has a program capacity of 1,102 which results in a Fort Belvoir elementary age student program capacity deficit of 416 students. The four existing schools in the area which house the majority of the Fort Belvoir off-post students (shown on Figure 1-2) are beginning to experience capacity deficits. Based upon current FCPS projections, these four schools will be as crowded as FBES within the next 5 years (FCPS 2013b).

Therefore, FCPS seeks to meet the educational needs of the Fort Belvoir elementary school age population through eliminating projected educational space capacity deficits and providing programming to meet the unique special needs of military children. FCPS seeks to meet this need on the installation. In addition to the capacity issues at FBES, recent audits of FBES have determined that there are several Anti-Terrorism Force Protection (ATFP) deficiencies with the existing building. FCPS seeks to address these deficiencies as part of the same project to meet capacity needs.

1.2 LOCATION AND BACKGROUND

Fort Belvoir is located in southeastern Fairfax County, Virginia, approximately 18 miles southwest of Washington, D.C. (Figure 1-1). Fort Belvoir includes the 7,682-acre Main Post and the 807-acre North Area (FBNA, formerly called the Engineer Proving Ground) (Figure 1-2). Fort Belvoir Main Post lies between Interstate-95 (I-95) and Pohick Bay and Gunston Cove on the Potomac River. U.S. Route 1 divides Main Post into North Post and South Post (USAG Fort Belvoir 2012).

In recent years, Fort Belvoir has functioned as an administrative and logistics support center for the Department of Defense (DoD) and the Army, as well as a host for over 140 tenant organizations. Fort Belvoir also provides support services (hospital, dental, recreational, etc.) for over 200,000 military personnel, dependents, and retirees in the region. Implementation of the DoD's Base Realignment and Closure (BRAC) 2005 realignment actions at Fort Belvoir resulted in a number of new facilities and new personnel. Personnel working on Fort Belvoir's Main Post and FBNA currently total approximately 39,000 (USAG Fort Belvoir 2012). About 7,500 residents live on-Post (USAG Fort Belvoir 2014).

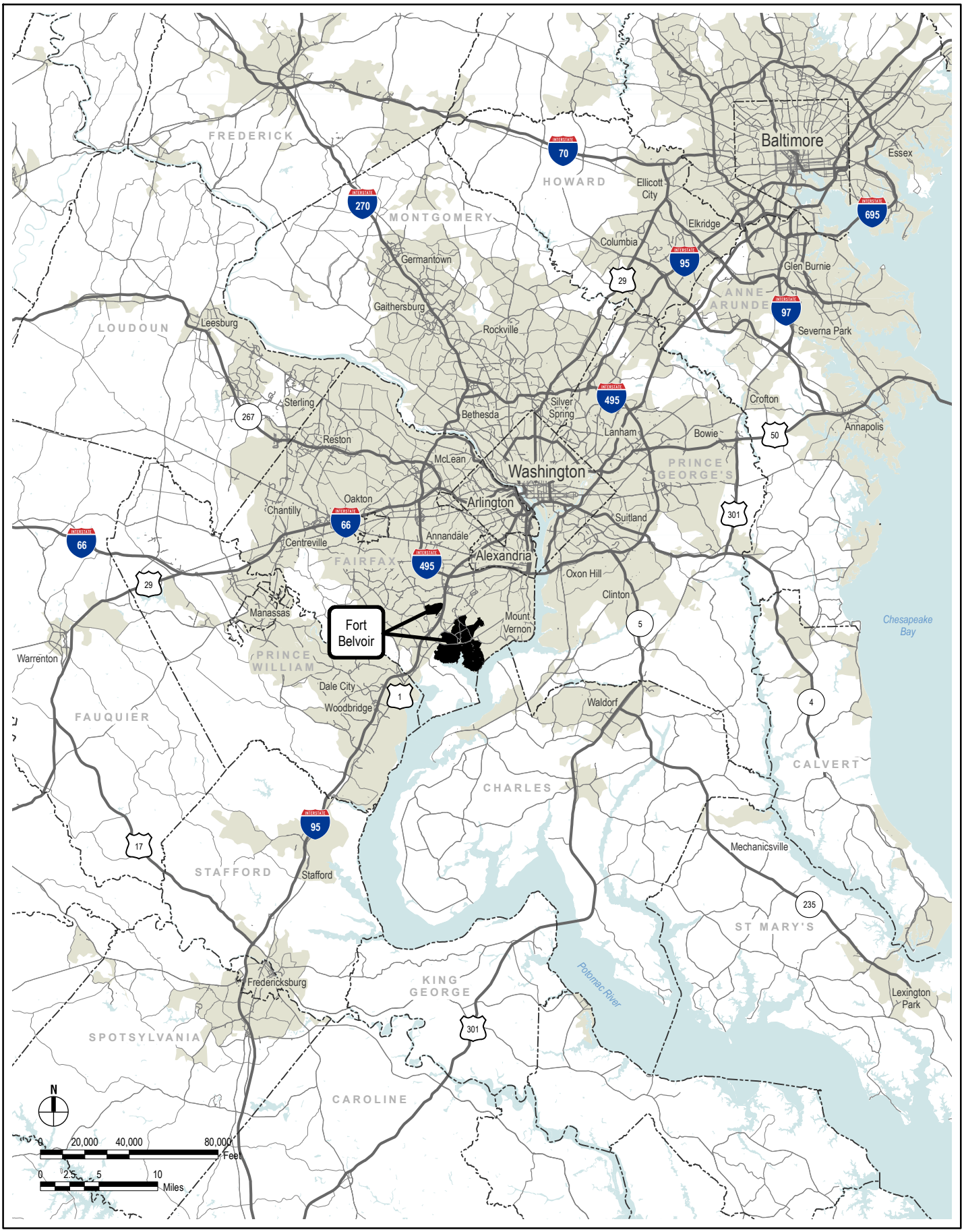


Figure 1-1. Location Map

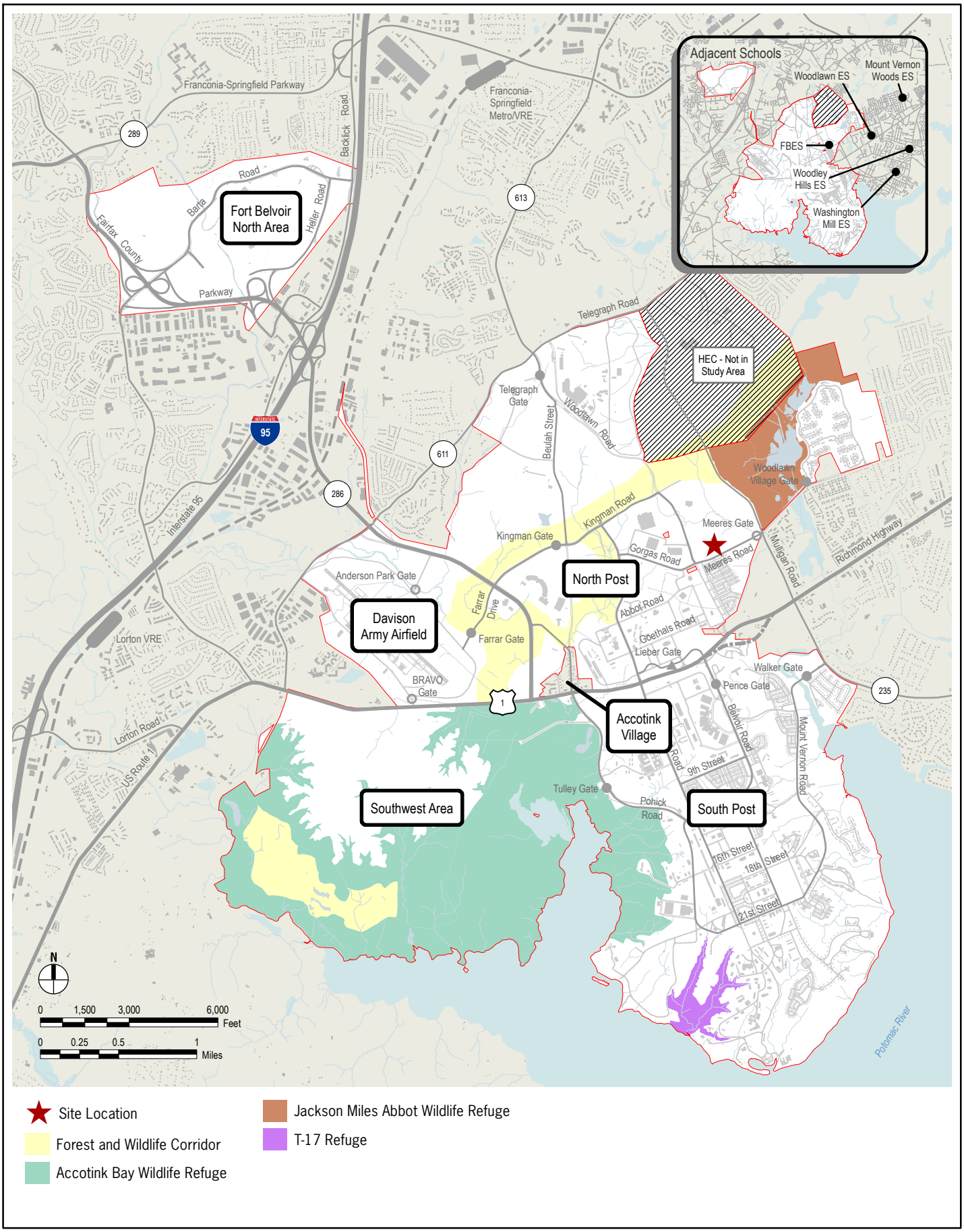


Figure 1-2. Fort Belvoir Overview

The existing Fort Belvoir Elementary School (FBES) is located on Fort Belvoir's North Post, northeast of the intersection of Meeres Road and Woodlawn Road (Figure 1-2). The existing FBES is located on 19.5 acres of land outgranted to FCPS, of which approximately 9 acres of land are currently developed.

1.3 THE NEPA PROCESS

The National Environmental Policy Act of 1969 (NEPA) provides for the consideration of environmental issues in Federal agency planning and decision-making. Under NEPA and 32 CFR Part 651, the Army must prepare an environmental impact statement (EIS) or an environmental assessment (EA) for any Federal action, except those actions that are determined to be exempt by law, "emergencies," or "categorically excluded." An EIS is prepared for those Federal actions that may significantly affect the quality of the human environment. An EA is a concise public document that provides sufficient evidence and analysis for determining whether to prepare an EIS. The EA includes a brief discussion of:

- The purpose and need for the proposal.
- The alternatives (as required under Section 102 (2)(E) of NEPA).
- The environmental, social, and economic impacts of the proposed action and alternatives.
- A listing of agencies and persons consulted.

An EA results in either a Finding of No Significant Impact (FNSI) or a Notice of Intent (NOI) to prepare an EIS. An evaluation of the environmental consequences of the proposed action and alternatives includes direct, indirect, and cumulative effects as defined at 40 CFR 1508.7 and 1508.8, as well as qualitative and quantitative (where possible) assessment of the level of significance of these effects. If Fort Belvoir determines that the proposed action may have a significant impact on the quality of the human environment, then an EIS will be prepared.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The Council for Environmental Quality's (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* establish a number of policies for Federal agencies, including ". . . using the NEPA process to identify and assess the reasonable alternatives to the proposed action that will avoid or minimize adverse effects of these actions on the quality of the human environment" (40 CFR 1500.2 [e]). FCPS has considered the following alternative approaches to eliminating the Fort Belvoir elementary school age population capacity deficit:

- Implementing the Proposed Action to construct a new school on the site of the existing FBES and renovate the existing FBES to comply with anti-terrorism/force protection (ATFP) requirements.
- No Build ("the No Action" Alternative).

In order for an alternative to be reasonable, it must fulfill the purpose and need for the Proposed Action. As discussed in Subsection 1.1, the purpose of this proposed action is to meet the educational needs of the Fort Belvoir elementary school age population by eliminating projected educational space capacity deficits and providing programming to meet the unique special needs of military children. The Proposed Action is driven by the need to:

- Provide sufficient educational space to accommodate the educational needs of students as defined by FCPS.
- Provide for the unique special needs of military children through services provided by the School-based Behavioral Health Program.
- Keep elementary students on the installation.
- Ensure that the educational facilities meet current ATFP standards.

Only those alternatives that are reasonable and able to fulfill the purpose and need for the action warrant a detailed environmental analysis.

2.1 PROPOSED ACTION

The lack of overall acreage at the four existing school sites currently housing the majority of the Fort Belvoir off-post students, the short timeframe allowed for expansion / renovation, and limited funding available to renovate all four schools has led FCPS' Office of Design & Construction to recommend that another school building be constructed on the property immediately adjacent to the existing FBES building. At the same time, modifications to the existing building can be made to bring it into proper alignment with ATFP requirements and other educational program needs (FCPS 2013b).

FCPS proposes to design an elementary school building based upon the FCPS prototype, which has been constructed multiple times within Fairfax County. The school building is a two-story, 26-classroom, elementary school which adequately supports the entire academic program of studies offered in FCPS. The proposed building will be approximately 92,254 sq ft with a program capacity of 492 students. The combination of the new building and appropriate modifications to the existing FBES building will create an available capacity of nearly 1,600 (K-6) students. The new facility will also be compliant with the Virginia Collaborative for High Performing Schools (CHPS) Sustainable Standards which were developed by FCPS. The CHPS program seeks to create a healthy, high performance, green, sustainable learning environment for children and contains elements similar to the Leadership in Energy and Environmental Design (LEED) program (FCPS 2013b).

The location of the new school on a previously disturbed site (former Cheney Elementary School), adjacent to an existing elementary school minimizes the disturbance of land and reduces impact to the environment. FCPS proposes to reconfigure the existing school bus loop and combine it with the new school. In addition to the increased transportation efficiency, this will allow the appropriate building to road offset for the existing elementary school to be compliant with current ATFP requirements. Another important advantage is the reduction of traffic impact to the surrounding homes and businesses. Separate paved play areas and playgrounds will be provided for the new school, but the play fields to the north of the existing school will be combined for use by both facilities (FSCP 2013b).

Stormwater management for FBES is currently met by a dry pond facility located behind the existing building and adjacent to the existing athletic fields. This pond will be appropriately modified and rehabilitated to meet current quality and quantity treatment requirements associated with the new school building and associated parking area expansion. During rehabilitation and modification, FCPS typically incorporates the latest Low Impact Design (LID) philosophies into the new stormwater strategy for a site utilizing such facilities as permeable pavers, bio-retention areas, underground retention/detention/infiltration facilities, porous pavement, and porous concrete (FCPS 2013b). All stormwater management facilities will be compliant with Virginia Department of Environmental Quality (VDEQ) stormwater regulations by utilizing best management practices (BMP) approved by the BMP Clearinghouse. All stormwater design will also comply with Section 438 of the Energy Independence and Security Act of 2007 (EISA 438).

Since construction will already be occurring at the FBES site, FCPS intends to take advantage of contractor mobilization and address several deficiencies of the existing FBES in meeting ATFP requirements.

The work proposed by FCPS will take place in two phases and will consist of:

- Construction of the new school
- Improvements to the existing school building and supporting facilities.

2.1.1 Phase One: Proposed New School

The proposed new school is not currently named but will be referred to as Fort Belvoir Elementary School (FBES) II throughout this document. FBES II will be built on the existing play fields located to the west of the existing FBES (Figure 2-1 and Figure 2-2). The initial 2013 grant application submitted by FCPS in September 2013 provided the number of classrooms, administrative areas, support areas, and the area of each in order to meet these specifications. The initial documented need was for six classrooms each for grades kindergarten through 2 and five classrooms each for grades 3 through 6 (FCPS 2013a). As the needed capacity was reduced in the revised proposal submitted in December, the number of core classrooms was reduced; however, a number of additional resource areas were added, which resulted in a modest 8 percent decrease in the total size of the school. The proposed school will contain four kindergarten classrooms, three classrooms each for grades 1 through 3, two classrooms each for grades 4 and 5, and three classrooms for grade 6. The proposed layout will be completely compliant with the 2009 FCPS Educational Specifications (FCPS 2013b).

The proposed school building will be adapted from the FCPS prototype to meet ATFP requirements. The most important alteration to the site model will be the change from masonry bearing to a steel bearing facility. Not only will the structure be steel bearing, but the infill masonry walls will be reinforced to comply with ATFP standards. The current schedule provided by FCPS indicates that the design of the school will be complete by July 2014 with construction occurring from January 2015 to March 2016. The new school is scheduled to open on September 6, 2016 (FCPS 2013b).

2.1.2 Phase Two: Existing School Renovations

A DoD OEA report prepared in 2011 documented several ATFP deficiencies with the existing FBES (FCPS 2013b). The deficiencies were specifically related to the ability of the facility to withstand certain blast forces. The renovation design proposes to move a significant amount of the parking/travel lanes in order to create a sufficient distance between the building and the road to meet offset requirements. It is not possible to remove all of the parking/travel lane concerns; therefore, many sections of the existing facility will need to be modified in order to bring the building into ATFP compliance. Such modifications include:

- the installation of structural bollards along the frontage of both the existing and new facility
- control of bus and vehicular traffic with automatic gates

In addition to the modifications of the exterior frontage of the existing facility, additional changes to the existing building will be necessary to meet ATFP requirements per a report from BEI Structural Engineers (FCPS 2013b). Such improvements include upgrades to the exterior walls, which are scheduled to occur between June 2016 and October 2016 (FCPS 2013b).

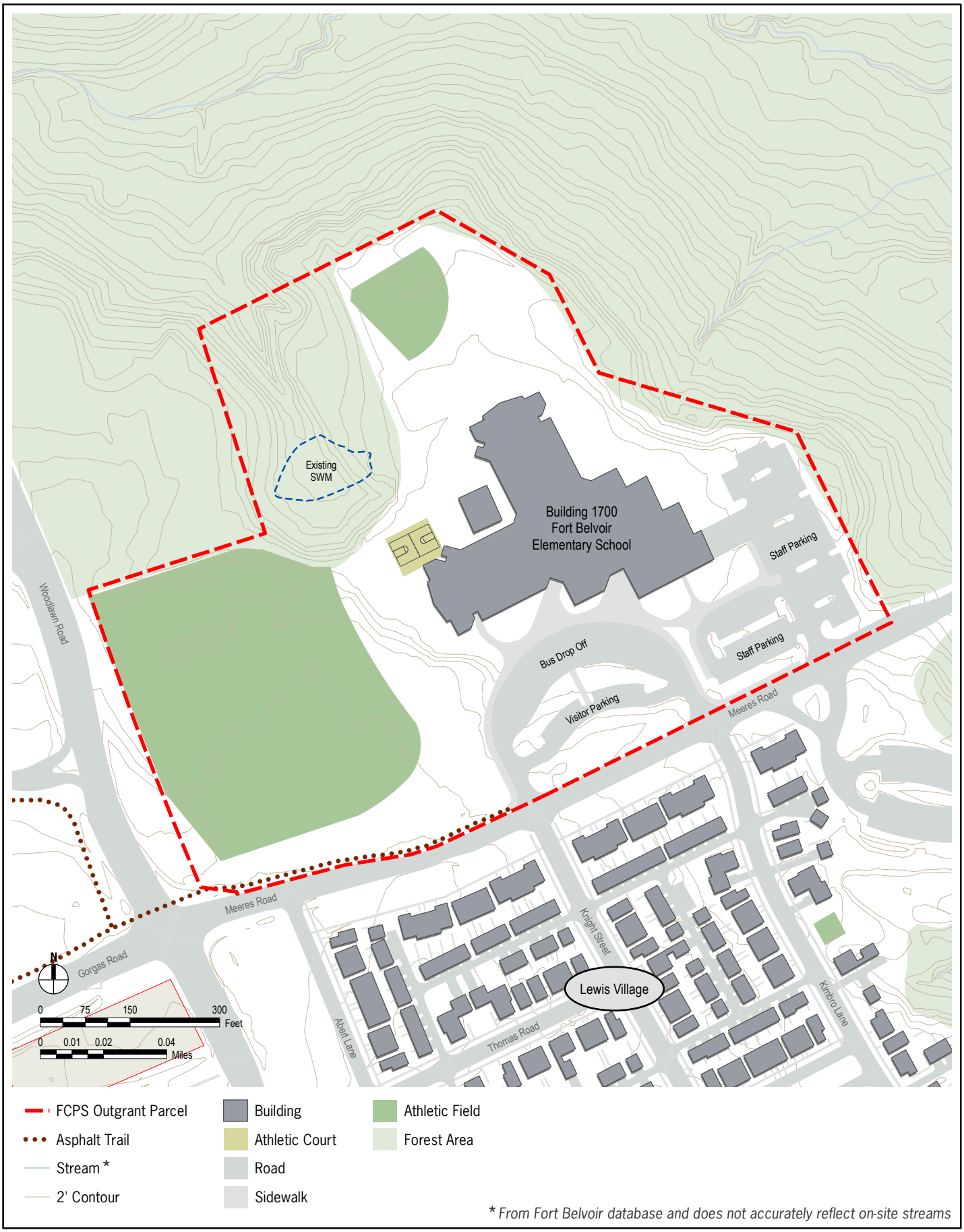


Figure 2-1. Existing Fort Belvoir Elementary School

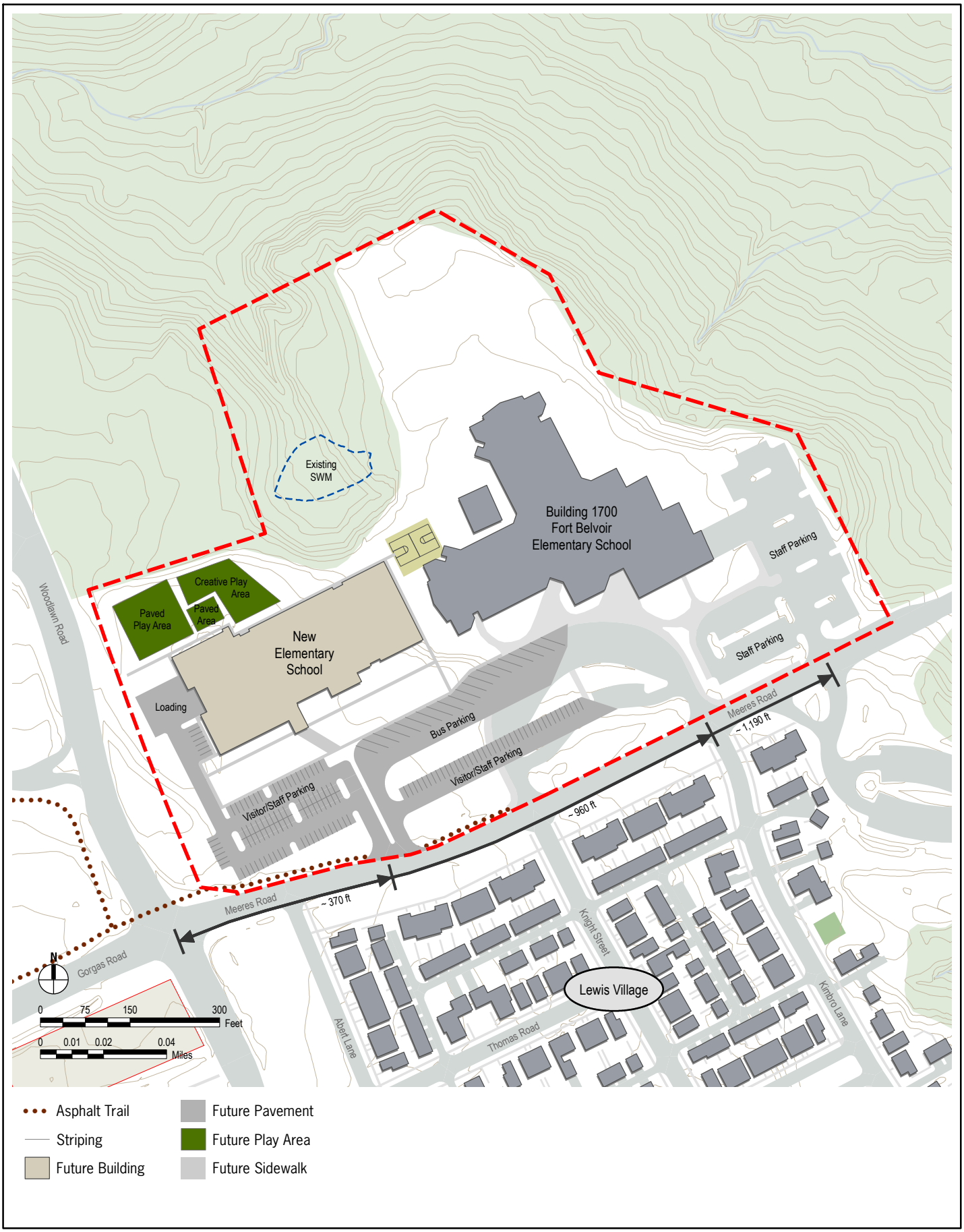


Figure 2-2. Proposed Project

2.2 NO ACTION ALTERNATIVE

In the short-term, if no action was taken, and the Army did not approve the construction of an additional elementary school by FBES, there would continue to be a capacity deficit at FBES. Approximately 400 students would continue to need to attend off-Post elementary schools. These off-Post schools do not provide the same level of support services for military children as on-post schools and are beginning to experience capacity issues. The existing FBES will also remain noncompliant with ATFP standards. In the long-term, the capacity deficits at FBES and off-Post schools may continue to increase, contributing to decreased educational services for the Fort Belvoir elementary school age children.

The no action alternative does not meet the project need as defined by FCPS and Fort Belvoir (Subsection 1.2). Nevertheless, the no action alternative is evaluated in this EA in accordance with CEQ guidance to serve as a baseline against which to measure environmental impacts.

2.3 ALTERNATIVES CONSIDERED BUT DISMISSED

FCPS considered several alternatives to constructing a new school at the existing FBES site. FCPS explored the option of expansion/renovation at the four off-post schools that house the majority of Fort Belvoir off-post students. The lack of overall acreage at these four existing school sites, the short timeframe allowed for expansion/renovation, and limited funding available to renovate all four schools makes this option unsuitable. Additionally, expansion at off-Post schools does not meet the defined purpose of providing on-Post schooling for all Fort Belvoir elementary aged students. Since the existing FBES has onsite acreage available for construction of a school and this area has been identified for new school construction in the Fort Belvoir Real Property Master Plan, FCPS did not evaluate additional sites on-post for new school construction.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL IMPACTS

The CEQ regulations implementing NEPA (40 CFR Part 1500) require documentation succinctly describing the environment of the area(s) to be affected by the alternatives under evaluation, as well as a discussion of the impacts in proportion to their significance. The affected environment under the Proposed Action Alternative(s) ranges from site-specific physical and natural resources to broader regional concerns (i.e., air quality, noise, infrastructure, socioeconomics, community facilities and services, transportation and traffic).

3.1 RESOURCES NOT EVALUATED IN THIS ENVIRONMENTAL ASSESSMENT

To the extent practical, analyses of the various resources presented in this environmental assessment are streamlined based on the anticipated level of potential impact. The focus of this environmental assessment is on the potential environmental impacts associated with the construction of a new school and renovations at the existing FBES. Consistent with 40 CFR Part 1501.7(a)(3), the following resources are not analyzed in this EA because the proposed action either has no potential to affect them or the potential impacts would be negligible:

- **Noise:** The Noise Control Act of 1972 (Public Law 92-574) directs Federal agencies to comply with applicable Federal, state, interstate, and local noise control regulations. Fairfax County Code prohibits creating sounds louder than 55 decibels (dB) in residential areas and 60 dB in a commercial area. It also prohibits creating any excessive noise on any street adjacent to any school, institution of learning, court, or hospital that interferes with its function (Fairfax County Code Section 108-4-1). Construction and demolition activities are exempt from the ordinance if they occur between 7:00 A.M. and 9:00 P.M. Construction and demolition activities under the Proposed Action would require using heavy machinery and equipment that would generate short-term increases in noise at the construction site within Fort Belvoir. However, construction would be performed during the noted hours and would comply with all noise ordinances and regulations. Additionally, FCPS has particular specifications to be included in construction contracts to address the minimization of noise when performing work on an existing school. These include phasing of work and scheduling work to occur during non-school hours. Therefore, impacts would be negligible during construction and are not expected during the operation of an elementary school.
- **Floodplains**: The National Flood Insurance Act of 1968, the Flood Disaster Protection Act of 1973, and Executive Order 11988, *Floodplain Management* – administered by the Federal Emergency Management Agency (FEMA) – set forth the responsibilities of Federal agencies in reducing the risk of flood loss or damage to personal property, minimizing the impact of flood loss, and restoring the natural and beneficial functions of floodplains. There are no regulatory floodplains identified on the National Flood Insurance Program Flood Insurance Rate Map for the site. The closest regulatory floodplain is associated with Dogue Creek, which is approximately 4,000 feet east of the FBES school site.

3.2 LAND USE AND PLANS

3.2.1 Land Use

Existing Conditions: Fort Belvoir is approximately 8,500 acres[1] in size. Approximately 65 percent of the area is undeveloped, primarily due to environmental constraints. The Post is divided into five areas: North Post, South Post, the Southwest Area, the Davison Army Airfield, and the Fort Belvoir North Area (FBNA – formerly called the Engineer Proving Ground). The North and South Posts are separated by U.S. Route 1, which bisects the Post. The North and South Posts contain most of the development at Fort Belvoir.

Figure 3-1 shows Fort Belvoir's designated land use categories on and surrounding the FBES site. FBES is located in the northeast portion of North Post. Development in this region of North Post is clustered and moderate to low density. Numerous environmental constraints separate developed areas from each other. The FBES site, including the location for the proposed school, is currently designated as Community land use. Community is a broadly defined land use that encourages a mix of uses and facilities including religious, family support, personnel services, medical, community, housing, commercial, and recreational services (Atkins 2013). The proposed school would be in the Building Height Restriction Zone for Davison Airfield, which limits buildings to a height of 230 feet msl.

The FBES site is bounded by undeveloped forested areas to the north and east. The proposed school will be situated on play fields located west-southwest of the existing school. Lewis Villages, an on-post residential community, is located to the south of the FBES site across Meeres Road. The new Exchange was recently constructed on the other side of Woodlawn Road to the west of the site.

Impacts of No Action: The No Action Alternative would have no impact on current land uses on the Post. Existing conditions at the FBES site would continue for the foreseeable future.

Impacts of the Proposed Action: The Proposed Action would result in the conversion of play fields to building and parking facilities. Since the footprint of these facilities would be confined within areas already designed as Community land use, no change in land use would occur.

3.2.2 Plans

3.2.2.1 Fort Belvoir Real Property Master Plan

Existing Conditions: In response to the 2005 Base Realignment and Closure (BRAC) process, the Army sought to update and amend the land use plan in Fort Belvoir's 1993 Real Property Master

[1] 8,500 ac consists of Fort Belvoir Main Post and Fort Belvoir North Area but does not include the Mark Center.

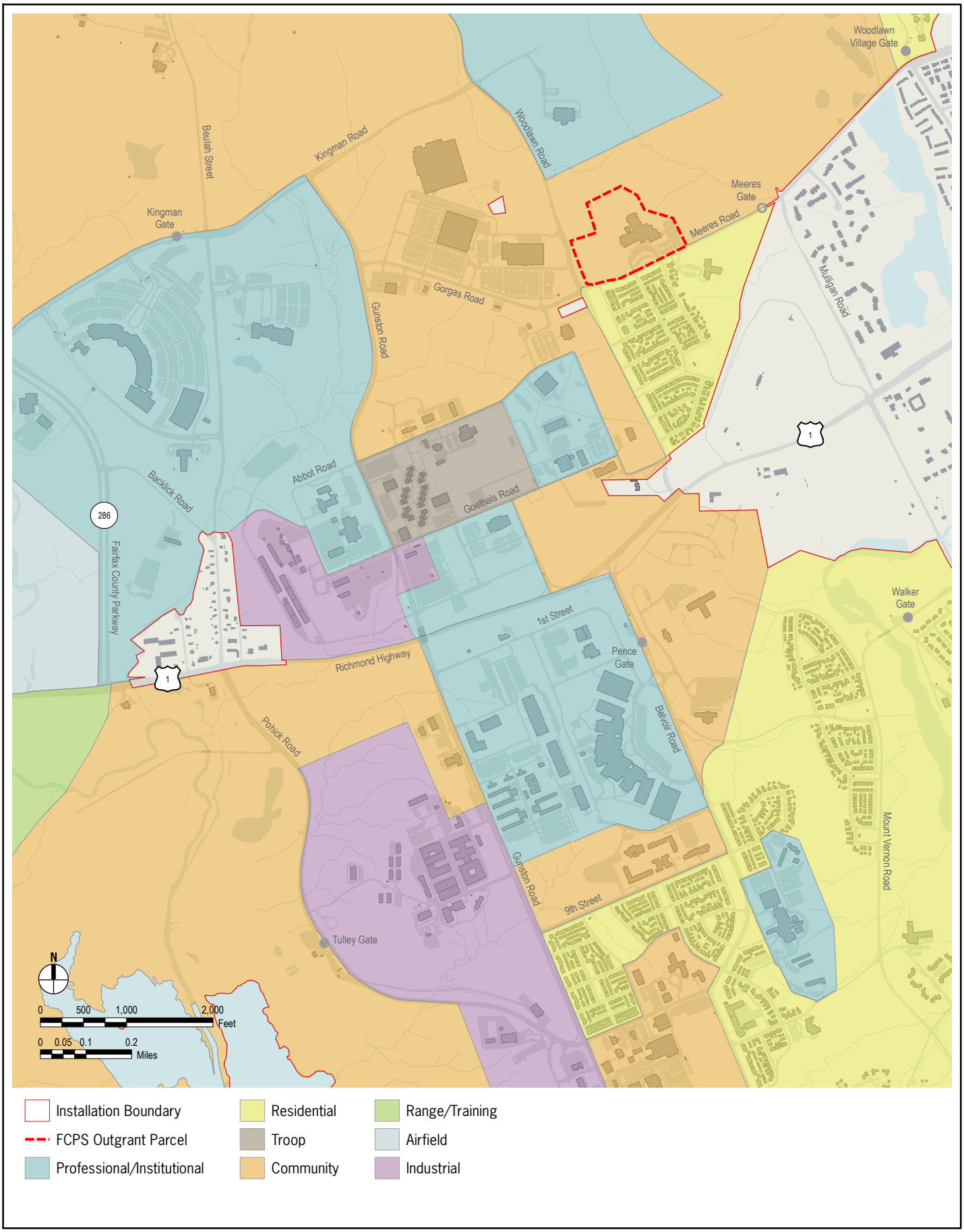


Figure 3-1. Land Use

Plan (RPMP) (USACE Mobile District 2007). The Final Environmental Impact Statement (FEIS) for the Implementation of the 2005 Base Realignment and Closure Recommendations and Related Army Actions at Fort Belvoir addressed the adoption of the amended land use plan as well as BRAC realignment plans (USACE Mobile District 2007). The Army is currently in the process of preparing an update of the RPMP to address future growth on the garrison through 2030. The FBES site is designated as Community under both the 2007 land use plan presented in the FEIS, as well as the land use plan being proposed as part of the RPMP. Additionally, the update to the RPMP assumes that a second school will be built on the FBES site.

Impacts of No Action: The No Action Alternative would result in no additional school being built and would therefore not fulfill expectations assumed in the proposed RPMP.

Impacts of the Proposed Action: The Proposed Action would be consistent with the currently approved land use plan and the plan proposed as part of the updated to the RPMP. The addition of a second school on the FBES site would meet development planning strategies proposed in the update to the RPMP.

3.2.2.2 National Capital Planning Commission

Existing Conditions: Federal actions in the National Capital Region must be reviewed by the National Capital Planning Commission (NCPC). The NCPC has been involved in the RPMP update process and will also be afforded the opportunity to comment on this environmental assessment. NCPC also prepares the Federal Elements of the Comprehensive Plan for the National Capital Region, including elements for Federal workplaces. Since the proposed school will be operated by FCPS and will not have Federal employees, policies set forth in the Comprehensive plan, *Federal Workplace: Location, Impact, and the Community* (NCPC 2004) do not apply.

NCPC guidance mandates that Federal agencies develop a transportation management program (TMP) when preparing a master plan or requesting site plan approval and anticipating an increase in personnel. The goal of preparing a TMP is to foster more efficient employee commuting patterns by minimizing "single occupant vehicle" (SOV) trips related to Federal agency worksites. This is mandated by Federal air quality regulation, local trip reduction ordnances, and NCPC planning requirements. Fort Belvoir is in the process of preparing an installation-wide TMP to support the update of the Real Property Master Plan.

Impacts of No Action: The No Action Alternative would have no impact on current plans or the ongoing planning process.

Impacts of the Proposed Action: NCPC will be given the opportunity to review this EA, assess the proposed action's compatibility with Federal planning goals, guidelines and initiatives, and provide comments before the decision is made to proceed with the action.

3.2.2.3 Coastal Zone Management

Existing Conditions: The Coastal Zone Management Act (CZMA) of 1972 (16 USC § 1451, et seq., as amended) provides assistance to the states, in cooperation with Federal and local agencies, for developing land and water use programs in coastal zones. Section 307(c)(1) of the Coastal Zone Management Act Reauthorization Amendment (CZMARA) stipulates that Federal projects that affect land uses, water uses, or coastal resources of a state's coastal zone must be consistent to the maximum extent practicable with the enforceable policies of that state's federally approved coastal management plan. The Commonwealth of Virginia has developed and implemented a federally approved Coastal Resources Management Program (CRMP) describing current coastal legislation and enforceable policies. There are enforceable policies for:

- Fisheries management
- Subaqueous lands management
- Wetlands management
- Dune management
- Non-point source pollution control
- Point source pollution control
- Shoreline sanitation
- Air pollution control
- Coastal lands management

All of Fairfax County is within Virginia's coastal zone; therefore, Federal actions at Fort Belvoir are subject to Federal consistency requirements. The Virginia Department of Environmental Quality (VDEQ) serves as the lead agency for consistency reviews.

Impacts of No Action: The No Action Alternative would have no impact on the Virginia coastal zone or future implementation of the Coastal Resources Management Plan.

Impacts of the Proposed Action: Fort Belvoir has determined that the proposed action is consistent, to the maximum extent practicable, with the Commonwealth of Virginia CRMP's enforceable polices, as described in Appendix A, Coastal Consistency Determination.

3.3 TRAFFIC AND TRANSPORTATION NETWORKS

Existing Conditions – Regional Transportation Network:

Four principal roadways make up the highway system in the vicinity of the site (Figure 3-2):

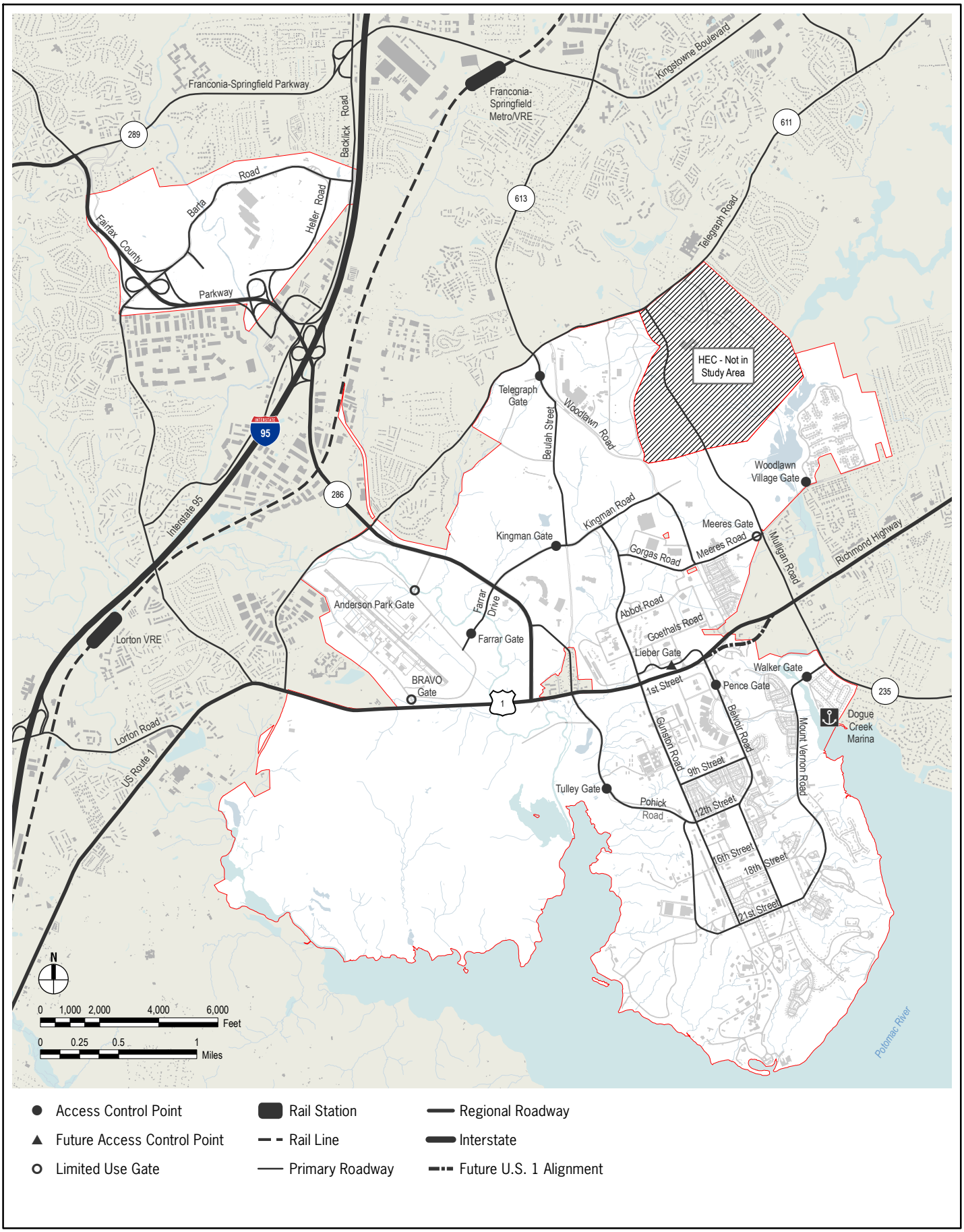


Figure 3-2. Regional Transportation Network

- I-95
- Fairfax County Parkway (Virginia Route [VR] 286)
- Richmond (Jefferson Davis) Highway (US 1)
- Telegraph Road (VR 611)

I-95 is the primary north-south travel route for traffic traveling along the East Coast through Northern Virginia. US 1 is a major four-lane north-south transportation arterial that parallels I-95 in Northern Virginia and serves regionally as an alternate corridor to I-95, connecting the City of Alexandria with points south, including Fort Belvoir, Lorton Road, and the Fairfax County Parkway. US 1 passes through Fort Belvoir, while I-95 is located two miles west of the installation.

Direct access to Fort Belvoir from I-95 is primarily via the Fairfax County Parkway (VR 286 via Exit 166) with alternate access points at Lorton Road (Exit 163) and US 1 (Exit 161). The Fairfax County Parkway is a divided four-lane limited access highway that links Fort Belvoir with I-95 as well as northern and western parts of Fairfax County. Telegraph Road also provides direct access with North Post and intersects with Fairfax County Parkway.

As shown on Figure 3-2, two gates control access to North Post: the Kingman Gate, which controls access from the Fairfax County Parkway, and the Telegraph Gate, which controls access from Telegraph Road and Beulah Street. All visitors to the installation, including FBES, must use Tulley Gate, which is accessed from US 1 and approximately 3.1 roadway miles from FBES. Currently, offsite buses and commuting teachers use Tulley Gate to enter Fort Belvoir. There is an exit only gate at Meeres Road, east of FBES, which operates on school days between 0800 to 0930 and 1545 to 1645. Buses, faculty, and parents may exit through this gate at these times.

Existing Conditions – Fort Belvoir Transportation Network:

From the US 1/Tulley Gate entrance, the most direct route to FBES is via Pohick Road and Gunston Road to Gorgas Road (Figure 3-3). Gorgas Road is known as Meeres Road east of Woodlawn Road. FBES' bus and visitor entrance is located approximately 970 feet east of the Gorgas/Meeres Road and Woodlawn Road intersection, referred to herein as the Woodlawn intersection (Figure 3-4). The roadway conditions along the primary route to FBES are considered good. Pohick Road and Gunston Road were widened to four lanes as part of the BRAC 2005 action that was completed in 2011. These roads have signalized intersections, sidewalks, and dedicated on-street bike lanes on both sides of the street. The new sidewalks and bike lanes have improved pedestrian mobility throughout the post including the residential housing areas on the South Post to FBES.

Gorgas Road is a two lane road with turn lanes that will expand to four lanes with the completion of the new Commissary. A continuous asphalt trail runs along the north side of Gorgas Road and Meeres Road leading to FBES. Woodlawn Road is a two-lane road that provides mobility within the

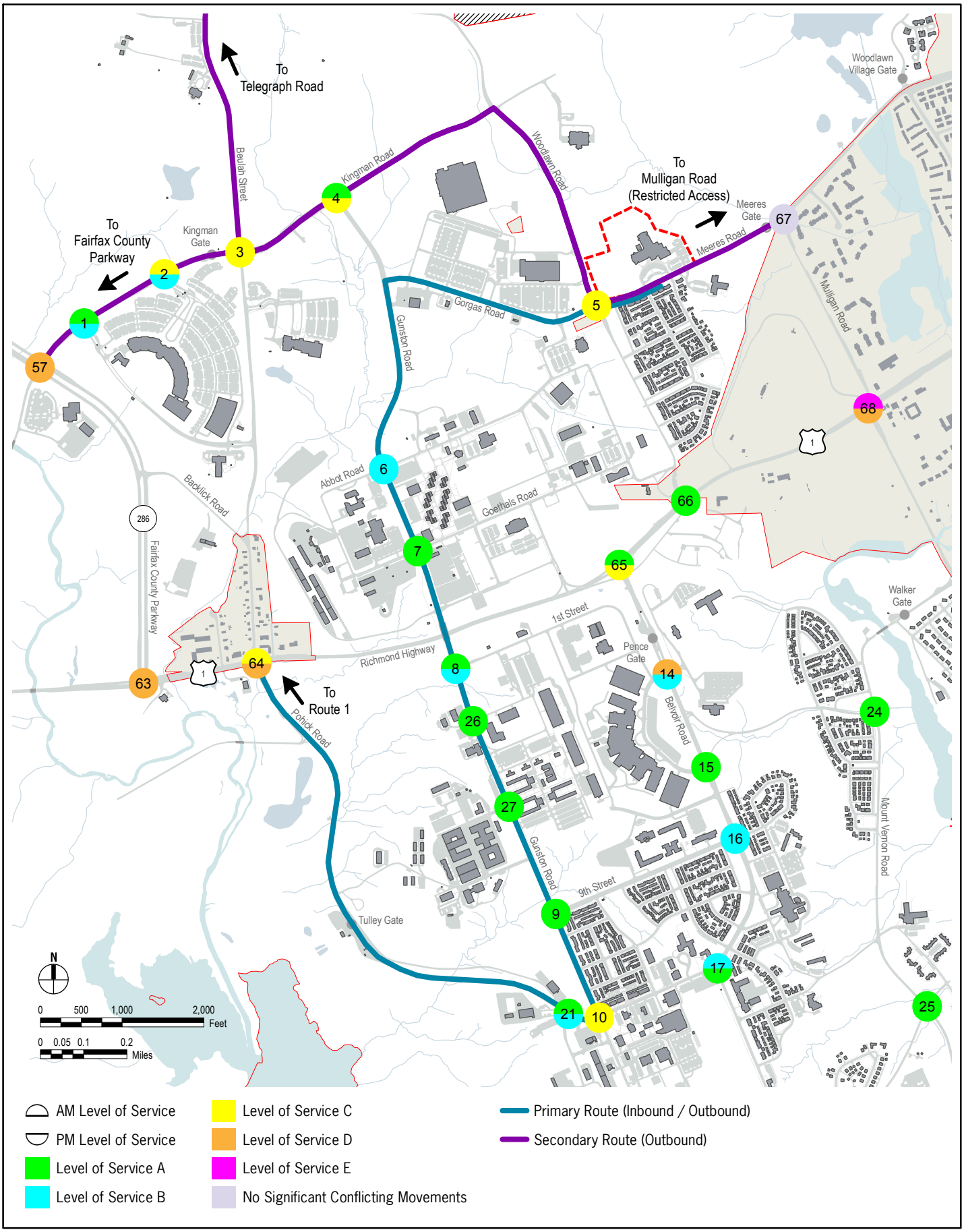
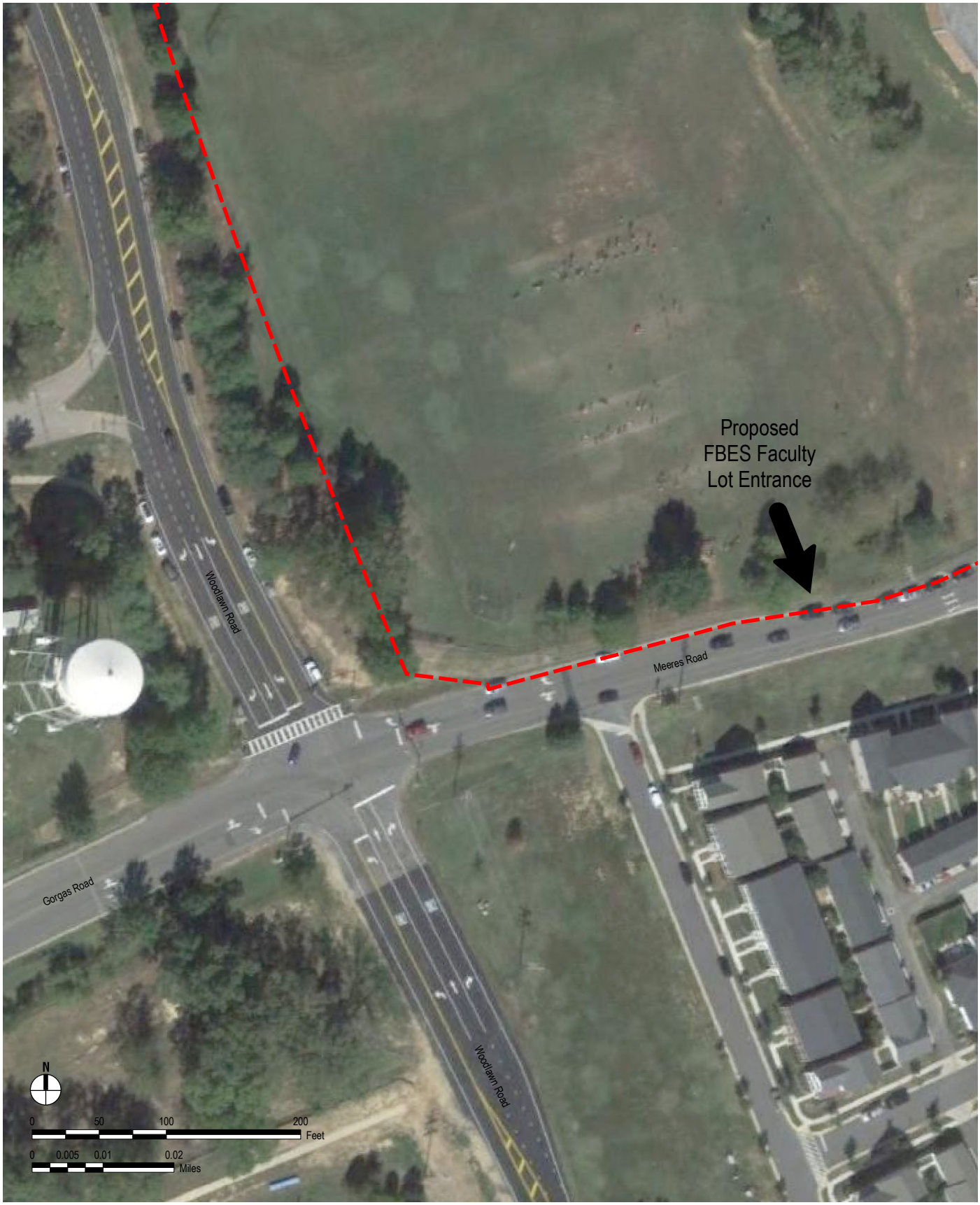


Figure 3-3. Intersection Level of Service - Existing



FCPS Outgrant Parcel

Figure 3-4. Woodlawn Road and Gorgas/Meeres Road Intersection

North Post, south of Gorgas/ Meeres Road it serves Lewis Village and the office uses on the lower north Post. North of Woodlawn Road it connects to Kingman Road, which connects to Telegraph Gate via Beulah Street and Kingman Gate.

All inbound and most outbound traffic serving FBES comes through the Woodlawn intersection. Since Woodlawn Road was closed to public traffic after the terrorist attacks of September 11, 2001, the north-south through traffic volumes at this intersection are minor, with the east-west through movement carrying the bulk of the traffic along Gorgas Road/Meeres Road. Eastbound Gorgas at the Woodlawn intersection contains a combination through lane/left turn lane onto northbound Woodlawn Road and right turn lane. Westbound Gorgas maintains the right turn lane from southbound Woodlawn Road that enters into the Commissary and a through lane. Westbound Meeres Road at the Woodlawn intersection consists of combination through/left turn lane onto southbound Woodlawn Road and a right turn lane onto northbound Woodlawn Road. Eastbound Meeres is one through lane that serves each of the three entrances into FBES. Meeres Road continues eastbound to Meeres Gate and connects to Mulligan Road. Meeres Road is a secondary route and as stated above is restricted to outbound traffic only. Since faculty, staff, and visitors leaving the installation are not required to exit at Tulley Gate, they can use alternate exit routes from FBES to Kingman Gate that connects to Fairfax County Parkway or Telegraph Gate that connects to Telegraph Road.

Existing Conditions – FBES Entrances and Parking Facilities:

There are three entrances to FBES. The entrances located at the intersection of Meeres Road at Knight Street and Meeres Road at Kimbro Lane are restricted to bus and visitor use only. Based on the existing angled bus striping, buses must enter the drop off area from Kimbro lane, which is the furthest entry point from Gorgas/Meeres Road and Woodlawn Road Intersection. The bus drop off area includes a dedicated parking lot for parents or visitors that drop off or pick up students. The parent/visitor parking area is physically separated from the bus drop off area in order to avoid potential conflicts with arriving and departing buses during the AM/PM weekday. The faculty and staff parking lot is located approximately 200 feet further east of the Meeres/Kimbro Lane bus entrance. The faculty and staff parking lot also includes a drop off area.

Existing Conditions – Traffic Impact Area of Influence:

The traffic assessment focuses on the impact of the FBES school expansion on the Woodlawn intersection and Meeres Road entry areas. Due to the relatively small percentage of traffic volumes generated by the school when compared to other Belvoir uses in the network, the capacity of the existing Fort Belvoir roadway network along the primary and secondary routes to FBES is not a significant concern.

Existing Conditions – Existing Roadway Level of Service (LOS):

As part of Fort Belvoir's TMP effort, traffic counts were collected at 27 intersections within the installation to determine how well the installations roadways and intersections function. The traffic counts were completed by early 2013 with the completed widening of Gunston Road and as the signalized traffic lights along the route became fully operational. The intersection counts included Woodlawn intersection. This intersection is identified as Site #5 in the Fort Belvoir TMP traffic study and was selected for evaluation in anticipation of the new school expansion. The installation traffic counts were collected for 3 hours in the A.M. and P.M. peak periods on two consecutive midweek days (Tuesday to Thursday). The traffic volumes were then input into the Synchro[2] signal timing program. This program simulates the existing roadway conditions and analyzes traffic conditions at the intersections by calculating the average delay per vehicle for each turning and non-turning movement, and the level of service for each movement, approach and assigns and overall LOS for the intersection. Synchro 8 calculates LOS based on the 2010 Highway Capacity Manual.

There are six LOS classifications ranging from A to F, with "A" representing the best condition and F representing the worst condition. The range of average delay per vehicle that is associated with each LOS is shown in Table 3-1 for signalized and unsignalized intersections. Unsignalized locations include stop-sign controlled intersections and traffic circles. The numbers shown in this table are industry standards and used by the Military Surface Deployment and Distribution Command Transportation Engineering Agency (SDDCTEA), the agency that is responsible for improving highway safety and reducing traffic congestion on DoD installations. SDDCTEA and Virginia Department of Transportation (VDOT) considers LOS D generally acceptable for existing facilities on and serving military installations.

Table 3-1
LOS and Average Delay for Intersections

LOS	Signalized Intersections	Unsignalized Intersections
A	≤10 sec	≤10 sec
B	10–20 sec	10–15 sec
C	20–35 sec	15–25 sec
D	35–55 sec	25–35 sec
E	55–80 sec	35–50 sec
F	≥80 sec	≥50 sec

The traffic analysis results concluded that Site #5, the Woodlawn intersection, maintains an overall LOS C condition for the AM (calculated delay of 23.1 seconds/vehicle) and PM (calculated delay of

[2] Synchro Version 8., Build 802-Trafficware LTD.

25.1 seconds/vehicle) peak hours. Further the Belvoir TMP traffic study reveals the primary approach route from Tulley Gate to FBES and 9 intersections along the route are currently operating at acceptable LOS ranging from A to C for AM and PM peak hours (Figure 3-3).

Impacts of No Action: The No Action Alternative would result in no change to local traffic conditions. No construction would be undertaken and no changes in operations or traffic would be expected.

Impacts of the Proposed Action: During construction minimal increases in traffic may occur. Since workers would likely arrive before the start of the school day and leave after the end of the school day, construction traffic is not expected to interact with traffic from the existing school.

2017 Level of Service with FBES II

An installation wide traffic study, completed in February 2014 as part of the Belvoir TMP, included the school expansion project in its 2017 Short Term Traffic Analysis. The traffic study utilizes the Metropolitan Washington Council of Governments (MWCOG)/National Capital Transportation Planning Board (TPB) regional travel demand forecasting model to determine trip generation and distribution in the study area (both within and outside of the installation). The Fort Belvoir traffic model assigned all future 2017 projects by land use, location, and number of new personnel to specific Transportation Analysis Zone (TAZ) areas on the main post. The traffic model assigned 75 additional personnel to TAZ 2555, the site of the current FBES location. In all, there is an increase of approximately 5,000 new workers in 2017 that will also be utilizing segments of the same roadways as the existing FBES and proposed FBES II staff and faculty members will use. Thus the model takes into account Fort Belvoir's future growth that is expected to be in place with the opening of the new school in September 2016.

The model outputs provided peak period traffic volumes for the roadway links, the through movements and for turning lanes at individual intersections. Existing traffic data counts and LOS results were also provided. The forecasted traffic model volumes, growth factors, and land uses changes (i.e. the background growth added due to new projects) were then entered into the Synchro signal timing model to calculate delays and to establish an overall LOS classification for the intersection.

The traffic analysis results concluded that Site #5, the Woodlawn intersection, will maintain an overall LOS C condition for both the AM (calculated delay of 25.3 seconds/vehicle) and PM (calculated delay of 33.2 seconds/vehicle) peak hours in 2017 (Figure 3-5). Overall, there is no change in LOS at the intersection, as the measureable increase in delay time (or 2.2 second delay increase in AM and an 8.1 second delay increase in PM Peak hours) will not change the overall LOS C classification. It is noted that the slightly higher delay in the PM peak hours at the Woodlawn intersection captured in the traffic model may be associated with the future opening of Mulligan

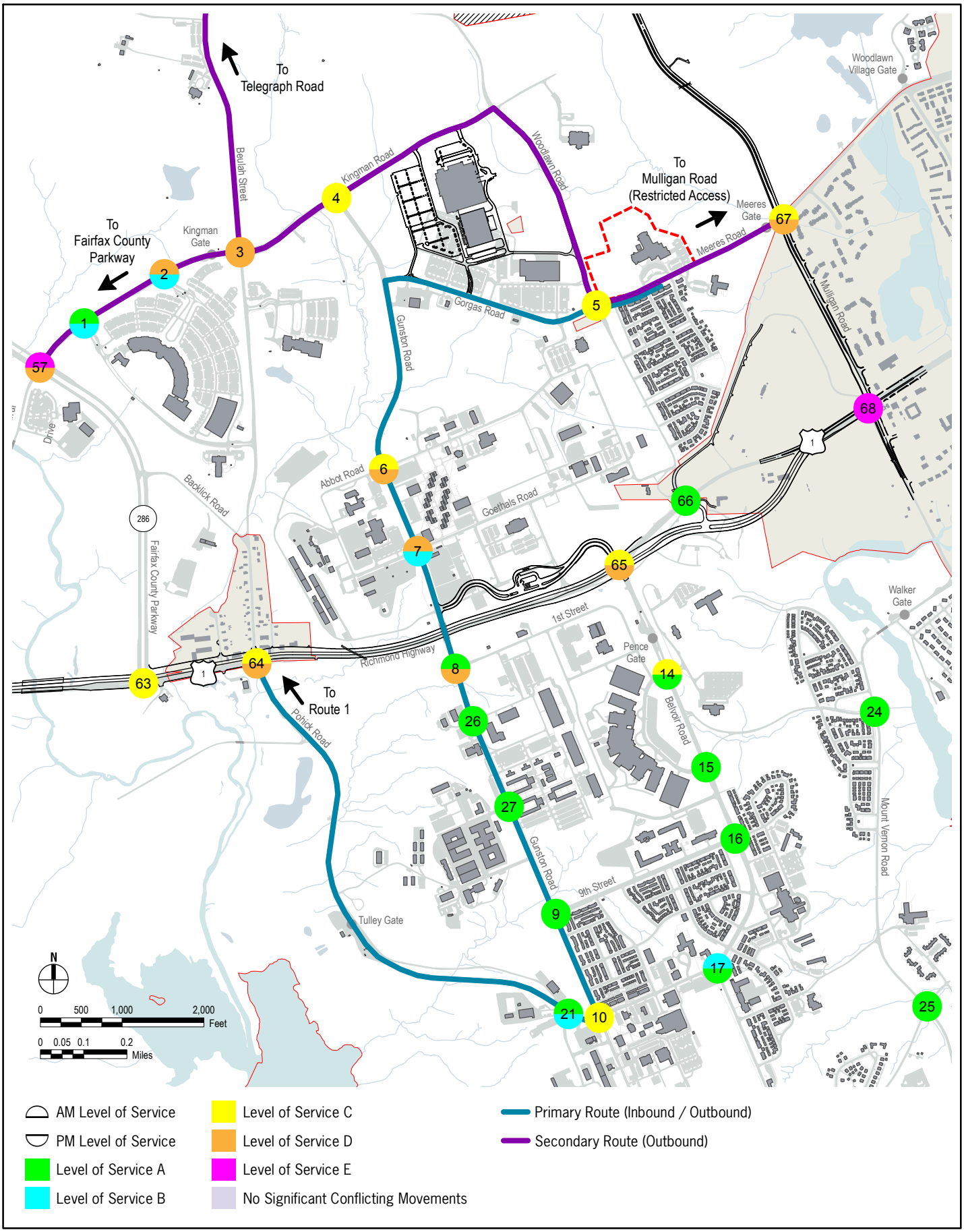


Figure 3-5. Intersection Levels of Service - 2017 with Proposed Action

Road. Mulligan Road will be a four lane road providing direct access for Fort Belvoir commuters exiting Meeres Gate to connect to Telegraph Road and US 1 for points north and west of the installation.

The Fort Belvoir TMP traffic study reveals the primary approach route from Tulley Gate to FBES and nine intersections along the route will continue operating at an acceptable LOS, ranging from A to C for AM and PM with one exception at Gunston Road and Abbot Road (Site 6) that changes from LOS B to LOS D. Secondary Route LOS changes also will occur at the intersections of Kingman Road and Fairfax County Parkway and at Beulah Road and Telegraph Road, Sites 57 and 52 (Figure 3-5); however, these LOS changes occur in the AM and would not be generally influenced by FBES traffic.

Proposed FBES Entrances and Parking Facilities

Figure 2-2 shows the proposed FBES II site layout and new entrance locations. While the site layout is conceptual and will go through engineering and architectural design study, it does provide an understanding of how the FBES II facility may develop. The installation's traffic analysis determined that there is adequate capacity for the Woodlawn intersection and adjacent roadways to support the school expansion; however, the operation of the intersection could be negatively affected by the proximity of any new entrances on Meeres Road.

The site layout shows a potential visitor and staff parking lot entrance that is approximately 400 feet from the Woodlawn intersection. The proposed entry point appears to be located on the tapered portion of the Meeres Road right turn lane. As shown in Figure 2-2, the existing bus/visitor entrance at Meeres and Kimbro is approximately 960 feet from the Woodlawn intersection; therefore, the proposed entrance would cause a 590-foot reduction in stacking distance for cars heading eastbound on Meeres and turning left into FBES. The proposed 90 space parking lot creates a higher demand for left turn movements in the AM peak hour; therefore, there is a potential effect on the Woodlawn intersection. This increase in left turning movements may not result in a reduced LOS for the intersection as bus arrival is staggered and typically arrives later than faculty and staff. Additionally, there are a several options that could prevent any possible future impact, and these include:

- Reconfiguration of the proposed parking lot and travel lanes to utilize existing entrances and/or modified entrance locations that avoids the existing right turn lane.
- Relocation of the new visitor/staff parking lot entrance to Woodlawn Road.
- Restriction of the existing and/or new entrance that is closest to Gorgas/Woodlawn intersection to a right out only movement.
- Evaluate the feasibility of widening a portion of Meeres Road to provide dedicated turn lanes. This would ideally be conducted after the completion of Mulligan Road to determine the effect of increased outbound traffic and as part of the installation's overall TMP efforts.

- Evaluate the signal timing at Gorgas and Woodlawn Roads to allow more green time for the east-west movement and monitor the signal light for adjustments, if needed, after occupancy of the new school.

In addition, it was noted in interviews with FCPS that the school currently has a process in place whereby the school staff supervises the arrival and dismissal of buses at the bus loop and parent kiss and ride lot. FCPS representatives indicated that there were no reported issues with traffic flow and control in the vicinity of the school. The traffic oversight currently conducted by FCPS is a standard procedure expected to continue with the new school.

The existing Belvoir transportation network is adequate to support the school expansion, with minimal impacts that are entirely within the school entry and approach areas on Meeres Road. These minor transportation impacts can be addressed in a number of ways by FCPS and Fort Belvoir staff as part of the site plan approval process.

On a regional level and considering the impact of traffic on the installation's gates, the traffic influence as a result of the FBES expansion would represent a slight improvement in terms of reduced vehicle miles traveled. Presently, an estimated 385 students living on-Post are attending off-Post public schools. The majority of these students attend Mount Vernon Woods, Washington Mills, Woodlawn, and Woodley Hills elementary schools. The off-Post schools have a driving distance between 2 and 4 miles to FBES. With the construction of FBES II, these bus routes would be eliminated in favor of a consolidated bus pickup within residential neighborhoods contained within the installation. There would also be reduced off-Post roadway impacts due to on-Post student attendance resulting in shorter travel distances for parents dropping off or picking up students. Lastly, there are a number of school age children within walking distance to the new school, which would reduce or eliminate some of the existing bus routes within the post. The immediate effect of faculty and staff travel commuter distance to the new school is unknown as some FCPS personnel may be reassigned from other schools or may be new hires for FBES II. Regardless, the long term implications on commuter travel between the no action and proposed action would not be significantly different.

3.4 INFRASTRUCTURE AND UTILITIES

3.4.1 Potable Water Supply

Existing Conditions: American Water owns, operates, and maintains the on-Post water supply and distribution system. Fairfax Water (formerly Fairfax County Water Authority) provides potable water for Fort Belvoir through three entry locations, namely Pole Road, Telegraph Road, and Beulah Street. The Post has a purchased capacity of 7.6 million gallons per day (mgd) (peak flow). Demand for potable water is currently estimated to be 2.3 mgd at Main Post and 1.0 mgd at FBNA (Atkins 2013). Fort Belvoir's water system has a storage capacity of 2.3 million gallons. The system encompasses 78 miles of more than 6-inch-diameter water main pipes, two pumping stations and

four storage tanks (three elevated, freestanding aboveground tanks and one at ground-level) (USAG Fort Belvoir 2012).

The existing school is served by a 4-inch water main. The existing school is rated for 719 drainage fixture units (DFU). The largest demand ever experienced by the school was 320 gallons per minute (gpm) (Brunner 2013). The average water use is estimated at approximately 26,000 gallons per day (gpd). Additionally, a potable water line runs from Meeres Road at approximately the west exit of the existing bus loop along the west side of the existing school to a point just south of the existing stormwater pond. At this point there is a junction in the line. From the junction a spur proceeds to the north along the east side of the existing pond to supply water to an offsite facility while another line proceeds west toward Woodlawn Road to provide redundant service.

Impacts of No Action: The No Action Alternative would have no impact on potable water infrastructure nor increase the demand for potable water at Fort Belvoir.

Impacts of the Proposed Action: In the short term, some potable water would be required for the mixing of cement, washing, and dust suppression during the construction of FBES II and existing FBES renovations. Potable water will be supplied to FBES II through a new 4-inch water main proceeding from Meeres Road. The new school will be rated for 561 DFU. The average usage is estimated at approximately 11,000 gpd. This additional water usage is minor compared to the total demand from existing and proposed development at Fort Belvoir. According to American Water, this increase is within the capacity of Fairfax Water to supply. Additionally, the CHPS program has a requirement for a 20 percent reduction in potable water for new construction. Additional water saving strategies that FCPS may elect to implement to meet the requirements of the CHPS program include:

- Decreasing water use by an additional 30 to 50 percent after meeting the Energy Policy Act of 1992.
- Achieving a 30 to 50 percent reduction in potable water for sewage conveyance through utilization of water-efficient fixtures, use of rainwater catchment systems, or both.
- Achieving a 20 to 50 percent reduction in potable water use for landscaping.
- Achieving a 25 to 50 percent reduction in potable water use for recreational landscaping areas.
- Creating an irrigation commission plan and completing installation review during construction, testing performance after installation, and documenting ongoing operations and maintenance.
- Installing a water management system to monitor water for any equipment or system that have heavy use requirements. (CHPS 2011)

During construction of the new FBES II, the project will be required to maintain uninterrupted potable water service to the offsite tenant to the north. Improvements to the stormwater pond would need to avoid impacts to the line in the vicinity.

Renovations to the existing FBES are not expected to increase potable water demand in the long-term.

3.4.2 Sanitary Sewer

Existing Conditions: American Water owns, operates and maintains the on-Post sanitary sewer system, which includes 39 sewage pumping/lift stations and two main pumping stations. Wastewater is conveyed to Fairfax County's Lower Potomac Treatment facilities. The Lower Potomac Treatment facility has a plant capacity of 67 mgd and receives an average daily flow of 45 mgd. The Post purchased 3 mgd capacity (average flows; 5 mgd peak flows) in collection/treatment from Fairfax County, exclusive of FBNA. The post currently uses only 1.1 mgd of the purchased capacity. The preliminary estimates of new loads from BRAC mission partners indicate that the total peak flow from Main Post will approach 2 mgd (Atkins 2013).

A gravity line provides sanitary sewer service for FBES and discharges to a line along Meeres Road. It is estimated that FBES currently discharges approximately 26,000 gpd to the sanitary sewer system.

Impacts of No Action: The No Action Alternative would have no impact on sanitary sewer infrastructure nor increase the demand for sanitary sewer disposal at Fort Belvoir.

Impacts of the Proposed Action: A new gravity sanitary sewer line will connect from FBES II to the gravity line along Meeres Road. The proposed FBES II is projected to discharge approximately 11,000 gallons of wastewater per day. Sanitary sewer system deficiencies were evaluated as part of the RPMP update (Atkins 2013). There are no sanitary sewer system deficiencies in the vicinity of the project area; therefore, no wastewater capacity issues will occur due to the construction of FBES II. Potable water use reduction strategies implemented to meet CHPS certification requirements (subsection 3.4.1) will also reduce the sanitary sewer demands. Renovations to the existing FBES are not expected to impact the sanitary sewer system or demand.

3.4.3 Stormwater

Existing Conditions: Section 402 of the Clean Water Act (CWA) established requirements for discharges of industrial and sanitary wastewater effluents and stormwater through the National Pollutant Discharge Elimination System (NPDES) permit program. In July 2013 the responsibility for enforcing the requirements of the Federal stormwater permit program and the Commonwealth's Stormwater Management Act (§ 62.1-44.15:24 et seq.) transferred from the Virginia Department of Conservation and Recreation (VDCR) to VDEQ.

Fort Belvoir holds a small municipal separate storm sewer system (MS-4) discharge general permit for ongoing discharges from the stormwater system. Stormwater from construction sites is managed through the Virginia Stormwater Management Program (VSMP), administered by VDEQ. Any construction activity such as clearing, grading, and excavation that is greater than 2,500 sq ft requires a VSMP permit. In 2011, the Virginia Soil and Water Conservation Board approved new stormwater management regulations. Compliance with these new rules will be required by the 2014 VSMP permit, which takes effect July 1, 2014. The new regulations require that the phosphorus load not exceed 0.41 lbs/ac/year (4 VAC 50-60-63). Compliance with the water quality criteria shall be determined utilizing the Virginia Runoff Reduction Method. The water quantity criteria require that the design meet channel protection and flood protection flow rate standards (4 VAC 50-60-66). The Virginia Stormwater Management Handbook has been updated to reflect these new regulations and design criteria. Fort Belvoir has required the use of the Runoff Reduction Method Spreadsheet on all new construction projects where stormwater design is required since July 1, 2012. In addition to Virginia stormwater compliance, this project must be in compliance with the Fairfax County Public Facilities Manual (Fairfax County DPWES 2011).

Also applicable, Section 438 of the 2007 Energy Independence and Security Act (EISA) requires Federal development projects with a footprint exceeding 5,000 sq ft to include site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow. The U.S. Environmental Protection Agency (USEPA) *Technical Guidance for Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (USEPA 2009) requires either implementing stormwater practices that retain the 95th percentile rainfall event onsite or implementing storm-water practices that preserve the predevelopment runoff conditions. Since the FBES II will be constructed on Federal land, the new elementary school will be subject to the requirements of EISA 438.

The Virginia Collaborative for High Performance Schools (CHPS) has established a sustainable design assessment tool for new construction. The site credits are similar to those found in LEED and include a category for post-construction stormwater management. It appears that if the stormwater design complies with the Virginia Stormwater Management Regulations and the EISA requirements, then the design will meet the requirements for CHPS stormwater quantity and quality credits.

Fort Belvoir also complies with the Executive Council of the Chesapeake Bay Program Directive 01-1, *Managing Stormwater on State, Federal and District-owned Lands and Facilities* to control nutrient, sediment, and chemical contaminants in runoff from its developed sites (Chesapeake Bay Program 2001). Fort Belvoir does this by following to the extent practicable the Fairfax County Chesapeake Preservation Ordinance at Chapter 118 of the Fairfax County Code.

The existing FBES site uses curb inlets and underground storm pipe to collect and route the stormwater runoff. The undeveloped new school site consists predominately of sheet flow and some open channels. Stormwater from the FBES site is routed to an existing stormwater pond located within the wooded area to the north (Figure 2-1). After detention and treatment within this dry pond, stormwater flows north into an intermittent stream, then east within an offsite perennial stream where it enters Dogue Creek. The outfall of the pond is severely incised and eroded.

Impacts of No Action: The No Action Alternative would not impact the amount or quality of stormwater runoff from the site.

Impacts of the Proposed Action: An increase of approximately 4 acres of impermeable surface due to the construction of FBES II would increase the amount and rate of stormwater runoff from the FBES site. FCPS will be responsible for designing stormwater management controls that meet regulatory and policy requirements. A design incorporating Low Impact Development (LID) principles would allow the site to meet the multiple stormwater management criteria discussed above. LID is:

> . . . a design strategy with the goal of maintaining or replicating the pre-development hydrologic regime through the use of design techniques to create a functionally equivalent hydrologic site design. Hydrologic functions of storage, infiltration and ground water recharge, as well as the volume and frequency of discharges are maintained through the use of integrated and distributed micro-scale stormwater retention and detention areas, reduction of impervious surfaces, and the lengthening of runoff flow paths and flow time. Other strategies include the preservation/protection of environmentally sensitive site features such as riparian buffers, wetlands, steep slopes, valuable (mature) trees, floodplains, woodlands, and highly permeable soils. (VDEQ 2013)

The existing site conditions and conceptual design provide multiple opportunities for meeting the stormwater management criteria using LID design techniques. Figure 3-6 illustrates possible locations for potential LID Best Management Practices (BMPs). The designer will need to use the Runoff Reduction Method Spreadsheet and the EPA EISA 438 guidance to calculate the number and extent of treatment and detention systems required. Additionally, infiltration tests will be needed to determine the infiltration properties of the soil.

Based on initial site inspection, one logical location for additional stormwater treatment and detention is the existing dry pond. This dry pond could be retrofitted with a sediment forebay, extended detention pools, and planting areas to provide additional treatment of the runoff entering the pond. There is also some room to expand the pond to the south to provide additional volume. The control structure would likely need to be replaced or altered for the new design. The existing outfall from the pond appears to be severely eroded and incised. The outfall could be reconstructed using a stepped pool system. The pools would slow the velocity of the discharge while encouraging infiltration in each of the pools. This system is an effective and proven treatment system.

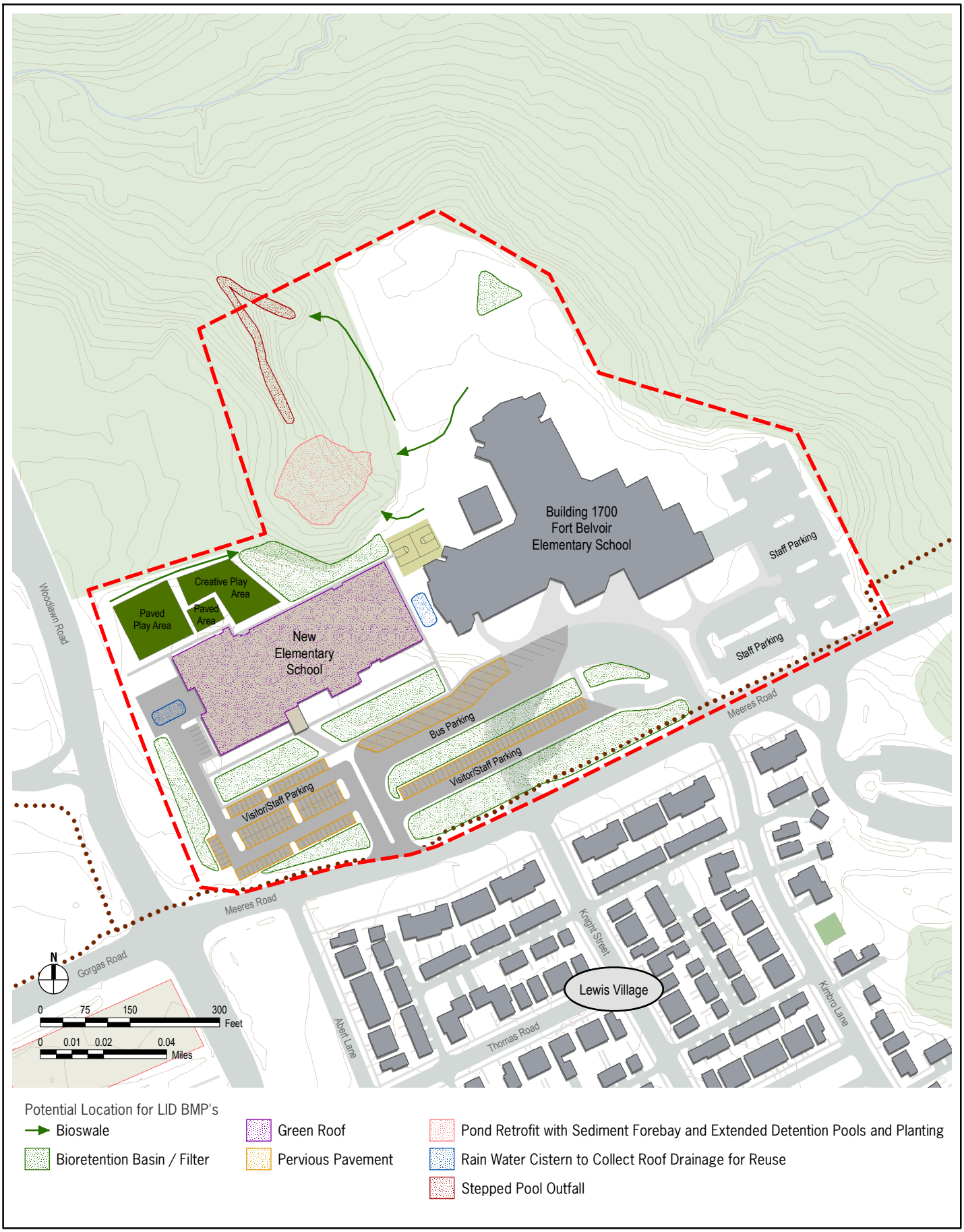


Figure 3-6. Potential Stormwater Management BMPs

If additional stormwater treatment and detention is required, then the following practices can be investigated. Based upon the Fairfax County soil survey, the existing soils may have poor infiltration rates. If poor infiltration rates are confirmed by geotechnical investigation during design, then the LID systems can still be used, but will have reduced treatment capacity. LID philosophies state that runoff from impervious areas should be treated adjacent to the source, rather than with "end-of-pipe" systems. To provide this, it is recommended that bioretention basins or filters be provided adjacent to each of the new areas of pavement. Additionally, runoff from the managed turf areas can be treated using bioretention and bioswales. Runoff from the pavement areas can also be addressed through use of pervious pavement. It has been found that pervious pavement is best implemented as parking spaces because travel lanes cause increased wear on the pavement. If additional detention volume is needed, bioretention and pervious pavement systems can be augmented with underground detention systems.

In addition to the treatment for the pavement and managed turf areas, the site may require detention and treatment of the rooftop runoff to meet the State and Federal stormwater regulations. The rooftop could be designed with a green roof that provides both quality treatment and rate reduction. Another alternative is to use cisterns to collect the drainage. The rainwater could then be reused for irrigation or non-potable water needs. The rooftop runoff could go to an underground infiltration system or small areas could be daylighted and allowed to flow to a downstream treatment system.

The design should also look to enhance the conservation areas and provide reforestation or additional plantings where space allows. The existing compacted soils can be amended to improve their hydrologic properties. The stormwater design will likely not need all of the potential LID BMPs discussed above and shown on Figure 3-6. However, it is expected that a combination of multiple BMPs will be required. The designer will be able to examine full potential for each system once site surveys and testing have been performed. The appropriate BMPs should be selected based on the physical properties of the existing soils, slopes, land use, efficiency, construction cost, and long term maintenance requirements. Fort Belvoir Directorate of Public Works (DPW) will ultimately be responsible for the long term maintenance of all stormwater BMPs. FCPS will submit the proposed stormwater design to DPW for review and approval.

3.4.4 Natural Gas

Existing Conditions: Fort Belvoir's natural gas system is owned and operated by Washington Gas. As of 2000, natural gas was distributed to the Post through 25 miles of main gas line and 11 miles of service lines mostly servicing the family housing areas (USACE Mobile District 2007). The existing FBES is serviced with natural gas by a main line from Meeres Road.

Impacts of No Action: The No Action Alternative would not impact the service or supply of natural gas at Fort Belvoir.

Impacts of the Proposed Action: The proposed usage for the new school is 1510 thousand British Thermal Units per hour (MBH). To meet this usage, the proposed school will be heated by natural gas with a 4012 MBH heating unit (FCPS 2014). A new supply line for the school will connect with the gas line along Meeres Road. New projects on-Post must provide a load letter to Washington Gas to determine the extent of improvements required to provide service. For small projects adjacent to existing gas mains, such as FBES II, service can be provided with little to no improvements (Atkins 2013). The existing gas main is expected to be able to support the requirements of the new school. Renovations to the existing FBES are not expected to impact natural gas demand.

3.4.5 Electricity

Existing Conditions: Dominion Power owns and manages the electrical distribution system on Post. Fort Belvoir owns and manages the electrical lines inside the buildings and structures. There are two 84 megavolt transformers at Dominion's Fort Belvoir substation. Power is transferred from the substation to a switching station and distributed to the Post via four 34.5 kilovolt distribution circuits, 78 miles of overhead wires, and 83 miles of underground wires. Ten substations are located throughout the installation to transform power to lower voltage. Main Post consumes approximately 157 million kilowatt hours of electricity annually. Meter information from Dominion indicated in 2007 that incoming feeders were operating at about 50 percent of capacity (USACE Mobile District 2007). The distribution system is well-balanced and has adequate capacity to serve on-Post existing needs (Atkins 2013).

The existing FBES is serviced by both overhead and underground distribution lines. The connected designed load for the existing FBES is 1647.2 kW. Based upon that power company load history for the last 36 months, the maximum demand for the existing school has been 662.0 kW (FCPS 2014).

Impacts of No Action: The No Action Alternative would not impact the demand, supply, or distribution system of electricity at Fort Belvoir.

Impacts of the Proposed Action: The proposed connected design load for FBES II is estimated to be 1566.0 kW. Based upon the expected design, the maximum demand at FBES II is expected to be 626.0 kW. The projected load and expected maximum demand are subject to the final design of the school and heating, ventilation, and air conditioning (HVAC) system (FCPS 2014). FBES II will be designed to meet CHPS standards. Part of the CHPS certification process includes design requirements and options to reduce energy usage of the building. There are several energy use reduction prerequisite requirements that must be met to obtain the CHPS certification. These include:

- Designing the building to exceed ASHRAE 90.1 or the current edition of the International Energy Conservation Code (IECC) by 15 percent
- Receiving an EPA Energy Performance Rating goal of at least 75 using USEPA's Target Finder rating tool

- Installing a base level energy management system to control, monitor, and understand energy use patterns in the school. (CHPS 2011)

During the design of the school, FCPS will determine what other energy reduction options will be implemented as part of the CHPS certification process. FCPS has indicated that the following options will be considered for inclusion in the design for FBES II:

- Day lighting in classrooms
- Providing high quality and flexible classroom lighting
- Reducing light pollution
- Implementing minimum energy performance requirements
- Testing the optimal performance of HVAC equipment
- Conserving energy loss through natural ventilation and energy conservation interlocks
- Using high efficiency HVAC equipment with minimum 13 Seasonal Energy Efficiency Rating (SEER)
- Installing Advanced Energy Management Systems (e.g. temperature controls)
- Verifying that additional building energy systems are designed, installed, calibrated, and operated as intended, and providing for the ongoing accountability and optimization of building energy performance over time. (FCPS 2014)

New copper power lines will connect FBES II to the distribution system. New projects must provide a load letter to Dominion Virginia Power, and Dominion Virginia Power will determine whether the distribution system requires improvements to provide power (Atkins 2013). The load requirements of FBES II are insignificant compared with the demand of the installation. The renovations of the existing FBES will not increase electricity demand in the long-term.

3.4.6 Communications

Existing Conditions: Fort Belvoir owns the entire communications system, including copper and fiber-optic cables, utility poles, and computerized switchboard systems. Most distribution cable is carried overhead on utility poles, while most fiber-optic cable is carried through underground duct banks, along with some conventional cable. A telecommunications line provides commercial communications and data lines to the existing FBES. Verizon Communications provides telephone and telecommunication service (USACE Mobile District 2007).

Impacts of No Action: The No Action Alternative would not impact the communications system or infrastructure at Fort Belvoir.

Impacts of the Proposed Action: New telecommunications service for the proposed FBES II would be provided via a connection to the telecommunication lines along Meeres Road. No additional communications service will be required for the renovations of the existing FBES.

3.4.7 Solid Waste

Existing Conditions: Fort Belvoir has a mandatory Post-wide Qualified Recycling Program (QRP) that collects white paper, colored paper, newspaper, aluminum cans, tin/steel cans, scrap metal, cardboard, glass bottles, plastic containers, and toner cartridges. Controlled non-regulated solid waste such as tires, used oil, paint and fluorescent lighting, batteries, pesticides, thermostats, mercury-containing equipment and scrap metal, is handled through the Fort Belvoir Environmental and Natural Resource Division (ENRD) in accordance with the national Resource Conservation and Recovery Act (RCRA) (40 CFR 273).

Fort Belvoir generates about 6,700 tons of municipal solid waste annually, which is disposed of off-Post by a contract hauler. Approximately 2,700 tons of the total municipal solid waste is recycled (USACE Mobile District 2007).

Fairfax County has established a partnership with FCPS for the Schools/County Recycling Action Program (SCRAP) to further environmental and recycling education efforts within FCPS schools. FBES also participates in a Fairfax County grant program, the Johnie Forte Jr. Litter/Recycling Grant Program, which provides funding for recycling programs in the schools (Fairfax County DPWES 2004).

Fort Belvoir provides the solid waste disposal and recycling pickup for FBES. The existing FBES has two solid waste dumpsters and two large recycling containers. Fort Belvoir picks up solid waste and recycling three days a week at FBES.

Impacts of No Action: The No Action Alternative would result in no additional waste being generated or transported.

Impacts of Proposed Action: The construction of FBES II and renovation activities at the existing FBES would generate construction and demolition debris containing typical building materials including asphalt pavement, concrete, steel, and wood. The building debris would not contain hazardous materials such as asbestos or lead paint, since the existing FBES was built in 1997. The debris would be removed from the site and disposed of by the construction contractor at an approved facility. Army policy requires that 50 percent of the construction waste be diverted from landfills. Fort Belvoir, in an effort to meet Department of Army waste diversion standards, requests monthly reports by item description and weight of any materials removed for recycling or reuse by the contractor. Soils excavated during the construction of FBES II would be used as onsite fill material or properly disposed.

FBES II would have two solid waste dumpsters and two recycling containers. These facilities would be picked up by the Fort Belvoir contract hauler three times a week. This increase is a small amount compared to the total amount of solid waste generated on Fort Belvoir.

3.5 SOCIOECONOMICS

3.5.1 Demographics

Existing Conditions: Fort Belvoir is located in Fairfax County, Virginia, within the Washington, D.C. Metropolitan Area. This metropolitan area had a 2012 population of nearly 5.9 million people (George Mason University Center for Regional Analysis, 2013). Within a 30-mile radius of Fort Belvoir are the counties of Prince William, Fauquier, Stafford, King George, Loudoun, and Arlington, and the city of Alexandria in Virginia; the counties of Montgomery, Prince George's, and Charles in Maryland; and the District of Columbia. Fairfax County is the region's most populous jurisdiction. According to the U.S. Census Bureau's (USCB) American Community Survey (ACS) data, in 2012 approximately 1.12 million people lived in Fairfax County (USCB 2012a). The population along Northern Virginia's I-95 corridor (comprising Arlington County, Alexandria City, Fairfax County, Fairfax City, Falls Church City, Prince William County, Manassas City, Manassas Park City, and Stafford County) was about 2.1 million in 2012 (USCB 2012a).

In 2012, following full implementation of the BRAC 2005 recommendations, Fort Belvoir had a working population of about 40,000 persons and supported 2,156 family housing units, including 50 excess units to be removed through attrition and renovation efforts (the actual number of residents occupying family housing units varies over time) (USAG Fort Belvoir 2012). The residential population of Fort Belvoir is approximately 7,500 (USAG Fort Belvoir 2014).

Impacts of No Action: The No Action Alternative would have no impact on area population levels.

Impacts of the Proposed Action: The purpose of the proposed action to construct a new elementary school and renovate the existing FBES to comply with ATFP standards would have little effect on demographics. The construction of the new elementary school would create 82 additional full time jobs on Fort Belvoir (Brunner 2013). This is less than a one percent increase of the current workforce at Fort Belvoir. The increase in Fort Belvoir working population would be minor and likely result in little change in regional population.

3.5.2 Age, Race, and Ethnicity

Existing Conditions: Table 3-2 provides data from the 2000 and 2010 decennial census on race and ethnicity for Fort Belvoir, the Accotink Village enclave, the surrounding Fairfax County, and the Commonwealth of Virginia as a whole. The "Fort Belvoir Census Designated Place (CDP)" is Fort Belvoir itself. Accotink Village is a small, non-military residential area clustered near the intersection of Backlick Road and US 1 near Tulley Gate (see Figure 2-2), and surrounded by Fort Belvoir. It is represented at the block group level in the census.

Generally, the area around Fort Belvoir became more diverse between 2000 and 2010. During this period the proportion of White residents decreased substantially at the state and county level, and

in Accotink Village. However, the White population rose in Fort Belvoir. The largest minority group in Fort Belvoir, Accotink Village, and the Commonwealth of Virginia is Black and African Americans, while in Fairfax County it is Asians (USCB 2000a,b and 2010a). Fairfax County, Fort Belvoir, and Accotink Village are more ethnically diverse than the state as a whole during this period (USCB 2000a,b and 2010a).

Table 3-2
Race and Ethnic Distribution by Percentage, 2000 and 2010

	Fort Belvoir CDP		Accotink Village[1]		Fairfax County		Commonwealth of Virginia	
	2000	**2010**	**2000**	**2010**	**2000**	**2010**	**2000**	**2010**
White	55.7	64.9	46.2	38.5	69.9	62.7	72.3	68.6
Black or African American	31.8	21.7	37.4	42.3	8.6	9.2	19.6	19.4
Asian	1.7	2.5	9.2	7.7	13	17.5	3.7	5.5
Native American and Other Pacific Islander	1.4	1.1	0.8	1.5	0.4	0.5	0.4	0.5
Some Other Race (or two or more races)	9.4	9.8	6.4	10.1	8.2	10.2	4	6.1
Total Non-White	44.3	35.1	53.8	61.6	30.2	37.4	27.7	31.5
Hispanic[2]	10.5	13.2	9.2	9.2	11	15.6	4.7	7.9

Source: USCB 2000a and 2010a.

1. Accotink Village represented by Block Group 2 Census Tract 4220 (USCB 2000a) and Block Group 3 Census Tract 4219 (USCB 2010a).
2. Hispanic or Latino of any race.

Population data are important in determining the presence of "Environmental Justice" populations. Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, directs all Federal departments and agencies to incorporate environmental justice considerations in achieving their mission. CEQ provides guidance on EO 12898 by stating that "minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997)."

Each Federal department or agency is to accomplish this by conducting programs, policies, and activities that substantially affect human health or the environment in a manner that does not exclude communities from participation in, deny communities the benefits of, nor subject communities to discrimination under such actions because of their race, color, or national origin.

Fort Belvoir, Fairfax County, and the Commonwealth of Virginia had similar minority populations in 2010, ranging from 31.5 percent at the state level, to 37.4 percent at the county (USCB 2010a). In contrast, more than half of the population of Accotink Village (239 out of 338 residents) belongs to a racial or ethnic minority (USCB 2010a). Because of this significant difference, Accotink Village qualifies as an Environmental Justice community on the basis of racial and ethnic criteria.

Similar to EO 12898, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires government agencies to recognize that children may suffer more than adults from environmental health and safety risks. (Children are more apt to ingest or touch items that contain contaminants, e.g., lead paint on window sills). This EO directs Federal agencies to identify and assess such risks, and to ensure that its policies, programs, activities, and standards address effects on children.

In order to provide an estimate of the proportion of school aged children in the project area, Table 3-3 shows the proportion of persons ages 19 and under living in the Fort Belvoir CDP, Accotink Village, Fairfax County, and Virginia, based on available census data. The Fort Belvoir CDP had a much higher proportion of under-19 residents than the county, commonwealth or Accotink Village, reflecting the presence of many military families housed on the Post.

Table 3-3
2010 Population 19 Years and Younger

Jurisdiction	Population (%)
Fort Belvoir CDP	46.9
Accotink Village[1]	18.6
Fairfax County	26.4
Commonwealth of Virginia	26.0

Source: USCB 2010b.

1. Block Group 3 of 2010 Census Tract 4219

Impacts of No Action: The No Action Alternative would result in a continued school seat deficit at FBES. Children residing in Accotink Village, an Environmental Justice community, currently attend Fort Belvoir and could be adversely impacted by crowded school conditions. A 416 seat capacity deficit exists for Fort Belvoir. A decision not to construct a new school would result in the continuation of transporting some elementary age children residing on Fort Belvoir to attend off-Post schools. These off-Post schools may not provide onsite social services that military children require as discussed in Subsection 1.1. Additionally, without the proposed action, children from Accotink Village and Fort Belvoir would continue to attend a school that falls short of current ATFP standards for such schools on Federal installations.

Impacts of Proposed Action: During the construction of the new school and renovations of FBES, there would not be disproportionate impacts to the residents of Accotink Village. The village is too

distant (over 0.5 mile) from the FBES school to experience more than minor short-term construction-related air and noise impacts.

The construction phase of the new elementary school and renovations of FBES would have minor impact to children. The construction of the new school will occur adjacent to the existing FBES. Additionally, Lewis Village, residential on-Post housing, is located south of the existing FBES and proposed school site. No more than minimal short-term noise and air quality impacts would occur to children during construction. FCPS considers the implications of construction noise on school children in the school construction process and incorporates measures to minimize disruption (see Subsection 3.1). Air quality impacts from construction are expected to be well under de minimis levels. Mitigation to offset localized air quality impacts, such as dust, are discussed in Subsection 3.7. Renovations to the existing FBES would occur primarily in the summer when school is not in session to minimize impacts to the students.

Over the long term, the construction of a new elementary school would increase school capacity for schools serving the children residing in Fort Belvoir and Accotink Village, an Environmental Justice community. The combined student capacity of the new school with FBES would be approximately 1,600 students, an increase of approximately 500 students over the current capacity. This expanded capacity would eliminate the current and projected need to transport Fort Belvoir elementary aged children to off-Post schools and provide them with at-school access to special needs social services particular to military children. The proposed action would result in a positive effect for Environmental Justice communities and children.

3.5.3 Employment and Income

Existing Conditions: As seen in Table 3-4, in 2012, 3.0 percent of the population within the Fort Belvoir CDP was earning income below the poverty line (ACS 2012b). However, military personnel salaries do not necessarily reflect benefits such as on-Post housing (or off-Post housing allowances), Army-provided medical care, or the ability to purchase goods at lower prices at the Post Exchange. Therefore, income alone is not a good metric for poverty level when considering a military community. However, poverty status is another criterion designated for determining Environmental Justice populations. CEQ guidance on EO 12898 states that "low-income populations in an affected area should also be identified using the annual statistical poverty thresholds from the Bureau of the Census (CEQ 1997)."

No ACS poverty estimates are available for Accotink Village alone. However, data is available for the census tract in which Accotink Village is located. Excluding Fort Belvoir, the median household income for the census tract is $48,567 (ACS 2012c). This is lower than the median household income for the state and less than half of the median household income for Fairfax County (Table 3-4). The poverty rate for Accotink Village is also substantially higher than poverty rates in the comparative geographies (ACS 2012b,d). Thus, Accotink Village qualifies as an Environmental

Justice community on the basis of income, as well as race and ethnicity. Fairfax County, on the other hand, is one of the most prosperous jurisdictions in the Washington, D.C. area and U.S.

Table 3-4
2012 Median Income and Poverty Estimates

Jurisdiction	Median Household Income ($)	Median Family Income ($)	Percent Below Poverty Line
Fort Belvoir CDP 2012	72,141	72,434	3.0
Accotink Village Area[1]	48,567	32,773	24.8
Fairfax County	109,383	128,102	5.6
Commonwealth of Virginia	63,636	76,566	11.1

Source: ACS 2012b,c,d,e.

1. Census Tract 4219, excluding Fort Belvoir.

In November 2013 Virginia Employment Commission reported that the state had an unemployment rate of 5.4 percent. Between 2012 and 2013 the state's seasonally adjusted non-farm employment increased by 25,800 jobs, or 0.7 percent (Virginia Employment Commission 2013). The Northern Virginia metropolitan statistical area surrounding Washington, D.C. added more than 10,000 jobs between 2012 and 2013, increasing the employment rate by 0.8 percent (Virginia Employment Commission 2013). The most recent data that is available for the county is from October 2013. During that month, Fairfax County had an unemployment rate of 4.3 percent, not seasonally adjusted (Bureau of Labor Statistics 2013a). Both state and county unemployment were lower than the 7.3 percent national unemployment rate in October (Bureau of Labor Statistics 2013b).

Monthly employment data is not available for the Fort Belvoir or Accotink Village, but ACS data shows that the median household and family income were much lower in Accotink Village (represented by Census Tract 4219 excluding Fort Belvoir) than in Fort Belvoir, Fairfax County, or the state in 2012 (ACS 2012b,c,e).

Impacts of No Action: The No Action Alternative would result in no change in employment or income for the Fort Belvoir area.

Impacts of the Proposed Action: Construction of the proposed new school and renovations of the existing FBES would generate direct economic benefits for the contractors working on the project, as well as indirect benefits to the communities where they are based. Additional earnings generated by the work will be felt within the communities as those earnings are spent within the local economies. The proposed school facility would require additional staff. Some of the staff will likely be transfers from other overcrowded schools while others would be new hires. The existing elementary school has a staff of 152 and the proposed school would require 82 additional staff members (Brunner 2013). The average salary of FCPS teachers is $62,000 per year (FCPS 2014). These additional positions would provide opportunities for individuals with a range of professional

skills, from teachers and administrators to custodians and food service workers. Compared to the employment levels in Fairfax County and other nearby localities, the positive economic impacts are generally small. There are no significant income or employment impacts anticipated for the inhabitants of Accotink Village.

3.6 COMMUNITY FACILITIES AND SERVICES

3.6.1 Services

Existing Conditions: Safety and security issues at Fort Belvoir are handled by the Directorate of Emergency Services which includes the Army's Military Police and Fire and Emergency Medical Services. The Military Police headquarters is located on Abbot Road, on the North Post, to the south of the existing FBES. There are three fire stations on Fort Belvoir. Five fire companies (three engine companies, one ladder truck company, and one airport crash company), with a total staff of 66 firefighters, staff these stations (USACE Mobile District 2007). The closest fire station to the existing FBES is located on Abbot Road (Station 63). Additionally, Fort Belvoir has mutual aid police and fire service agreements with Fairfax County. The stations closest to the site are Fairfax County Fire Station 37 at 7936 Telegraph Road and the Franconia Police Department at 6121 Franconia Road (USACE Mobile District 2007).

Medical needs of military personnel and their dependents (and, in an emergency, civilian personnel) at Fort Belvoir are served by the Fort Belvoir Community Hospital that was recently constructed on South Post near Pence Gate on Belvoir Road. The hospital serves up to 130 inpatients and is a major outpatient facility. Currently, three dispensaries are also located at Fort Belvoir; two near the residential areas and a third at Davison Army Airfield. The nearest off-Post hospital to Fort Belvoir is Inova Mount Vernon Hospital, a 232-bed facility about 5 miles to the northeast.

As described in Section 1.1, the existing FBES provides elementary school education for military families living on Fort Belvoir. FBES also provides a variety of social and community services for military children and families (see section 1.1). The existing FBES is in good condition but currently does not meet several ATFP standards.

Impacts of No Action: The No Action Alternative would have no impacts on safety, security, or medical services. With the No Action Alternative, the existing FBES would continue to have ATFP deficiencies and a capacity deficit for elementary aged school children would remain on Fort Belvoir. These students would continue to need to be transported off-Post to attend other FCPS schools. Over time the capacity deficit is expected to increase.

Impacts of the Proposed Action: While the new FBES II could potentially generate more fire and rescue calls on Fort Belvoir, this increase is expected to be small. The Proposed Action is not anticipated to impact safety, security, or medical services. Renovations at the existing FBES would

bring the school in compliance with current ATFP standards. The construction of the new FBES II would increase the total student capacity for on-Post elementary education from approximately 1,100 to nearly 1,600 students. Construction of the new FBES II would also allow Fort Belvoir elementary aged children to receive onsite special needs programs that are unique to children of military families.

3.6.2 Recreation

Existing Conditions: Fort Belvoir offers 1,006 acres of recreational areas that are convenient to the population they serve. Facilities include two 18-hole golf courses, officers and noncommissioned officers clubs, tennis courts, swimming pools, softball and soccer fields. In addition, the Dogue Creek Marina rents boats and slips and dry-storage facilities. Some of Fort Belvoir's undeveloped areas are open to recreational use including:

- two wildlife refuges,
- fishing at Mulligan Pond, Gunston Cove, Accotink Creek, Dogue Creek, and Pohick Creek,
- bow hunting in designated areas,
- bird watching, hiking, nature photography, environmental education programs at the Accotink Bay Wildlife Refuge Education Center, and
- 10 miles of trails.

The playfields are currently available for FBES recess and physical education activities. The playfields west of the existing FBES are not currently utilized in Fort Belvoir Family and Morale, Welfare and Recreation (MWR) programming for recreational use by the military and their families, Fort Belvoir DoD civilian employees, or military retirees.

Impacts of No Action: The No Action Alternative would have no impacts on community recreational facilities.

Impacts of the Proposed Action: The construction of the new FBES II and renovations at the existing FBES would not impact recreational facilities utilized by MWR. FCPS would lose the use of these playfields once FBES II construction began. Outdoor recess and physical education activities would be limited to the paved play areas associated with each school and the grass play areas located north of the existing FBES. Adequate space and facilities will exist at the schools to comply with FCPS recreational and physical education program requirements.

3.7 AIR QUALITY

Existing Conditions: Air quality and Climate Change, in a given location, is described as the concentration of various pollutants in the atmosphere and the proposed action's potential to impact these concentrations. Air quality is determined by several factors including the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing

meteorological conditions. Climate change is determined by the type and amount of greenhouse gases (GHGs) emitted into the atmosphere in conjunction with the continued world emission of GHGs. This section describes the existing air quality and GHG emissions.

Air Quality

Air quality in Virginia is regulated by the USEPA Region 3 and the VDEQ. The USEPA has the responsibility, under the Clean Air Act (42 U.S.C. 7401-761q), to establish acceptable concentration levels for six criteria pollutants. Primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for carbon monoxide (CO), nitrogen oxides (NO_X), sulfur dioxide (SO_2), ozone (O_3), coarse particulate matter (PM_{10}), fine particulate matter ($PM_{2.5}$), and lead. Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air ($\mu g/m^3$), as shown in Table 3-5. Individual states have the authority to adopt their own regulatory standards as long as they are at least as strict as those established under the Federal program. The Commonwealth of Virginia accepts the Federal standards. The NAAQS are used to determine whether the air quality within a region is meeting the requirements of the USEPA for impacts on human health, the environment, and property; or if the region needs to implement further strategies to reduce criteria air pollutant emissions to comply with the standards.

The VDEQ has the authority to implement and enforce the air pollution control program in Virginia. VDEQ applies and enforces the air quality regulations, which establish requirements for sources that emit or release air contaminants into the atmosphere.

Air Quality Control Regions (AQCRs) are designated by Federal Regulations as areas that either meet or exceed the NAAQS. Fairfax County is located within AQCR 47, the National Capital Interstate AQCR.[3] Areas that meet the NAAQAS are classified as "attainment" areas while areas that do not meet these standards are classified as "non-attainment" areas. The severity of the classifications for ozone non-attainment range in magnitude from: marginal, moderate, serious, severe, or extreme. An area that can show two consecutive years of no more than one exceedence per year of the standard can, upon submittal of a plan to demonstrate how the area plans to remain in attainment, petition for redesignation as an attainment area. An area that has been re-classified from non-attainment to attainment is designated as a maintenance area until it demonstrates that it has maintained the standards for at least 10 years. The Federal attainment status for the Virginia is shown in Table 3-6. AQCR 47 is located within the O_3 transport region which includes Washington, D.C. and 12 other states. The USEPA Green Book reports that Fairfax County Virginia is presently in attainment for all criteria pollutants with the exception of O_3 and $PM_{2.5}$. Fairfax County is currently listed as in marginal non-attainment for the 8-hour O_3 Standard and as non-attainment for $PM_{2.5}$.

[3] 40 CFR 81.12

Table 3-5
National Ambient Air Quality Standards

Pollutant	Standard Value	Standard Type	Form
Carbon Monoxide (CO)[1]			
8-hr Average	9 ppm (10 mg/m^3)	Primary	Not to be exceeded more than once per year.
1-hour Average	35 ppm (40 mg/m^3)	Primary	
Nitrogen Dioxide (NO_2)[2]			
Annual Average	0.053 ppm[3]	Primary & Secondary	98th percentile, averaged over 3 years
1-Hour	100 ppb	Primary	Annual mean
Ozone (O_3)[4]			
8-hour Average	0.075 ppm	Primary & Secondary	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years
1-hour Average	0.12 ppm[5]	Primary & Secondary	
Coarse Particulate Matter (PM_{10})			
24-hour Average	150 g/m^3	Primary & Secondary	Not to be exceeded more than once per year on average over 3 years.
Fine Particulate Matter ($PM_{2.5}$)			
Annual Average	12.0 μg/m^3	Primary	Annual mean, averaged over 3 years
Annual Average	15.0 μg/m^3	Secondary	Annual mean, averaged over 3 years
24-hour Average	35 μg/m^3	Primary & Secondary	98th percentile, averaged over 3 years.
Sulfur Dioxide (SO_2)[6]			
Annual Average	0.03 ppm[7]	Primary	
24-hour Average	0.14 ppm[7]	Primary	
3-hour Average	0.50 ppm	Secondary	Not to be exceeded more than once per year
1-hour Average	75 ppb[7]	Primary	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
Lead (Pb)[8]			
Rolling 3-Month Average[9]	0.15 μg/m^3	Primary & Secondary	Not to be exceeded

Source: USEPA 2011.

[1] 76 FR 54294, August 31, 2011.

[2] 75 FR 6474, February 9 2010; and 61 FR 52852, October 8, 1966

[3] The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb.

[4] 73 FR 16436, March 27, 2008.

[5] The Final rule was signed March 12, 2008. The 1997 ozone standard (0.08 ppm, annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years) and related implementation rules remain in place. In 1997 the EPA revoked the 1-hour ozone standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour ozone standard is attained when the expected number o days per calendar year with maximum hourly average concentration above 0.12 ppm is less than or equal to 1.

[6] 75 FR 35520, June 22, 2010; and 38 FR 25678, September 14, 1973.

[7] Final rule signed June 2, 2010. The 1971 annual and 24-hour SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

[8] 73 FR 66964, November 12, 2008.

[9] Final rule signed October 15, 2008. The 1978 lead standard (1.5 mg/m3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated as nonattainment for the 1978, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

Table 3-6
Attainment Status

Pollutant	Federal Status
Carbon Monoxide (CO)	Attainment
Nitrogen Dioxide (NO_2)	Attainment
Ozone (O_3) 8-hour 1-hour	Marginal non-attainment Attainment
Particulate Matter (PM_{10})	Attainment
Particulate Matte ($PM_{2.5}$)	Non-Attainment
Sulfur Dioxide (SO_2)	Attainment
Lead (Pb)	Attainment

Volatile Organic Compounds (VOCs) and ammonia have been identified as potential $PM_{2.5}$ precursors and therefore have the potential to require quantification and control measures. Ammonia has been found to not contribute to $PM_{2.5}$ impacts in either AQCR 47 or downwind areas. Therefore, ammonia is not addressed within this analysis. VOC, however, are addressed as they are precursors to both $PM_{2.5}$ and O_3.

Fort Belvoir holds a Title V operating permit (NRO70550). The status of the permit is currently pending renewal (VDEQ 2014). As part of the permit requirements, Fort Belvoir is required to conduct annual periodic inventory for all significant stationary sources of air emissions and stipulates the monitoring, recordkeeping, and reporting requirements. Fort Belvoir's 2012 installation-wide air emissions are presented in Table 3-7. The emissions presented in Table 3-8 represent only those significant stationary sources monitored under the Title V permitting process. Total air quality emissions at Fort Belvoir, including Title V emissions and all emissions resulting from non-significant activities, will exceed what is identified in Table 3-8. However, these non-significant emissions, typical of land use operations such as motor vehicle and building operations, are not specifically monitored and therefore cannot be quantified.

Table 3-7
Existing Emissions at Fort Belvoir

Criteria Pollutant	Emissions (tons/year)
Volatile Organic Compounds (VOCs)	6.6
Nitrogen Oxides (NO_X)	71.8
Sulfur Dioxide (SO_2)	0.4
Carbon Monoxide (CO)	34.6
Fine Particulate Matter (PM_{10})	3.2
Very Fine Particulate Matter ($PM_{2.5}$)	3.2

Source: USAG Fort Belvoir 2014

Greenhouse Gases and Climate Change

The term Climate Change refers to any noticeable change in the measures of climate such as temperature, precipitation, or wind that endures for an extended period of time. Factors that affect climate change include natural cycles (changes in the sun's intensity or Earth's orbit around the sun), natural processes within the climate system (changes in ocean circulation), and anthropogenic activities that change the atmosphere's composition (burning fossil fuels) or land surface (deforestation, urbanization).

The emissions of greenhouse gases (GHGs) are commonly thought to contribute to changes in the global climate. These gases trap heat in the atmosphere are called greenhouse gases because they transform the light of the sun into heat, similar to the glass walls of a greenhouse. Common GHGs include water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), chlorofluorocarbons (CFCs), hydrofluorocarbons (HFCs), perfluorocarbons, sulfur hexafluoride (SF_6), O_3, and aerosols.

The relationships of water vapor and O_3 as GHGs are poorly understood. It is unclear how much water vapor acts as a GHG. The uncertainty is due to the fact that water vapor can also produce cloud cover, which reflects sunlight away from Earth and can counteract its effect as a GHG. Also, water vapor tends to increase as the Earth warms, so it is not well understood whether the increase in water vapor is contributing to or rather a result of climate change. Ozone tends to break down in the presence of solar radiation but is not understood well enough for evaluation. For these reasons, methodologies approved by the Intergovernmental Panel on Climate Change (IPCC) focus on CO_2, N_2O, CH_4, and CFCs (IPCC 2006).

The effect each GHG has on climate change is measured as a combination of the volume of its emissions, and its global warming potential (GWP), and is expressed as a function of how much warming would be caused by the same mass of CO_2. Thus, GHG emissions are typically measured in terms of pounds or tons of CO_2 equivalents (CO_2e), and are often expressed in metric tons (MT CO_2e) or millions of metric tons of CO_2 equivalents (MMT CO_2e). Current global, U.S., and regional emissions of GHGs are estimated as follows:

- **Global Emissions**: Worldwide emissions of GHGs in 2005 were nearly 30 billion tons of CO_2e per year (including ongoing emissions from industrial and agricultural sources, but excluding emissions from land-use changes). Emissions in 2005 were 26 percent greater than global emissions in 1990 (USEPA 2013).
- **U.S. Emissions**: In 2011, the United States emitted 6.7 billion tons of CO_2e, with electricity generation accounting for the highest percentage of GHG emissions. Land use and forestry practices offset 14 percent of U.S. emissions in 2011, with one of the largest sinks being the net growth in forests. Between 1990 and 2007 GHG emissions increased at a similar rate as the population. Between 2007 and 2011, emissions per capita declined due to the 2008/

2009 economic recession and the increased use of natural gas in electricity generation in 2010 and 2011 (USEPA 2013b).

- **State of Virginia Emissions**: In 2005 the Commonwealth of Virginia emitted approximately 175 MMT CO_2e. The primary emissions sources were energy and transportation representing 45 and 31 percent of total emissions respectively. Virginia emissions are projected to reach 218.83 MMT CO_2e by 2020 and 229.84 MMT CO_2e by 2025 (VDEQ 2008).

Emissions of greenhouse gases are believed to contribute to the changes in the global climate, which have a number of physical and environmental effects. Effects associated with global climate change include sea level rise and flooding, water supply, water quality, ecosystem and biodiversity, and human health impacts.

Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy and Economic Performance*, sets sustainability goals for Federal agencies with a focus on environmental, energy, and economic performance. EO 13514 requires Federal agencies to submit 2020 GHG reduction targets, increase energy efficiency, reduce fleet related petroleum consumption, reduce waste, conserve water, and to support sustainable communities and promote environmentally responsible products and technology. Specifically, the Army is required to measure, report, and reduce GHG direct and indirect emissions. In response to EO 13514, the Department of Defense has committed to reduce non-combat related GHG emissions by 34 percent by 2020 (DoD 2010).

In February of 2010, the CEQ published a draft guidance document on the consideration of GHG emissions and climate change in NEPA analysis. This guidance states that:

> . . . if a proposed action would be reasonably anticipated to cause direct emissions of 25,000 metric tons or more of CO_2-equivalent GHG emissions on an annual basis, the agencies should consider this an indicator that a quantitative and qualitative assessment may be meaningful to decision makers and the public. For long-term actions that have annual direct emissions of less than 25,000 metric tons CO_2-equivalent, CEQ encourages Federal agencies to consider whether the action's long term emission should receive similar analysis (CEQ 2010).

While the 25,000 MT CO_{2e} is not a significance threshold, it represents a presumptive effects threshold for consideration of GHG emissions in NEPA analysis.

Impacts of No Action: The No Impact Action would result in no changes to the existing conditions on Fort Belvoir. The existing school site would remain unchanged and therefore no construction or new operational emissions would be expected. Ambient air quality conditions would remain as described in the existing conditions section.

Impacts of the Proposed Action: Unless emissions exceed the General Conformity Rule applicability thresholds for the individual criteria pollutants, or contribute to a violation of any

Federal, state, or local air regulation, emissions are considered minor. Minor short-term and long-term effects to air quality are anticipated from the implementation of the proposed action.

The General Conformity Rule identifies thresholds for each pollutant to determine the applicability of conformity requirements for a project. The General Conformity Rule thresholds with respect to the proposed action are:

- NO_X – 100 tons/year as the proposed action is located in an O_3 transportation region that is in marginal non-attainment for ozone and is in nonattainment for $PM_{2.5}$.
- VOC – 50 tons/year as the proposed action is located in an O_3 transportation region that is in marginal non-attainment for ozone and is in nonattainment for $PM_{2.5}$.
- $PM_{2.5}$ – 100 tons/year as the proposed action is in a region that is in nonattainment for $PM_{2.5}$.
- SO_2 – 100 tons/year as the proposed action is in a region that is in nonattainment for $PM_{2.5}$.

Construction and operational emissions were estimated for the proposed action. Construction emissions are the result of the exhaust from non-road equipment (bulldozers, graders, scrapers), worker commute vehicles, vendor vehicles; the release of volatile organic compounds (VOCs) from paints and asphalt paving; and fugitive dust from surface disturbance. Operational emissions are the result of the operation of heating boilers and an onsite generator (not large enough to be subject to major new source review) and the use of buses and private motor vehicles. Table 3-8 summarizes the proposed action emissions in comparison to the applicability thresholds. Because the highest total direct and indirect emissions from the proposed action do not exceed the applicability thresholds for any nonattainment pollutant or precursor, the General Conformity Rule requirement is not applicable. The proposed action would be considered de minimis and therefore would not interfere with the Commonwealth of Virginia's ability to reach or maintain attainment of the NAAQS. Detailed emissions calculations are provided in the Record of Non-Applicability (RONA) included as Appendix B.

Table 3-8
Total Estimated Emissions

	tons/year					
	CO	**NO_X**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOC**
Construction 2015	7.03	8.13	0.53	0.44	0.63	1.01
Construction 2016	5.10	1.61	0.09	0.08	0.12	0.21
Operational Emissions	3.79	1.96	0.20	0.13	0.00	0.53
Applicability Threshold	N/A	100	N/A	100	100	50
Exceeds Threshold?	N/A	No	N/A	No	No	No

Construction emissions were estimated based on an approximate 19-month schedule. Even if the construction schedule was compressed to 12 months or less the total emissions would not increase significantly or approach the applicability thresholds. Small changes in site design, building design, and moderate changes in the quantity and type of equipment used for construction activities would not appreciably change emission estimates and therefore would not result in a change in determination under the General Conformity Rule or level of effect under NEPA.

Additionally, as part of the proposed action, capacity is being expanded to allow for all residents of Fort Belvoir to attend school within the boundaries of the base and not have to be bussed or driven to other area schools. This will reduce the vehicle miles traveled by at least the parents if not bus service for the district. This offset in vehicle miles traveled will reduce operational emissions from what is presented in Table 3-8.

Regulatory Review

All new sources of emissions may be subject to both state and Federal Permitting requirements. Requirements may include but would not be limited to prevention of significant deterioration (PSD) for sources in attainment areas; new source performance standards (NSPS) for selected categories of industrial sources; and new source review for sources in nonattainment areas. Additionally, new and modified stationary sources of air emissions may be subject to Maximum Achievable Control Technology requirements under the National Emissions Standards for Hazardous Air Pollutants (NESHAP). If the potential to emit hazardous air pollutants (HAPs) exceeds 10 tons per year of a single HAP or 25 tons per year for all regulated HAPs then the source would be subject to NESHAP.

The proposed action would be equipped with a 35 kW emergency back-up generator and therefore both Federal and state air permitting regulations would apply. The proposed action would also require a boiler with a minimum output of 5 million British thermal Units (MM BTU). Regulatory requirements state that boilers of greater than one million BTUs would be required to be included under the Title V provisions. Therefore, only the emergency back-up generator from the proposed action would be required to be included in the Title V provisions for Fort Belvoir. Table 3-9 addresses the proposed actions requirements under each of the above mentioned regulations.

In addition to the above regulatory requirements, the proposed action would have to implement Best Management Practices and comply with current Virginia regulatory requirements. The Army and any contractors would be required to comply with all applicable air pollution control regulations, however outside of these regulations and the listed BMPs, no mitigation would be required for the proposed action. Virginia State regulations include, but are not limited to:

- Fugitive dust emissions – Standards for Fugitive dust/emissions (9VAC5-40-90)
- Visible emissions – Standards for visible emissions (9VAC5-40-80)
- Portable fuel containers – Standard for volatile organic compounds (9VAC5-45- 190)

Table 3-9
Regulatory Review

Regulation	Discussion
PSD	The PSD is a Clean Air Act permitting program for new and modified major sources of air pollution and applies to all pollutants that do not exceed the NAAQS. Emissions from the proposed action would not exceed the 250 tons per year PSD threshold and therefore would not be subject to PSD review.
NSPS	NSPS are part of 40 CFR Part 60 and apply to specific categories of stationary sources including emergency generators and boilers rated greater than one million BTU. All new generators associated with the proposed action would be required to comply with NSPS.
New Source Review	Emissions from the proposed action would not exceed NSR thresholds and therefore would be exempt from NSR permits with respect to PSD and nonattainment areas. Although not anticipated due to size, it is possible that any boilers or back-up generators may require a minor NSR permit.
NESHAP	The proposed action would not result in the emission of significant amounts of any HAPs identified in 40 CFR Part 61 and Part 63. Therefore, emissions would not exceed NESHAP thresholds or require the use of Maximum Achievable Control Technologies.
Title V Permitting	Under the Title V provisions Fort Belvoir is a major source of air emissions. The emergency generator would be required to be included in the Fort Belvoir's Title V annual emissions inventories.

- Open Burning – Open burning prohibitions (9VAC5-130-30), and Permissible open burning (9VAC5-130-40).
- Asphalt paving operations:
  - Standards for volatile organic compounds (9VAC5-45-780)
  - Standards for visible emissions (9VAC5-45-790)
  - Standard for fugitive dust/emissions (9VAC5-45-800), and
  - Standard for odor (9VAC5-45-810)
- Architectural and industrial maintenance coatings – Standards for volatile organic compounds (9VAC5-45-550)
- Consumer Products – Standards for volatile organic compounds (9VAC5-45-430)

Greenhouse Gases and Climate Change

Construction and operation of the proposed action would result in approximately 1,065 MT CO_2e annually of GHG emissions. According to the CEQ, actions that cause direct emissions of 25,000 MT CO_2e per year or more should consider this level of emissions as an indicator that a detailed quantitative and qualitative analysis of GHG emissions is needed in a NEPA analysis of the project. Because the proposed action does not emit more than the CEQ emissions level, impacts from the proposed action are considered less than significant and screened from further review.

The proposed action would be subject to CHPS standards. The CHPS is a national organization that is committed to building healthy, efficient, environmentally responsive schools. Compliance with CHPS standards will reduce the energy intensity, utility consumption, and waste generation of the proposed action. Additionally, the DoD has committed to reducing emissions from non-combat activities by 34 percent by 2020. By complying with both the CHPS standards and the DoD reduction commitments, GHG emissions from the proposed action would be reduced from the 1,065 MT CO_2e reported herein.

Mitigation

All direct, indirect, and cumulative effect of the implementation of the proposed action would be minor and would not conflict with existing regulations, permits, or plans. Therefore no mitigation measures would be required to reduce air quality emissions.

3.8 HAZARDOUS MATERIALS/HAZARDOUS WASTE

Existing Conditions: Fort Belvoir conducts its hazardous waste management program in compliance with the Resource Conservation and Recovery Act (RCRA). Fort Belvoir has a RCRA Part B permit (VA7213720082) issued by VDEQ for the accumulation, storage, and disposal of hazardous waste. It has a Hazardous Waste Management/ Waste Minimization (HWMP) Plan and a Master Spill Plan. Fort Belvoir participates in the "Greening of Government" program (EO 13101, *"Greening" the Government through Waste Prevention*) that promotes the purchase of products to reduce solid and hazardous waste through implementation of a centralized system for tracking procurement, distribution, and management of toxic or hazardous materials. In addition, the cleaning and maintenance departments have replaced toxic and hazardous materials with environmentally friendly chemicals, and adhere to an Integrated Pest Management Plan. Fort Belvoir ENRD also files annual hazardous material and toxic chemical reports in compliance with the Emergency Planning and Community Right-to-Know Act (EPCRA).

Current and former hazardous waste permitted facilities present potential constraints to future development, in that closure of such sites is required prior to reuse. There are no hazardous waste accumulation sites within the immediate vicinity of the proposed site.

A preliminary assessment/site inspection conducted in 1982 for the Installation Restoration Program (IRP) indicated that there were no Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites identified on Fort Belvoir (USAG Fort Belvoir 2012). There are no known hazardous waste contaminated sites close to the proposed site.

An underground storage tank was removed during the demolition of the former Cheney Elementary School, located on the site of the current play fields west of the existing FBES. This tank was registered with VDEQ as UST1741A. A petroleum release was reported to VDEQ in 1994 (record 19940797). The site was remediated during the demolition of Cheney Elementary School and the record is closed with VDEQ.

Impacts of No Action: The No Action Alternative would have no short or long-term adverse increase in the production or exposure to hazardous substances or wastes.

Impacts of the Proposed Action: The construction activity would cause a short-term increase in the use of fuels, oils, asphalt substances, fertilizers, and sanitary waste. These substances could be considered toxic or hazardous if accidentally released in high quantities. The contractor would be required to use control measures to minimize such releases. Any hazardous materials encountered during the renovation of the existing FBES would need to be disposed of according to applicable federal, state, and local regulations.

Any hazardous substance or petroleum contaminated soils encountered during construction would be disposed of in accordance with state and Federal regulations. The contractor will be required to prepare a site Health and Safety Plan to ensure the safety of construction workers at the construction site and to document procedures if hazardous materials are discovered during construction.

Emergency generators proposed for the new FBES II would be operated by natural gas; therefore, no underground or above ground storage tanks are proposed for the new school (FCPS 2014). If FCPS determines that an emergency generator will be part of the ultimate school design, FCPS will need to obtain a Fort Belvoir Directorate of Public Works (DPW) Tank Activity Permit.

3.9 NATURAL RESOURCES

3.9.1 Geology and Topography

Existing Conditions: Most of Fort Belvoir lies in the Coastal Plain Physiographic Province. The Fall Line, which forms the northeast-southwest boundary between the resistant, metamorphic rocks of the Piedmont Plateau on the west and the softer, sedimentary rocks of the Coastal Plain Province, is located in the vicinity of I-95. There are several geologic formations associated with the Coastal Plain Physiographic Province including the Potomac Formation, Bacons Castle Formation, Shirley Formation, and Tertiary Alluvium. The major geologic unit in the Fort Belvoir area is the Potomac

Formation, a seaward-thickening wedge of inter-layered unconsolidated sediments such as sand, silt, and clay (Larson and Froelich, 1977, as cited in USAG Fort Belvoir 1993).

Land features on Fort Belvoir range from smooth uplands to bluffs and V-shaped stream valleys (ravines) that rise abruptly from floodplains to lowlands and valley bottoms that are underlain with alluvium. The elevation of the Main Post ranges from approximately 0 msl along the Potomac River to approximately 230 feet above msl at the Beulah Street and Woodlawn Road intersection.

The topography in the FBES parcel ranges from gently sloping across the majority of the area to steeply sloping in the north. The lowest point in the project area is approximately 100 feet msl in the ravine downstream of the existing stormwater pond. The highest point is approximately 147 feet msl, located along Woodlawn Road. The parcel slopes gently to the north (USAG Fort Belvoir 1995). Natural topography of the site was altered during the construction of the former Cheney Elementary School and the existing FBES.

One drainageway is located within the project area. This drainageway begins west of the existing FBES and drains to the existing stormwater management pond. After outfalling from the pond, the drainageway continues north as in intermittent stream for approximately 600 feet, where it joins a perennial stream outside of the project area (PSA 2013a). This stream flows eastward for approximately 700 feet where it merges with another perennial stream. The stream flows southeast for approximately 3,900 feet to Dogue Creek (USAG Fort Belvoir 1995).

Impacts of No Action: The No Action Alternative would have no impacts to site geology or topography.

Impacts of the Proposed Action: Some fill and grading would be required to prepare the site for construction of the new school. Since the proposed school will be located where the existing ball fields occur, disruption to natural topography would be minimal. If FCPS chooses to retrofit the existing stormwater detention pond with a sediment forebay or construct stepped pool outfalls in the eroded intermittent stream, additional minor changes in topography would occur.

3.9.2 Soils

Existing Conditions: Soils in the Fort Belvoir area have formed from metamorphic rocks including granitic gneiss and quartz sericite schist. The formation of soils within the sedimentary deposits are of fluvial and marine origin, usually occupying the broader ridgetops that have gentle to undulating slopes of less than 10 percent. Many soils which are formed in fluvial and alluvial sediment have a fragipan, a natural subsurface horizon with high bulk density that causes them to drain slowly (USAG Fort Belvoir 1995).

Soil map units found within the project area are shown in Figure 3-7 and listed in Table 3-10. The soil survey has not been updated since the construction of the existing FBES and therefore current onsite soils within the areas of the disturbance for FBES may be different than the soil mapping units indicated. Sassafras sandy loam, 2 to 7 percent slopes is classified as prime farmland. Prime farmland, as defined by the U.S. Department of Agriculture, 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. Sassafras sandy loam, 2 to 7 percent slopes is mapped within the footprint of the existing parking lot for FBES and is unavailable for agricultural use. Sassafras sandy loam, 2 to 7 percent slopes is also mapped within a wooded area adjacent to the existing stormwater pond.

To help estimate the erosion potential of a soil, a K-factor is used. The K-factor is a soil erodibility factor, which represents both susceptibility of undisturbed soil to erosion and the rate of runoff as measured under the standard unit plot condition. K-factors range from 0.02 to 0.69 with higher values being more susceptible to erosion. Soils with high clay content have low K-factors (0.05 to 0.15) because clay soil particles are resistant to detachment. Coarsely textured soils, such as sands, have low K-factors (0.05 to 0.2) because although the particles are easily detached, there is low runoff. Medium textured soils, such as silt loams, have moderate K-factors (0.25 to 0.4) since they are moderately susceptible to detachment and produce moderate runoff. High content silt soils are the most erodible soils because they are easily detached and produce high rates of runoff. High silt content soils tend to have K-factors greater than 0.4. Soils within the project area have K-factors ranging between 0.15 and 0.32 (Table 3-10).

Soils also have susceptibility to wind erosion. Wind erodibilty groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. These groups are assigned a number from 1 to 8, with group 1 being the most susceptible to wind erosion and group 8 being the least susceptible. Wind erodibility groups of the soils within the project area are provided in Table 3-10. Additionally, soils are assigned a wind erodibility index, which corresponds to the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. Soil wind erodibility indexes for soils within the FBES project area are provided in Table 3-10.

Impacts of No Action: The No Action alternative would have no impact on onsite soils.

Impacts of the Proposed Action: The new FBES would have long-term impacts to onsite soils through grading and fill activities and the construction of the elementary school building and parking lots. The building and parking lots, including the reconfiguration of the bus loop for the existing FBES, would cover approximately 4 acres of permeable soils with impermeable surfaces.

Figure 3-7. Soils

Table 3-10
Project Area Soils and Select Soil Properties

Map symbol and soil name	Farmland Classification	Kw factor[1]	Wind erodibilty group	Wind erodibility index
40 – Grist Mill sandy loam, 0 to 25 percent slopes	Not prime farmland	0.15 to 0.24	3	86
90B – Sassafras sandy loam, 2 to 7 percent slopes	All areas are prime farmland	0.17 to 0.28	3	86
90C – Sassafras sandy loam, 7 to 15 percent slopes	Farmland of statewide importance	0.17 to 0.28	3	86
91D – Sassafras-Marumsco complex, 15 to 25 percent slopes	Farmland of statewide importance	0.17 to 0.28 (Sassafras)	3 (Sassafras)	86 (Sassafras)
		0.20 to 0.32 (Marumsco)	6 (Marumsco)	48 (Marumsco)
95 – Urban land	Not prime farmland	-	-	-

Source: NRCS 2013.

1. The Kw factor is the erodibility for the whole soil and is modified by the presence of rock fragments. The Kw factor can be different within the soil profile (depth) thereby resulting in a range for a particular soil map unit.

The new FBES would be largely constructed on Urban land soils, which were previously disturbed by the construction and demolition of the former Cheney Elementary School. Some area of Grist Mill sandy loam, 0 to 25 percent slopes will be impacted by the construction of the school and paved play areas. Additionally, small areas of Sassafras sandy loam, 2 to 7 percent slopes and Sassafras sandy loam, 7 to 15 percent slopes will be disturbed during the improvements to the existing stormwater management pond. Sassafras sandy loam, 2 to 7 percent slopes is considered prime farmland. While the prime farmland designation is based strictly on soil characteristics and does not depend on a history of current or past agricultural use, the applicability of protection of such lands under the Farmland Protection Policy Act (FFPA; 7 U.S.C. 4201) is contingent on the adjacent land uses and history of production. For example, lands already in urban use or otherwise irreversibly committed to nonagricultural uses do not typically qualify. Former farmlands within Fort Belvoir were committed to military use long before the passage of the FFPA and have not been in production for over 50 years. One area of prime farmland soil on the FBES site is currently developed and the other area is currently forested. Therefore, while Sassafras sandy loam, 2 to 7 percent slopes is classified as prime farmland, the recent land use on the FBES site is not consistent with prime farmland designation.

Clearing and grading for construction would cause short-term erosion and sedimentation, and minor localized changes in soil infiltration rates and surface runoff patterns. Because the proposed project would affect more than 2,500 sq ft, an erosion and sediment control (ESC) plan employing soil best management practices, and a VSMP permit would be required for the clearing and grading

activities. The ESC plan would include strict measures consistent with the *Virginia Erosion and Sediment Control Handbook* (VDCR 1992) to minimize ESC impacts. Additionally, the development of the school would comply with EISA 438 requirements for management of stormwater runoff and encouragement of onsite infiltration (see Subsection 3.4.3). No additional mitigation would be needed.

3.9.3 Surface Water, Wetlands, and Groundwater Resources

Figure 3-8 (Sensitive Resources) shows waterways and wetlands in the vicinity of the FBES site based on a field delineation (PSA 2013b). Surface waters are regulated by both the Federal and state governments. Most waterways and wetlands are regulated by the U.S. Army Corps of Engineers (USACE) and USEPA as "waters of the U.S." under Sections 402 and 404 of the Clean Water Act. The Commonwealth of Virginia also asserts jurisdiction over wetlands and waterways within its boundaries. "State waters" are regulated by VDEQ under their Water Protection Permit Program. Although "waters of the U.S." may not include isolated wetlands or the extreme upper headwaters of streams, state waters do include these areas.

The project is in subwatershed 32 that flows to Dogue Creek and the Potomac River. This subwatershed is approximately 300 acres (USAG Fort Belvoir 2001). The only surface water present on the project site is an intermittent stream immediately downstream of the existing stormwater management dry pond. This intermittent stream flows north approximately 600 feet where it enters an unnamed perennial stream. This stream flows another 700 feet to the east where it discharges to another unnamed perennial stream. This perennial stream flows approximately 3,900 feet where it enters Dogue Creek. The dry pond is not a surface water or "water of the U.S."

Wetlands were delineated within the FBES project site according to the U.S. Army Corps of Engineers 1987 Wetlands Delineation Manual (USACE WES 1987) and the Regional Supplement to the Corps of Engineers 1987 Wetlands Delineation Manual: Gulf and Atlantic Coastal Plain Region (Version 2.0) (USACE ERDC 2010). No wetlands were found to occur within the project boundary (Appendix C) (PSA 2013b).

Fairfax County is underlain by three main groundwater aquifers: Bacons Castle Formation (not present at Fort Belvoir) and the Lower and Middle Potomac Formations. Potable water below Fort Belvoir is found predominantly in the Lower Potomac Formation, which is recharged by vertical movement from overlying, water-bearing strata (USAG Fort Belvoir 2001). In this aquifer, the groundwater flows southeast and is recharged by precipitation in the western part of Fort Belvoir, as well as areas north and west of the Post (Grogin and Widdowson 1998, in USAG Fort Belvoir 2001). Three groundwater wells located at the North Post Golf Course are used for irrigation. One additional well located on the Defense Logistics Agency site, to the west of the FBES site, is used for irrigation and pond-filling.

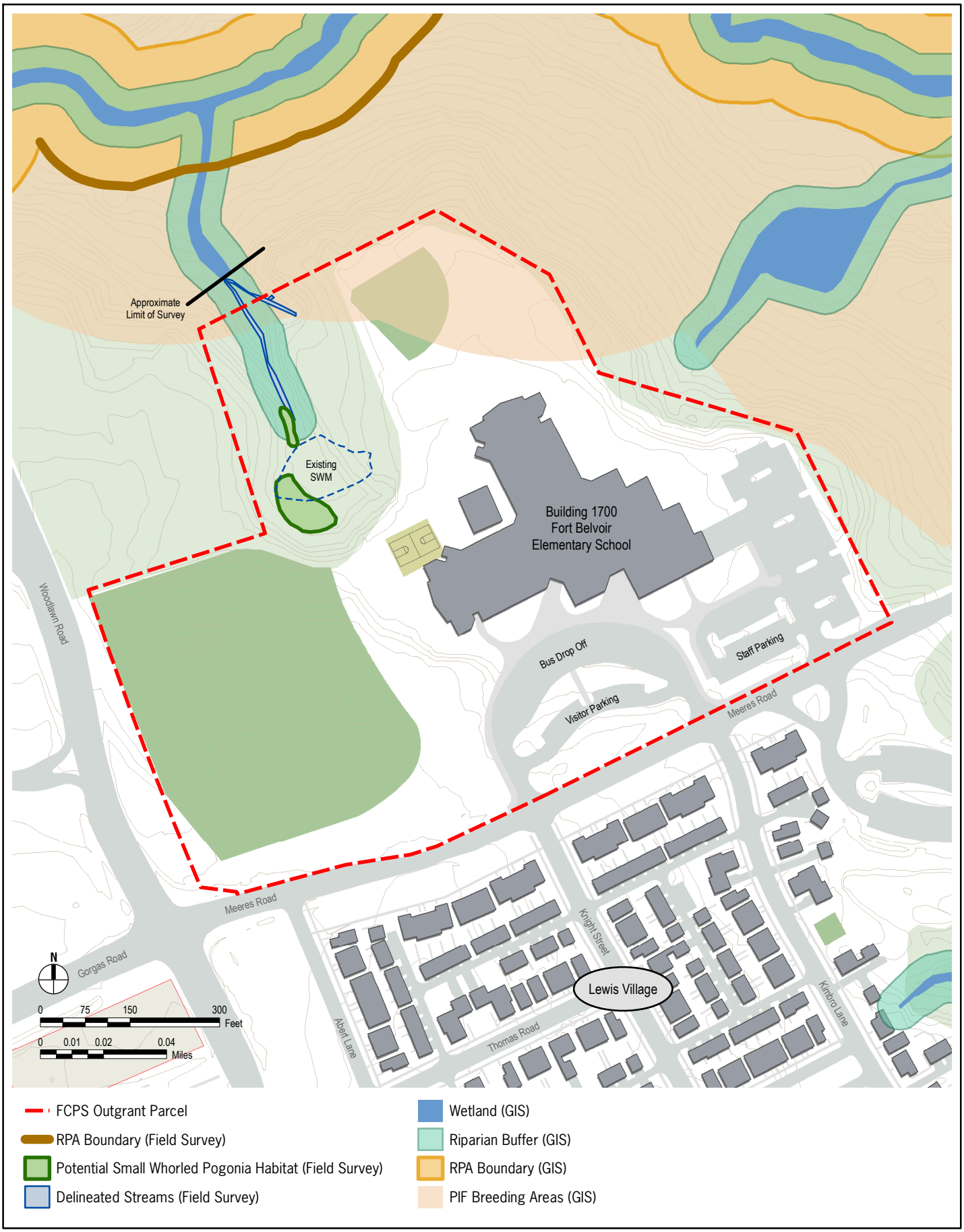


Figure 3-8. Sensitive

The surface aquifer (surface water table) has localized flows, originating from various recharge areas on the installation and draining to nearby streams, creeks, and large surface water bodies (USAG Fort Belvoir 2001). The water table may occur at or near the surface at locations adjacent to streams or in seeps, indicating that shallow groundwater flow relates to surface drainage features (USAG Fort Belvoir 2001).

Impacts of No Action: The No Action Alternative would have no new impacts on surface or groundwater.

Impacts of the Proposed Action: The stormwater improvements would be designed to comply with the Virginia Stormwater Management Regulations and the Chesapeake Bay Preservation Act (CBPA). Compliance with these regulations would ensure that the impacts on the water quality of downstream receiving waters would be minimized. Stormwater that enters the existing detention pond would continue to be discharged to the unnamed intermittent stream downstream of the existing stormwater pond after treatment (sediment settling out) in the pond.

If FCPS designs stormwater BMPs that require work within waters of the U.S., a permit from the USACE and/or VDEQ will be required. Prior to submitting an application to the agencies, Fort Belvoir will obtain an approved jurisdictional determination from USACE. Modifications to the existing stormwater outfall structure could potentially be permitted under the USACE Nationwide Permit (NWP) program. Depending on the extent of the activity, modifications to the outfall structure may qualify under NWP 3: Maintenance or NWP 43: Stormwater Management Facilities. Utilization of NWP 43 limits impacts to waters of the U.S. to less than ½-acre and less than 300 linear feet of stream. Construction of stepped pool outfalls may also qualify for a NWP. Such stormwater BMPs could be viewed favorably by the regulatory agencies since they would address eroded conditions within the streams and limit further erosion by providing stability. Stepped pool outfalls could qualify for NWP 13: Bank Stabilization or NWP 43. NWP 13 limits impacts of streams to less than 500 feet and an average of less than 1 cubic yard per running foot below the ordinary high water mark. If impacts for the stormwater BMPs exceed these thresholds, the project could be permitted under a USACE individual standard permit and VDEQ Virginia Water Protection (VWP) Permit WP-4. The VWP WP-4 would require that impacts to streams do not exceed 1,500 linear feet. Compensatory mitigation would be required for any impacts that exceed 300 feet for all permit types.

The Proposed Action would have a minor impact on the overall availability or quality of groundwater and surface water resources. The increase in impermeable surfaces onsite would reduce infiltration of stormwater to groundwater resources. Use of LID practices to fulfill EISA 438 and VSMP requirements would help to mitigate this impact. The proposed site is not near any recharge areas for the Lower Potomac Formation, so impacts would be minor and restricted to the surface water table. No withdrawal of groundwater would be necessary for the proposed action, as potable water is supplied by American Water.

3.9.4 Vegetation and Wildlife

Existing Conditions: Within Fort Belvoir's Main Post, areas of native vegetation occur in large blocks, aligned from the northeast to the southwest near and within the Jackson Miles Abbott Wetland Refuge, the Forest and Wildlife Corridor (FWC), the Accotink Bay Wildlife Refuge, and the T-17 Refuge (see Figure 1-2). This configuration affords a continuous band of wildlife habitat through the installation, and provides for connectivity with wildlife habitat areas outside the installation, notably Huntley Meadows Park and Pohick Bay Regional Park. Vegetation cover in the remaining 30 percent of Fort Belvoir consists primarily of the improved and semi-improved grounds associated with the installation's developed land uses (USAG Fort Belvoir 2001).

An installation-wide vegetation study of Fort Belvoir (Paciulli 1998a, in: USAG Fort Belvoir 2001) identified 17 plant community types, four of which possess species with state conservation rankings of rare or very rare. These 17 types are included in the broader categories of mixed hardwood forests, pine forests, floodplain hardwood forests, wetlands, oldfield grasslands and urban land (USAG Fort Belvoir 2001). Based upon field work, three vegetation types occur at the FBES site. The predominate vegetation type is urban land, which consists of impervious areas and maintained playfields. A band of early successional forest occurs on the edge of the existing playfields west of FBES and extends north to the outfall of the existing stormwater detention pond. This community is comprised primarily of volunteer and nuisance species including tulip tree (*Liriodendron tulipifera*), red maple (*Acer rubrum*), black locust (*Robinia pseudoacacia*), and tree-of-heaven (*Ailanthus altissima*). A mixed beech-oak-tulip tree forest occurs beyond the early successional forest. This community is more mature than the early successional forest and consists of American beech (*Fagus grandifolia*), oak species (*Quercus* spp.), and tulip tree.

In addition to the forested areas, there are landscaped tree plantings around the existing FBES. Some of these plantings serve as compensatory mitigation for tree removal at the Main Post Exchange. Some of these trees were planted as compensatory mitigation for tree removal at the Main Post Exchange as required by *Fort Belvoir Policy Memorandum #27, Tree Removal and Protection* (USAG Fort Belvoir 2012b). These trees are all under 4 inches dbh.

Fort Belvoir is home to numerous wildlife species. Based on information from installation-wide surveys, the Post contains potential habitat for 43 species of mammals, 274 species of birds, 32 species of reptiles, 27 species of amphibians and 60 species of fish (Ernst and Miller, 1997; Ernst and Belfit, 1997, as cited in USAG Fort Belvoir 2001). Many of the species that occur within Fort Belvoir forests may be found near the proposed project site, due to the forested area and riparian habitat north of the site. The remainder of the FBES site consists of paved surfaces and maintained turf grass and provides little wildlife habitat value.

Fort Belvoir developed its Integrated Natural Resources Management Plan (INRMP) to embrace the principles of ecosystem management to preserve native biodiversity. Through the INRMP, Fort

Belvoir aims neither to manage for single species nor to increase the number of species or communities on-Post (USAG Fort Belvoir 2001). Over 2,500 acres of land has been set aside on Fort Belvoir for wildlife, including the Accotink Bay Wildlife Refuge, the Jackson Miles Abbott Wildlife Refuge, and the FWC. These areas, as well as undeveloped stream valleys and slopes, provide habitat for numerous wildlife species.

The Accotink Bay Wildlife Refuge is located over 1 mile to the southwest of the project area. Jackson Miles Abbot Wildlife Refuge is located approximately 0.5 mile northeast of the project area. The closest FWC is approximately 2,000 feet north of the project.

Fort Belvoir participates in the Partners in Flight (PIF) program. The international PIF is a cooperative, non-advocacy partnership among federal, state and local government agencies, philanthropic foundations, professional organizations, conservation groups, industry, the academic community, and private individuals. DoD bird conservation programs are a vital part of this initiative. Based on Fort Belvoir's GIS data, there are two priority bird species for the Mid-Atlantic Coastal Plain Region that occur in the vicinity of the FBES project area. Figure 3-8 shows PIF habitat with associated buffer in the vicinity of the FBES project area. According to the INRMP, forested habitat north and east of the site provide suitable breeding habitat for the wood thrush (*Hylocichla mustelina*) and scarlet tanager (*Piranga olivaceae*) (USAG Fort Belvoir 2001).

Impacts of No Action: The No Action Alternative would have no short or long-term adverse impact on vegetation or wildlife habitat.

Impacts of the Proposed Action: Construction of the proposed new elementary school will generally be confined to the area of existing playfields to the west of the current FBES. A small amount of forested habitat may need to be cleared if FCPS chooses to incorporate retrofits to the extended detention pond or stepped pool outfalls as part of the stormwater management design. *Fort Belvoir Policy Memorandum #27, Tree Removal and Protection* outlines the criteria for tree protection, tree replacement, and out of kind mitigation (USAG Fort Belvoir 2012b). This policy promotes site-planning techniques and construction practices that maximize the retention and protection of existing trees. It requires that all proposed tree and shrub removals, as well as construction and excavation activities that may impact the growth and survival of trees, be approved by the DPW. FCPS will need to submit a site plan to DPW that shows all trees greater than 4 inches dbh that will need to be removed to construct the stormwater pond improvements. Any tree greater than 4 inches dbh proposed for removal will require two trees to be planted as mitigation. It is anticipated that the required replacement trees will be able to be incorporated into the landscape design for the proposed school. If tree replacement is not feasible, *Memorandum #27* allows for out-of-kind mitigation such as environmentally beneficial restoration, enhancement, or preservation measures.

Some of the trees that were planted as compensatory mitigation for the Main Post Exchange may need to be removed to construct the new FBES II. In particular, trees planted west of the existing bus loop would need to be removed to build the new bus loop. Trees planted west of the existing FBES building may also need to be removed to construct the new FBES II building. Other removals could be required in order to construct the stormwater improvements. In total, less than 20 trees planted for compensatory mitigation are anticipated to need to be removed. All of these trees are less than 4 inches dbh and are therefore not subject to *Fort Belvoir Policy Memorandum #27, Tree Removal and Protection*. However, since these trees serve as mitigation, they would need to be replaced at a 1:1 ratio.

If FCPS chooses to include stepped pool outfalls as a stormwater BMP, some impact to wood thrush and scarlet tanager PIF would occur. A temporary construction road would be required along at least one side of the existing stream to allow for construction of the stepped pool outfall. This clearing would be limited to 15 to 20 feet. Impacts to wood thrush and scarlet species would be minimized by limiting tree clearing during the breeding season (April through August). Replanting native trees would limit the impacts to being temporary in nature. Some of the PIF habitat buffer extends into the existing playfields to the north of the current FBES. No effect to the PIF habitat would be expected with the existing school renovations.

3.9.5 Special Status Species

Existing Conditions: Under the Endangered Species Act (ESA) of 1973, as amended, plant and animal species in danger of extinction throughout all or a part of their range are listed as endangered. Species that are likely to become endangered within the foreseeable future throughout all or a significant part of their range are listed as threatened. Endangered and threatened listings provide protective status to the listed species and their habitats. Candidate designations are made where the data support a species listing, but the listing procedure has been delayed. The Commonwealth of Virginia has several fish and wildlife laws, as well as the Endangered Plant and Insect Species Act, that list and provide protection for species vulnerable to extinctions at the state level.

Natural heritage resources include habitats for rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations. State Natural Heritage Programs maintain listings and conservation rankings of rare plant and animal species that occur within their state, and ecological communities. Unlike endangered and threatened listings, rare species listings and their rankings are not legal designations, and do not provide any protective status. They are used to prioritize resources for conservation. The Virginia's Department of Conservation and Recreation, Division of Natural Heritage (VDCR-DNH) manages the Virginia National Heritage Program.

Fort Belvoir has two state-listed animal species that have been regularly documented on-Post: the state-listed threatened wood turtle (*Clemmys insculpta*) and the state-listed threatened peregrine falcon (*Falco peregrinus* – during fall migration). The bald eagle is also federally protected through the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Bald eagles nest and forage near large bodies of water. The bald eagle foraging and nesting habitat nearest to the FBES site is at the Dogue and Accotink Creek shorelines (USAG Fort Belvoir 2001), approximately 4,000 feet and 0.8 mile away from FBES, respectively.

The wood turtle is found in mesic deciduous woodlands in or within 300 feet of clear brooks and streams. While wood turtles are terrestrial, they typically remain in moist areas and require streams with perennial flow. The Virginia Department of Game and Inland Fisheries (VDGIF) has designated Dogue Creek and an unnamed tributary to Dogue Creek as State Threatened and Endangered Species Waters because of wood turtle habitat (VDCR 2013; VDGIF 2014). This unnamed tributary to Dogue Creek is located approximately 1,300 feet downstream of the existing stormwater management pond on the FBES site. The stream that flows from the existing stormwater pond at the FBES site has intermittent flow and does not provide appropriate habitat for wood turtles; however, the perennial stream approximately 600 feet downstream of the stormwater pond may provide potential habitat.

The peregrine falcon has been regularly recorded on Fort Belvoir as it migrates through the area, typically utilizing foraging habitat along the Accotink Stream / Accotink Bay stream corridor (USAG Fort Belvoir 2001). In addition, the Northern Virginia well amphipod (*Stygobromus phreaticus*) was collected at Fort Belvoir's T-17 training area in 1996 (VDCR - DNH June 2003, in USACE Baltimore District 2010) – one of only three records of collection since 1922. While not state or federally listed as threatened or endangered, this critically imperiled amphipod (MACTEC Engineering and Consulting, of Georgia, Inc. June 2003, in USACE Baltimore District 2010) is considered to be a species of special concern. It is a subterranean crustacean limited to groundwater seeps. There are no groundwater seeps on the FBES site.

The small whorled pogonia (*Isotria medeoloides*), an orchid found in deciduous woods, can occur in Fairfax County. It is listed as threatened throughout its range by the U.S. Fish and Wildlife Service (USFWS). The state of Virginia lists the species as endangered (VDCR-DNH 2014). It has been found at FBNA but not on Main Post. A habitat survey for potential small whorled pogonia was conducted within forested areas of the FBES site that may be affected by the new construction. Areas of limited potential habitat were observed on wooded, colluvial slopes in association with the unnamed drainageways near the northern end of the study area (Appendix C). Remaining forested sections near the eastern boundary of the study area are characterized by slopes that would be considered too steep to support the small whorled pogonia (Rouse 2013). A detailed species survey was conducted on July 10, 2014 and no specimens of small whorled pogonia were found on site.

Impacts of No Action: The No Action Alternative would not affect any special status species such as federally or state-listed threatened or endangered species, the bald eagle, or natural heritage resources.

Impacts of the Proposed Action: Based upon the known locations of small whorled pogonia and the disturbed nature of the proposed site, it seems unlikely that small whorled pogonia would occur within the project area. In 2014 Fort Belvoir intends to survey the potential suitable habitat areas during the appropriate survey season (June 1 to July 20). If any small whorled pogonia is found during the survey, plans for the stormwater pond would need to be reevaluated to avoid impacts to this federally threatened species.

In a letter dated December 5, 2013, the VDCR noted that there are natural heritage resources in the project area; however, due to the scope of the proposed project and the distance to the resources, VDCR does not anticipate that the project would adversely affect them (Appendix D). VDCR did not specify what the natural heritage resources are (VDCR 2013). VDCR also noted the presence of the wood turtle habitat in the unnamed tributary to Dogue Creek (VDCR 2013). Since this stream is over 1,000 feet from any proposed forest disturbance and the closest perennial stream is approximately 600 feet from proposed forest disturbance, direct impacts to this species are unlikely. Proposed stormwater quantity and quality controls in compliance with the Virginia stormwater management regulations and EISA 438 (subsection 3.4.3) will minimize hydrologic alterations to downstream perennial waters that may provide wood turtle habitat.

3.9.6 Forest Riparian Buffers/Chesapeake Bay Resource Protection Areas

Existing Conditions: The Chesapeake Bay Preservation Act (CBPA), Sections 10.1-2100, et seq., of the Code of Virginia (VAC), is Commonwealth of Virginia legislation that was passed to reduce the amount of sediment and attached nutrients in stormwater runoff before runoff and nutrients can be transported to Chesapeake Bay. Fort Belvoir policy is to ensure that on-Post actions are consistent to the maximum extent practicable with the CBPA.

Fort Belvoir has adopted policy consistent with the Fairfax County Chesapeake Bay Preservation Ordinance (CBPO) and uses the same definition for Resource Protection Areas (RPAs) and Resource Management Areas (RMAs) as Fairfax County. RPAs include:

- Tidal shores and wetlands
- Streams with perennial flow
- A nontidal wetland connected by surface flow and contiguous to a tidal wetland or stream with perennial flow

- Buffer areas to include:
  - Land within the 100-year regulatory floodplain
  - Land within 100 feet of a tidal shore, tidal wetland, perennial stream, or nontidal wetland connected by surface flow and contiguous to a tidal wetland or stream with perennial flow.

There are no RPAs in the vicinity of the FBES (Appendix C). The stream discharging from the existing stormwater management pond has intermittent flow and therefore is not an RPA feature. Under the CBPO, construction within the RPA is largely restricted to water dependent activities, public utilities and roadways, passive recreation, water wells, and historic preservation. RMAs in Fairfax County include any land that is not within the RPA. Development is allowed in RMAs, but the development must meet performance criteria for nutrient reduction, including construction of BMPs. Compliance with these RMA standards is generally incorporated into the design of stormwater management/best management practices (SWM/BMPs).

As a matter of policy, Fort Belvoir also limits development within a 35-foot riparian buffer along its intermittent streams. A 35-foot riparian buffer would be implemented along the intermittent stream downstream of the existing stormwater pond on the FBES site. The onsite riparian buffer is shown on Figure 3-8.

Impacts of No Action: The No Action Alternative would have no effect on RPAs or riparian buffers.

Impacts of the Proposed Action: No RPAs occur within the vicinity of the FBES site; therefore, the proposed alternative would have no effect on RPAs. If FCPS chooses to incorporate a stepped pool outfall as part of the stormwater management system, portions of the 35-foot riparian buffer would need to be cleared during construction. A temporary access road requiring clearing of at least 15 to 20 feet would be required along at least one bank of the stream to allow for the construction within the channel. This buffer would need to be replanted with native trees and shrubs to replace the lost trees and restore the riparian buffer function.

3.10 CULTURAL RESOURCES

Existing Conditions: Federal actions that have the potential to affect cultural resources are subject to a variety of laws and regulations. The National Historic Preservation Act (NHPA) of 1966, as amended, is the principal legislative authority for managing cultural resources associated with Federal projects. Section 106 of the NHPA requires all Federal agencies to consider the effects of their actions on cultural resources listed and/or determined eligible for listing in the National Register of Historic Places (NRHP). Such resources are termed “historic properties” and may include buildings, sites, structures, districts, and objects that meet the NRHP’s Criteria of Eligibility. The regulations that implement Section 106 (36 CFR Part 800) describe the process for identifying and evaluating cultural resources; assessing effects of Federal actions on historic properties; and

consulting to avoid, reduce, or mitigate adverse effects. The goal of the Section 106 process is to accommodate historic preservation concerns with the needs of Federal undertakings through consultation with the State Historic Preservation Officer (SHPO); Tribal Historic Preservation Office, if applicable; other parties with an interest in the effects of the undertaking; and as required, the Advisory Council on Historic Preservation.

Section 110 of the NHPA also charges Federal agencies with the responsibility for establishing programs for the identification, evaluation, and nomination of historic properties on their land to the NRHP. Certain historic properties deemed to be of exceptional national significance have been designated National Historic Landmarks by the Department of the Interior. Additionally, Virginia and Fairfax County maintain their own lists, often overlapping with the NRHP, of historic properties worthy of protection.

In accordance with the regulations implementing Section 106 (36 CFR Part 800), impacts on cultural resources are identified and evaluated by (1) determining the area of potential effects (APE); (2) identifying historic properties present in the APE that are either listed in or eligible to be listed in the NRHP; (3) applying the criteria of assessing adverse effect to affected historic properties; and (4) considering ways to avoid, minimize, or mitigate adverse effects.

The Federal government has certain obligations with regard to items of cultural patrimony and sacred sites associated with Native Americans. Although these responsibilities are often included under the rubric of cultural resources compliance, they are defined in separate laws that afford federally recognized tribes status to engage in nation- nation consultations on matters for which the tribes' traditional practices and items of cultural patrimony are affected by the actions of Federal agencies.

The analyses of impacts on cultural resources that are presented in this section respond to the requirements of both NEPA and Section 106 of the NHPA, although the Section 106 compliance is being handled separately.

Fort Belvoir has conducted multiple architectural and archaeological surveys to accurately identify cultural resources located with the Post boundaries. Fort Belvoir has conducted Phase I archaeological surveys on all main post property and multiple Phase II surveys as required. Two archeological sites were identified within the area of potential effect for the project area. Site 44FX1942 is located adjacent to the project area. Site 44FX619 is located in the vicinity of the existing parking lot for FBES. Both sites were evaluated in 1996 as part of the Phase II Investigations of Sites 44FX619 and 44FX1942, Cheney School Outgrant Project, U.S. Army Garrison Fort Belvoir, Fairfax County, Virginia, and were determined ineligible for NRHP listing. Fort Belvoir received SHPO documentation on these determinations on January 31, 1997 (VDHR# 94-0412-F).

Impacts of No Action: The No Action alternative would have no effect on cultural resources eligible for listing on the NRHP or any sites of Native American interest.

Impacts of the Proposed Alternative: There are no cultural resource sites eligible for listing on the NRHP within the project area. Cultural resource sites within the APE have been determined by SHPO to be ineligible for listing on the NRHP. Construction of FBES II and renovations of the existing FBES would have no effect on NRHP eligible sites or any sites of Native American interest. Fort Belvoir has completed the Section 106 consultation process (Appendix E).

3.11 CUMULATIVE IMPACTS

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

The BRAC 2005 agency and personnel realignments at Fort Belvoir have resulted in significant construction activity at Fort Belvoir. This has resulted in approximately 20 construction projects and 12,800 employees being realigned to Fort Belvoir between 2008 and 2011. The cumulative impacts of these projects were addressed in the 2007 Fort Belvoir BRAC EIS and Record of Decision (ROD) (USACE Mobile District 2007, College 2007).

As part of Fort Belvoir's Real Property Master Plan (RPMP) update, 52 short term projects (defined as occurring within the next five years) have been identified (USAG Fort Belvoir 2014). The proposed FBES II is included among these 52 projects. These projects range from small-scale renovations of existing buildings to construction of new structures and associated parking, utilities, and other infrastructure. The RPMP is currently being updated and will be submitted for approval by Army Headquarters and the NCPC in 2014. An EIS is being prepared and will be issued to assess the effects of these projects.

Concurrent construction projects in the same area of the Post or immediately outside the Post could lead to increases in vehicle traffic, air emissions, and noise from the various construction activities. Table 3-11 provides a list of projects from the RPMP that could have the potential to cumulatively interact with the Proposed Project.

Table 3-11
Recent and Foreseeable Fort Belvoir Projects in Vicinity of FBES

Project	Description	Schedule
Main Post Exchange (PX)	Opened in June 2013 and consolidated three existing facilities. The existing PX is to be demolished.	FY 2012 (completed)
Privatized Army Lodging – East of Belvoir Road	A new 141-room transient lodging facility would be built near Pence Gate under terms of the privatized Army lodging agreement.	FY 2012
Fisher House 1	This project is a completed single-story brick residential facility with 12 bedrooms/suites. The facility provides a temporary residence and support functions for service men and women and their families receiving care at the Fort Belvoir Community Hospital.	FY 2012 (completed)
Child Development Center 144	The child development center was completed and provides care for up to 144 children of active duty and authorized civilian personnel. The facility is located near the Woodlawn family housing area.	FY 2012 (completed)
Water and Wastewater System Privatization	This project would privatize the operation and maintenance of water and wastewater systems on Fort Belvoir. The repair/replacement of aging infrastructure, including pipes, lift station, and water towers would also be included.	FY 2012 (EA completed projects ongoing)
Access Road & Control Point – Lieber Gate	A new access control point would be built for traffic accessing North Post from U.S. Route 1. The facility would replace the former Lieber Gate, which was closed after the September 2001 terrorist attacks.	FY 2013
Army & Air Force Exchange Service Car Wash	A car wash facility for privately owned vehicles would be built adjacent to the Class VI store at the intersection of Gunston and Gorgas Roads.	FY 2013
PX Demolition	The former PX building will be demolished to make space available for the construction of the new Commissary.	FY 2013
36-Hole Golf Course Reconfiguration	Six of the 36 holes at Fort Belvoir's golf course would be reconfigured to accommodate construction of the National Museum of the U.S. Army.	FY 2013
Army Intelligence & Security Command (INSCOM) Headquarters Expansion (Phases I-IV)	Four phases to expand INSCOM's headquarters facilities including parking garage, utility building, reconfiguration of parking lots, and site work.	FY 2013 through FY 2017

Table 3-11, concluded

Project	Description	Schedule
Army & Air Force Exchange Service Car Care Center	A car maintenance facility with 10 service bays would be built on an outparcel of the PX/Commissary site.	FY 2013
Name Brand Casual Dining Restaurant (Old Chicago)	An Old Chicago restaurant would be built on an outparcel of the PX/Commissary development site.	FY 2014
Main Post Commissary	This project would provide a new, larger Commissary for use by military personnel, their families, area retirees, and eligible civilians.	FY 2014
Fisher House 2	A second Fisher House would be built adjacent to Fisher House 1. The two houses would share the same purpose, design, and parking lot.	FY 2014
29th Infantry Headquarters	This project would construct a new headquarters complex for the 29th Infantry at the section of Gunston and Goethals Roads.	FY 2016
Defense Logistics Agency (DLA) Parking Garage	Two multi-story parking structures with a capacity of 1,650 parking spaces would be built on the existing DLA parking lot. The parking structures would make space available to build the Defense Logistics Agency Administrative Center.	FY 2016
Unaccompanied Enlisted Personnel Barracks	A barracks and operations facility would be built to house 240 enlisted personnel realigned by BRAC 2005 from Walter Reed Army Medical Center to the Fort Belvoir Community Hospital.	FY 2017
Religious Education Center	A facility with worship assembly area, classrooms, and offices would be built between the Woodlawn Chapel and Woodlawn Road.	FY 2017
DLA Headquarters Building	A general purpose headquarters facility for DLA and Defense Energy Support Center Operation would be built on an existing parking lot.	FY 2017

Source: USAG Fort Belvoir 2014.

Several private projects off-Post have been approved by Fairfax County or are pending site plan approval and can be considered as occurring in the foreseeable future. These projects include:

- Redevelopment of the 27-acre Village of Accotink. The proposed plan includes up to 470 multi-family units with some single-family attached; retail space up to 55,000 sq ft; and up to 16,000 sq ft of office space. Future development would require right-of-way dedication to support the planned widening of U.S. Route 1 from four to six lanes.
- Development of the Belvoir Business Park on Lorton Station Boulevard (northwestern corner of the Post) for office and/or industrial use.
- Development of the integrated mixed-use Hilltop Village Center, a 33-acre site at the intersection of Beulah Street and Telegraph Road. The current plans propose a 150,000 sq ft grocery store, 94,000 sq ft of specialty retail, office space totaling over 100,000 sq ft, and 953 parking spaces.
- Development of the Northern Virginia Industrial Park. A Fairfax County Comprehensive Plan Amendment allows 69 acres of land on Telegraph Road West to become a mix of office, hotel, retail, civic, and light industrial uses.
- The Fairfax County Board has also amended the county's Transportation Plan to plan for the expansion of Telegraph Road to six lanes from U.S. Route 1 to Fairfax County Parkway. (USAG Fort Belvoir 2012a).

These projects have the potential to increase local traffic congestion over the short and long term. If the construction of these projects overlaps (e.g. PX demolition and new commissary) with the construction of FBES II or the renovations at the existing FBES, there could be minor short-term cumulative impacts to traffic. Since the majority of the students that will attend FBES II will live on-Post and the increase in employment will be minor, there will be little long-term cumulative effect to traffic attributed to this project.

Stormwater from the construction and operation of the new FBES II and future on-Post construction projects within the FBES watershed has the potential to cause cumulative impacts. Implementation of erosion and sediment control measures for these projects will minimize the cumulative impacts from stormwater during construction. Construction of BMPs in compliance with the Virginia Stormwater Management Act and EISA 438 will minimize impacts from stormwater once these projects have been constructed.

The air emissions analysis for the construction and operation of the proposed school shows that emissions will be well under the de minimus thresholds. Therefore, the proposed project is not expected to contribute more than minor short-term and long-term cumulative impacts to air quality. Only minor effects to natural resources are expected due to the construction of FBES II and the renovation of FBES. These effects would be localized and are not expected to interact cumulatively with other projects in the area.

4.0 FINDINGS AND CONCLUSIONS

4.1 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable impacts are those impacts that would be caused by the construction of the proposed FBES II and renovations at the existing FBES. Impacts from the proposed action and no-action alternative are discussed in Chapter 3. Comprehensively, the proposed action would result in no more than minor impact to the human and natural environment. Table 4-1 summarizes the impacts of the proposed action and no action alternatives for each resource area.

Table 4-1
Summary of Impacts of the Proposed Action and No Action Alternatives

Resources	Proposed Action Alternative	No Action
Land Use		
Land Use	0	0
Plans	0	0
Traffic and Transportation Networks	1	0
Infrastructure and Utilities		
Potable Water	1	0
Sanitary Sewer	1	0
Stormwater	1	0
Natural Gas	1	0
Electricity	1	0
Communications	1	0
Solid Waste	1	0
Socioeconomics		
Demographics	0	0
Age, Race, and Ethnicity	0	0
Employment & Income	1	0
Community Facilities and Services		
Services	1	0
Recreation	1	0
Air Quality	1	0
Hazardous Materials/Hazardous Waste	0	0

Table 4-1, concluded

Resources	Proposed Action Alternative	No Action
Natural Resources		
Geology and Topography	1	0
Soils	1	0
Surface Water, Wetlands & Groundwater Resources	1	0
Vegetation & Wildlife	1	0
Special Status Species	0	0
Forest Riparian Buffers & Chesapeake Bay RPAs	1	0
Cultural Resources	0	0
Cumulative Impacts	1	0

0 = No or Negligible Impact, 1 = Minor Impact, 2 = Moderate Impact, 3 = High Impact

4.2 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

There are no impacts expected that require mitigation to reduce the level of impact from significant. Best management practices will be employed where appropriate to reduce and minimize impacts. The following best management practices and mitigation measures will be implemented to minimize potential adverse impacts.

- FCPS will design entrances to the school and site traffic flow so that impacts to the Meeres Road – Woodlawn Road intersection are minimized (e.g. alternative entrance on Woodlawn Road).
- FCPS will submit erosion and sediment control plans to Fort Belvoir DPW for approval. The erosion and sediment control plans will involve best management practices such as silt fencing, control matting, construction entrances, and storm drain outlet protection throughout the construction of the project. These BMPs would be maintained until the site has been stabilized.
- FCPS will design stormwater management best management practices to provide post-construction stormwater quantity control and quality treatment according to Virginia Stormwater Management Act and EISA 438 requirements.
- FBES II will be designed to obtain CHPS certification to conserve resources such as electricity, natural gas, and potable water.
- At least 50 percent of all construction debris will be recycled or reused to help Fort Belvoir meet Army waste diversion requirements. The contractor(s) building the new school and renovating the existing FBES will complete monthly reports detailing waste diverted from landfills by description and weight. These reports will be submitted to Fort Belvoir DPW.

- Fugitive dust will be minimized during construction by control methods outlined in 9 VAC 5-130 et seq. of the Regulations for the Control and Abatement of Air Pollution. These precautions could include methods such as using water for dust control, covering open equipment used for conveying materials, and promptly removing spilled or tracked dirt or other materials from paved streets or dried sediments from soil erosion.
- Tree protection methods will follow the Fort Belvoir *Tree Removal and Protection Policy* as outlined in Fort Belvoir Policy Memorandum #27. Tree protection will be coordinated with Fort Belvoir's Urban Forester. Appropriate mitigation for removal of trees will be provided as per the *Tree Removal and Protection Policy*, typically a 2:1 replacement ratio. Any removal of trees planted for compensatory mitigation of the Main Post Exchange will need to be replaced at a 1:1 ratio.

4.3 PERMITS AND OTHER REQUIREMENTS

The following permits and requirements may be needed depending on the final design of the proposed FBES II.

- Virginia Stormwater Management Program (VSMP), General Permit for Discharges of Stormwater and Construction Activities and associated Stormwater Pollution Prevention Plan (SWPPP). FCPS will be required to submit stormwater management plans to Fort Belvoir DPW for approval. The general contractor will apply for the VSMP permit.
- Fort Belvoir Excavation Permit. FCPS will need to request a Fort Belvoir Excavation Permit for any geotechnical exploration during design and excavation during construction.
- Fort Belvoir tree removal policy. FCPS will need to provide Fort Belvoir DPW a plan showing the removal of any trees greater than 4 in dbh. All such trees removed as part of the project will need to be replaced at a 2:1 ratio.
- Tree clearing in PIF habitat will be done outside of the breeding season (April to August).
- Section 404 Wetlands Permit. If a Section 404 wetlands permit is required from the USACE to construct stormwater pond modifications, USAG Fort Belvoir will be responsible for preparing and submitting a Joint Permit Application. FCPS will provide any required compensatory mitigation for stream impacts.
- Permits for road closures, after-hours work, or weekend work
- Federal Aviation Administration crane registration

4.4 CONCLUSION

The construction of the new FBES II and renovations at the existing FBES are not expected to result in significant impacts on the environment. Therefore, an environmental impact statement is not required. In accordance with 32 CFR 651.34(g), since no significant impacts to the environment will occur, a Finding of No Significant Impact (FNSI) will be prepared.

5.0 LIST OF PREPARERS

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Appendix A

Coastal Consistency Determination

Determination of Consistency with Virginia's Coastal Resources Management Program

Pursuant to Section 307 of the Coastal Zone Management Act of 1972, as amended, this is a Federal Consistency Determination for the construction of a new elementary school adjacent to the existing Fort Belvoir Elementary School located on U.S. Army Garrison Fort Belvoir. The school will be constructed and operated by Fairfax County Public Schools (FCPS); however, funding for the construction comes from a Department of Defense Office of Economic Adjustment grant and the building will be owned by Fort Belvoir. The Army is required to determine the consistency of its activities affecting Virginia's coastal resources or coastal uses under the Virginia Coastal Resources Management Program (CRMP).

This document represents an analysis of project activities in light of established Virginia CRMP Enforceable Policies and Programs. Furthermore, submission of this consistency determination reflects the commitment of the Army to comply with those Enforceable Policies and Programs. The proposed project would be constructed and operated in a manner that is consistent with the Virginia CRMP. The Army has determined that the construction of the proposed school facility would have a negligible impact on any land and water uses or natural resources of the Commonwealth of Virginia's coastal zone.

1. Description of Proposed Action

Fairfax County Public Schools (FCPS) proposes to construct a new elementary school on the U.S. Army Garrison Fort Belvoir, Virginia. The Proposed Action would include:

- Construction of a new 92,254 square foot school building
- Improvements to the existing Fort Belvoir Elementary School (FBES)

As of September 2013, there were 1,518 elementary age students who reside within the boundaries of Ft. Belvoir. The existing FBES has a program capacity of 1,102 which has resulted in a Fort Belvoir elementary age student capacity deficit of 416 students. The current enrollment of students at Fort Belvoir is 1,133 students, which is about 75 percent of the number of total elementary students living on-Post. The remaining 25 percent of elementary aged children living on-Post, or 385 students, are attending schools off-Post at twelve different existing FCPS facilities. The four existing schools in the area which house the majority of the Fort Belvoir off-post students are beginning to experience capacity deficits. Based upon current FCPS projections, these four schools will suffer from overcrowded conditions similar to FBES within the next five years (FCPS 2013). Therefore, FCPS seeks to meet the educational needs of the Fort Belvoir elementary school age population by eliminating projected capacity deficits of educational space and providing for the

unique special needs of military children. FCPS seeks to meet this need on the installation through the construction of the proposed public elementary school.

The new school will be built on existing play fields located to the west of the existing FBES, which is the location of the former Cheney Elementary School. The project site is located on Fort Belvoir's North Post, northeast of the intersection of Meeres Road and Woodlawn Road. The proposed building will have a design capacity of 492 students. The combination of the new building and appropriate modifications to the existing FBES building will create an available capacity of nearly 1,600 (K-6) students. The proposed school will contain four kindergarten classrooms, three classrooms each for grades 1 through 3, two classrooms each for grades 4 and 5, and three classrooms for grade 6. The design will be compliant with the Virginia Collaborative for High Performing Schools (CHPS) Sustainable Standards which were developed by FCPS and incorporate Leadership in Energy and Environmental Design (LEED) elements.

Stormwater management for the new FBES will be required to meet the recently enacted Virginia stormwater management regulations, Section 438 of the 2007 Energy Independence and Security Act (EISA), and the Executive Council of the Chesapeake Bay Program Directive 01-1, *Managing Stormwater on State, Federal and District-owned Lands and Facilities*. Although FCPS has not yet designed the stormwater best management practices (BMP), a suite of potential Low Impact Development (LID) practices, as well as retrofits for the existing extended detention pond, could be utilized to meet the requirements of stormwater management. These BMPs include:

- Pond retrofit with sediment forebay, extended detention pools, and planting
- Bioretention basins/filters
- Stepped pool outfalls
- Green roof
- Rainwater cistern
- Pervious pavement
- Bioswales

FCPS proposes to reconfigure the existing school bus loop and combine it with the new school. Additionally, renovations will be made to the existing school building to address Anti-Terrorism Force Protection (ATFP) deficiencies. Renovations will involve upgrades to the exterior walls, installation of structural bollards along the existing facility, and the control of bus and vehicular traffic with automatic gates.

2. Assessment of Probable Effects

In compliance with the National Environmental Policy Act of 1969, Fort Belvoir has prepared an Environmental Assessment (EA) to evaluate the environmental impacts potentially resulting from the proposed new school and renovations. Through this evaluation, Fort Belvoir has determined

that the proposed action is consistent, to the maximum extent practicable, with the Commonwealth of Virginia CRMP's enforceable policies, for the following reasons:

Fisheries Management: The proposed action has little potential to affect fisheries, either directly or indirectly. Retrofits to the existing stormwater pond may temporarily impact habitat within the intermittent stream connected to the pond at its outfall, but such impacts are likely to be minimal as this stream is highly incised and degraded. If FCPS chooses to incorporate stepped pool outfalls as a stormwater BMP, some minor indirect impact could occur to downstream fisheries habitat due to sedimentation during construction. Compliance with state and federal stormwater (see Non-point Source Pollution Control below) requirements and policy would assure minimal impacts to water quality. Additionally, addressing erosion concerns within this highly incised stream would likely result in positive long-term effects downstream by reducing future sediment transport. Effects on stormwater are addressed in Section 3.4.3 of the EA, while effects on surface and ground water resources are presented in Section 3.9.3.

Erosion and Sedimentation Controls: Strict measures consistent with the *Virginia Erosion and Sediment Control Handbook* would be used to minimize adverse effects to other resources, particularly water quality during construction. Such measures are addressed in Section 3.9.2 of the EA.

Subaqueous Lands Management: The project would be located in subwatershed 32 which has an area of 300 acres, or approximately 0.5 square mile. The Commonwealth of Virginia regulates subaqueous lands where the watershed is greater than five square miles as well as tidal waters; therefore, the proposed action would not encroach on any regulated subaqueous lands.

Wetlands Management: As described in Section 3.9.3 of the EA, there are no vegetated wetlands within the project area. Therefore, the project would have no impact on vegetated wetlands; however, depending upon the final post-construction stormwater design, the project could impact the intermittent and ephemeral watercourses downstream of the existing stormwater management pond. If impacts to these jurisdictional waters of the U.S. will occur, Fort Belvoir Directorate of Public Works Environmental and Natural Resources Division (DPW ENRD) will permit the activity through coordination with the U.S. Army Corps of Engineers (USACE) and the Virginia Department of Environmental Quality (VDEQ) as appropriate. It is expected that unavoidable impacts would be permitted through the USACE Nationwide Permit program. If impacts to the jurisdictional waters of the U.S. would exceed 300 linear feet, compensatory mitigation would be provided as appropriate and approved by the regulatory agencies.

Dune Management: The proposed action has no potential to affect sand dunes; therefore, the EA does not include an evaluation of this resource.

Non-Point Source Pollution Control: The proposed action would result in an approximate 4 ac increase impervious area of the site, thereby increasing the potential for non-point pollution.

Effects from construction stormwater discharge will be minimized through the implementation of erosion and sediment control measures consistent with the Virginia Erosion and Sediment Control Handbook (Section 3.9.2 of the EA). Stormwater from construction sites is managed through the Virginia Stormwater Management Program (VSMP), administered by VDEQ. Any construction activity such as clearing, grading, and excavation that is greater than 2,500 sq ft requires a VSMP permit. A Stormwater Pollution Prevention Plan will be prepared by the contractor for the proposed action.

Post-construction stormwater management for the existing FBES is currently met by a pond facility located behind the existing building. The addition of the new school will increase the impervious area onsite, requiring additional post-construction stormwater controls. Stormwater design has not yet been completed by FCPS; however, various regulations and policies will dictate the potential stormwater BMPs that will be implemented. Stormwater control for the site will need to meet the new VSMP regulations that take effect in mid-2014. Also applicable, Section 438 of the 2007 Energy Independence and Security Act (EISA) requires federal development projects with a footprint exceeding 5,000 square feet to include site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow, which would also act to control non-point source pollution. Fort Belvoir also complies with the Executive Council of the Chesapeake Bay Program Directive 01-1, *Managing Stormwater on State, Federal and District-owned Lands and Facilities* to control nutrient, sediment, and chemical contaminants in runoff from its developed sites. Fort Belvoir does this by following to the extent practicable the Fairfax County Chesapeake Preservation Ordinance, Chapter 118 of the Fairfax County Code.

These stormwater requirements suggest that a suite of potential Low Impact Development (LID) practices, as well as retrofits for the existing extended detention pond, could be utilized to meet the requirements of stormwater management. These BMPs include measures listed in Section 1. Implementation of these measures will minimize the effects of non-point pollution post-construction.

Point Source Pollution Control: No new sanitary or industrial point sources would result from the proposed action. Therefore, point source pollution control is not evaluated in the EA.

Shoreline Sanitation: The proposed action does not involve discharges from vessels or sanitary septic systems. Such discharges are not evaluated in the EA.

Air Pollution Control: A construction emissions estimate indicates that the construction activity would not generate sufficient emissions to trigger a need for a full General Conformity Analysis. No changes to the Fort Belvoir's Title V air permit would be required. The construction contractor will be required to follow VAC 5-50-60, Control and Abatement Air Pollution. The impacts of the proposed action on air quality would be minimal, and are discussed in Section 3.7 of the EA.

3. Summary of Findings

The preceding analysis is provided in more detail in the EA referenced above. Fort Belvoir would ensure that: the elementary school project design includes appropriate BMPs; the construction contractor uses and maintains appropriate BMPs; project designers obtain the requisite permits and approvals; tree replacement or other approved out of kind mitigation is performed in accordance with *Fort Belvoir Policy Memorandum #27, Tree Removal and Protection*, and FCPS implements the mitigation measures proposed in the EA. With the proposed mitigation measures, Fort Belvoir finds that the proposed construction, renovation, and operation of FCPS facilities would be consistent to the maximum extent practicable with the federally-approved enforceable policies of the Virginia CRMP, pursuant to the Coastal Zone Management Act of 1972, as amended, and in accordance with 15 CFR 930.30.

By certification that the Proposed Action is consistent with the Virginia CRMP Enforceable Policies, the Commonwealth of Virginia is hereby notified that it has 60 days from receipt of this document to concur with, or object to, this Federal Consistency Determination. However, pursuant to 15 CFR 930.62(b), if the Commonwealth of Virginia has not issued a decision within 60 days of receipt of this determination, it shall notify Fort Belvoir of the status of this matter and the basis for further delay. Point of contact is:

Mr. Patrick McLaughlin
Chief, Environmental and Natural Resources Division, Directorate of Public Works
703.806.4007
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FOR **Gregory D. Gadson**
Colonel, U.S. Army
Garrison Commander

Appendix B

Record of Non-Applicability

RECORD OF NON-APPLICABILITY

In Accordance with the Clean Air Act – General Conformity Rule For
Fort Belvoir Elementary School Expansion, Fort Belvoir, Virginia

May 21, 2014
[month day]

Fairfax County Public Schools (FCPS) proposes to construct a new public elementary school on Fort Belvoir. The Proposed Action includes:

- Constructing a two-story, 92,254 sq ft elementary school building with paved play areas on the former Cheney Elementary School site.
- Constructing staff and visitor parking areas and a bus loop that will connect to the bus loop for the existing Fort Belvoir Elementary School.
- Constructing stormwater Best Management Practices (BMPs) in accordance with applicable state and federal regulations and policies.
- Renovating the existing Fort Belvoir Elementary School to address Anti-Terrorism/Force Protection (ATFP) deficiencies).

General Conformity under the Clean Air Act, Section 176 has been evaluated according to the requirements of Title 40 of the Code of Federal Regulations Part 93, Subpart B. The requirements of this rule are not applicable to the action because:

The highest total annual direct and indirect emissions from this Proposed Action have been estimated at 8.13 tons of nitrogen oxides (NO_x), 1.01 tons of volatile organic compounds (VOCs), 0.44 tons of very fine particulate matter ($PM_{2.5}$), and 0.63 tons of sulfur dioxide (SO_2) per year, which would be below the applicability threshold values of 50 tons VOCs and 100 tons for NO_x, $PM_{2.5}$, and SO_2.

Supported documentation and emission estimates:

(X) Are attached
( ) Appear in the National Environmental Policy Act documentation
( ) Other (not necessary)

FOR Steph J. Rankin, Deputy

Gregory D. Gadson
Colonel, U.S. Army
Garrison Commander

EMISSIONS ESTIMATIONS AND METHODOLOGY

May 2014

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Emissions Estimations and Methodology

U.S. Army Garrison Fort Belvoir has considered the net emissions generated from all of the direct and indirect sources of air pollutants that are reasonably foreseeable. Direct emissions represent all emissions that are caused or initiated by the Federal Action and occur at the same time and place as the action. Indirect emissions represent those foreseeable emissions caused by the action that the Federal agency has practical control over but occur at a later time or a different location from the action itself. Specifically, project-related emissions at the Fort Belvoir school expansion include:

- **Construction Emissions.** Construction emissions are the result of the exhaust from non-road equipment (bulldozers, graders, scrapers), worker commute vehicles, vendor vehicles, the release of volatile organic compounds (VOCs) from architectural coatings, adhesives, and asphalt paving, and fugitive dust from surface disturbance.
- **Operational Emissions.** Operational emissions are the result of the operation of heating boilers and an emergency back-up generator (not large enough to be subject to major new source review); the operation of buses and private motor vehicles; the consumption of utilities such as electricity and water; and the generation of waste such as wastewater and municipal solid waste.

The proposed action would result in the construction of a new 92,254-square-foot elementary school building with a program capacity of 492 students and the renovation of the existing building to meet Anti-Terrorism/Force Protection (ATFP) requirements. Construction emissions are generated by estimating the equipment use for the site preparation, grading, utility installment, building construction, asphalt paving, and architectural coating activities associated with the proposed facilities. Construction of the new building is anticipated to begin in January 2015 and continue through March 2016 with the building being occupied in September 2016. The upgrades to the existing school are anticipated to begin in June 2016 and continue through October 2016. Table 1 identifies the construction scheduled used in the analysis. A summary of construction emission are included in Table 2.

Table 1: Construction Schedule

Construction Phase	# of Days	Start Date	End Date
New School Construction			
Site Preparation	5	1/1/2015	1/7/2015
Grading	15	1/8/2015	1/28/2015
Building Construction	260	1/29/2015	1/27/2016
Paving	5	1/29/2015	2/4/2015
Architectural Coating	80	12/1/2015	3/25/2016
Existing School Upgrade			
Building Construction	60	6/1/2016	9/30/2016
Architectural Coating	40	7/1/2016	9/30/2016

Table 2: Construction Emissions Summary

Year	Emissions (tpy)						MT
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
2015	7.03	8.13	0.53	0.44	0.63	1.01	450.14
2016	5.10	1.61	0.09	0.08	0.12	0.21	126.46
Phase	**Emissions (tons/construction phase)**						**MT**
	CO	**NO_X**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOC**	**CO_2e**
2015							
New Building Emissions							
Site Preparation							
Heavy Equipment	0.104	0.192	0.006	0.005	0.018	0.021	5.90
Worker/Vendor Trip Emissions	0.012	0.001	0.000	0.000	0.000	0.001	1.24
Total	0.116	0.193	0.006	0.005	0.018	0.022	7.15
Grading							
Heavy Equipment	0.279	0.504	0.073	0.065	0.046	0.055	15.00
Worker/Vendor Trip Emissions	0.029	0.003	0.000	0.000	0.000	0.002	3.11
Fugitive Dust	N/A	N/A	0.064	0.032	N/A	N/A	N/A
Total	0.308	0.507	0.137	0.097	0.046	0.057	18.11
Building Construction							
Heavy Equipment	3.394	6.277	0.329	0.297	0.553	0.749	161.43
Worker/Vendor Trip Emissions	1.958	0.990	0.052	0.035	0.002	0.165	254.73
Total	5.352	7.267	0.381	0.332	0.555	0.915	416.16
Paving							
Heavy Equipment	0.042	0.118	0.005	0.005	0.010	0.008	3.38
Worker/Vendor Trip Emissions	0.013	0.001	0.000	0.000	0.000	0.001	1.38
Paving Offgassing	0.004	N/A	N/A	N/A	N/A	N/A	N/A
Total	0.058	0.119	0.005	0.005	0.010	0.009	4.77
Architectural Coating							
Heavy Equipment	0.028	0.047	0.003	0.002	0.005	0.005	1.41
Worker/Vendor Trip Emissions	0.024	0.002	0.000	0.000	0.000	0.002	2.54
VOC Offgassing	1.142	N/A	N/A	N/A	N/A	N/A	N/A
Total	1.194	0.049	0.003	0.002	0.005	0.007	3.95
2016							
New Building Emissions							
Building Construction							
Heavy Equipment	0.283	0.523	0.027	0.025	0.046	0.062	13.45
Worker/Vendor Trip Emissions	0.163	0.083	0.004	0.003	0.000	0.014	21.23
Total	0.446	0.606	0.032	0.028	0.046	0.076	34.68

Table 2: Construction Emissions Summary

Phase	Emissions (tons/construction phase)						MT
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Architectural Coating							
Heavy Equipment	0.075	0.123	0.007	0.006	0.014	0.014	3.74
Worker/Vendor Trip Emissions	0.064	0.006	0.001	0.000	0.000	0.004	6.75
VOC offgassing	3.028	N/A	N/A	N/A	N/A	N/A	N/A
Total	3.168	0.129	0.008	0.007	0.014	0.018	10.49
Building Upgrade							
Building Construction							
Heavy Equipment	0.234	0.538	0.032	0.029	0.046	0.064	10.73
Worker/Vendor Trip Emissions	0.490	0.248	0.013	0.009	0.001	0.041	63.68
Total	0.724	0.786	0.045	0.038	0.047	0.105	74.42
Architectural Coating							
Heavy Equipment	0.049	0.081	0.004	0.004	0.009	0.009	2.45
Worker/Vendor Trip Emissions	0.042	0.004	0.001	0.000	0.000	0.003	4.42
VOC offgassing	0.670	N/A	N/A	N/A	N/A	N/A	N/A
Total	0.762	0.085	0.005	0.004	0.009	0.012	6.88

*Totals may not add exactly due to rounding.

Operational activities will result from the heating of the building, the operation of the new generator, and the operation of the 10 additional buses, and vehicle trips associated with new faculty and parent drop-offs. For Greenhouse Gas emissions, additional operational sources include electrical consumption, water consumption, and waste and wastewater generation. The following Proposed Action specific data was provided for each of these categories. A summary of operational emission are included in Table 3.

- Mobile sources: 82 staff vehicles, 10 buses, and 87 parent vehicles for drop-off/pick-up, using the assumption that 17.68 percent of the new students are driven by parents. This assumes that, in keeping with the current statistics, 8 percent of new students will walk, and 81.43 percent of the remaining (or bus eligible) students actually ride the bus. The analysis assumes a 183-day school year. The entire bus fleet is diesel. Each staff member is assumed to make one round trip per day while buses and parents are assumed to make two round trips per day. A thirty-mile round trip is used for staff and buses. Bus routes on Ft. Belvoir average 5.2 miles, therefore the remaining 24.8 miles accounts for travel to and from the bus garage. Parent vehicles assume a 6-mile round trip. Average vehicle speed is assumed at 25 miles per hour (mph) to accommodate on post and off-post speeds.[1] Buses will idle while students are entering and leaving the bus, therefore idling emissions were included in the analysis using an assumption of one hour of idling time per day for every bus.

[1] While there is potential to have greater on-post and off-post speeds, the use of 25 mph results in higher emission factors and therefore a more conservative emissions estimate.

- Natural gas: 1,510 MBH proposed usage, and 4,012 MBH heating usage = total 5,522 MBH annual natural gas usage. In addition a new natural gas back-up generator at 35 KW (48 horsepower [hp]) will be installed.
- Electrical consumption: design load is estimated to be 1,566 kW with an expected annual consumption of 626 kWh.
- Water consumption: 1,192,726 gal/year indoor, 3,067,010 gal/year outdoor.
- Wastewater generation: Waste water is assumed at 90 percent of indoor water consumption.
- Waste generation: Trash is two dumpsters emptied three times per week with recycling also resulting in two dumpsters emptied three times per week. Municipal Solid waste is estimated at 200 lbs per cubic yard, and recycling is estimated at 178 lbs per cubic yard. At 183 days per school year, there are approximately 37 weeks of school.

Table 3: Operational Emissions

	Emissions (tons/year)						MT
Source	**CO**	**NO_X**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOC**	**CO_2e**
Mobile Sources	3.778	1.950	0.203	0.125	0.004	0.528	459.79
Natural Gas Usage	<0.000	0.001	<0.000	<0.000	<0.000	<0.000	0.29
Generator	0.008	0.005	N/A	N/A	N/A	N/A	1.01
Electricity	N/A	N/A	N/A	N/A	N/A	N/A	533.85
Water/Waste Water	N/A	N/A	N/A	N/A	N/A	N/A	29.22
Solid Waste	N/A	N/A	N/A	N/A	N/A	N/A	21.31
Total	3.787	1.956	0.203	0.125	0.004	0.528	1,045.48

*Totals may not add exactly due to rounding.

1.0 HEAVY CONSTRUCTION EQUIPMENT

Pollutant emissions for the Proposed Action result from activities associated with the construction of the new school building, the upgrading of the existing facility, and the redesign of the parking lots and bus/parent drop-off loop. Typical construction activities would include the clearing of the land, grading, building construction (including laying utilities), architectural coatings and adhesives, and paving.

Construction emissions result from the use of various non-road pieces of equipment, generators, vendor trucks, and worker commuting vehicles. Table 4 details the construction equipment and worker/vendor trip information used in the analysis. Assumptions for type of equipment used, number of pieces, hours of operation per day, horse power, load factor, and number of worker trips and vendor trips per day were taken from the California Emissions Estimator Model (CalEEMod)

(California Air Pollutant Control Officers Association [CAPCOA], 2013)[2] default assumptions for projects of a similar nature. Miles per trip and average speed were taken from Ft. Belvoir default values as provided.

Table 4: Construction Equipment

Construction Phase	#	hrs/ day	hp	load factor	Worker Trips	Vendor Trips	Miles/ trip	Average Speed
New Building								
Site Preparation:					18	0	30	35
Rubber Tired Dozer	3	8	255	0.40				
Tractors/loaders/backhoes	4	8	97	0.37				
Grading					15	0	30	35
Excavator	1	8	162	0.38				
Graders	1	8	174	0.41				
Rubber tired dozers	1	8	255	0.40				
Tractors/loaders/backhoes	3	8	97	0.37				
Water truck	1	2	400	0.38				
Building Construction					39	15	30	35
Cranes	1	7	226	0.29				
Forklifts	3	8	89	0.20				
Generator Sets	1	8	84	0.74				
Tractors/loaders/backhoes	3	7	97	0.37				
Welders	1	8	46	0.45				
Paving					20	0	30	35
Pavers	2	8	125	0.42				
Paving Equipment	2	8	130	0.36				
Rollers	2	8	80	0.38				
Architectural Coating					8	0	30	35
Air Compressor	1	6	78	0.48				
Building Upgrade								
Building Construction					39	15	30	35
Cranes	1	7	226	0.29				
Forklifts	1	8	89	0.20				
Welders	1	8	46	0.45				
Architectural Coating					8	0	30	35
Air Compressor	1	6	78	0.48				

[2] California Air Pollutant Control Officers Association 2013. *California Emissions Estimator Model Version 2013 2.2.*

Emissions from onsite construction equipment were estimated based on the projected construction activity schedule, number of pieces of equipment, equipment load factors and horse power, hours per day of operation, and respective emissions factors for the pollutants. Emissions factors were obtained from the South Coast Air Quality Management District (SCAQMD) California Environmental Quality Act (CEQA) Air Quality Handbook (SCAQMD, 1993)[3] and South Coast Air Quality Management District's URBEMIS2007 Software User's Guide (SCAQMD, 2007)[4]. Table 5 details the emission factors used for the construction equipment.

Table 5: Construction Equipment Emission Factors

Construction Equipment by phase	Emission Factors						
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2
	(lbs/hp-hr)[1]						gr/hp-h[2]
Site Preparation:							
Rubber Tired Dozer	0.010	0.021	0.001	<0.000	0.002	0.002	335.60
Tractors/loaders/backhoes	0.015	0.022	0.001	0.001	0.002	0.003	312.85
Grading							
Excavator	0.011	0.024	0.015	0.014	0.002	0.001	324.22
Graders	0.008	0.021	0.001	0.001	0.002	0.003	346.97
Rubber tired dozers	0.010	0.021	0.001	<0.000	0.002	0.002	335.60
Tractors/loaders/backhoes	0.015	0.022	0.001	0.001	0.002	0.003	312.85
Water truck	0.020	0.024	0.002	0.001	0.002	0.003	324.22
Building Construction							
Cranes	0.009	0.023	0.002	0.001	0.002	0.003	244.60
Forklifts	0.013	0.031	0.002	0.001	0.002	0.003	170.64
Generator Sets	0.011	0.018	0.001	0.001	0.002	0.002	420.92
Tractors/loaders/backhoes	0.015	0.022	0.001	0.001	0.002	0.003	312.85
Welders	0.011	0.018	0.001	0.001	0.002	0.002	255.97
Paving							
Pavers	0.007	0.023	0.001	0.001	0.002	0.001	352.66
Paving Equipment	0.010	0.024	0.001	0.001	0.002	0.002	301.47
Rollers	0.007	0.020	0.001	0.001	0.002	0.002	318.53
Architectural Coating							
Air Compressor	0.011	0.018	0.001	0.0009	0.002	0.002	273.03
Building Upgrade							
Building Construction							
Cranes	0.009	0.023	0.002	0.001	0.002	0.003	244.60
Forklifts	0.013	0.031	0.002	0.001	0.002	0.003	170.64

[3] SCAQMD 1993. *CEQA Air Quality Handbook.* April 1993.

[4] SCAQMD 2007. *Software User's Guide: URBEMIS2007 for Windows version 9.2. November 2007.*

Table 5: Construction Equipment Emission Factors

Construction Equipment by phase	Emission Factors						
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2
	(lbs/hp-hr)[1]						gr/hp-h[2]
Welders	0.011	0.018	0.001	0.001	0.002	0.002	255.97
Architectural Coating							
Air Compressor	0.011	0.018	0.001	0.001	0.002	0.002	273.03

[1] SCAQMD 1993

[2] SCAQMD 2007

Emissions per phase for each piece of equipment were determined using the following equation. Table 6 summarizes the construction emissions by year.

$$TPY_P = (T_h \times (HP \times LF) \times EF_P \times N \times D)/C1$$

Where:

TPY_P = tons per year of pollutant
T_h = time (hours per day of operation)
HP = horsepower
LF = Load Factor
EF_P = Emission Factor for the given pollutant (lbs/hp-h)
N = Number of pieces of equipment
D = Days of use of equipment in a given year
C1 = Conversion from lbs to tpy (2,000)

A sample calculation for construction equipment for CO from the use of the grader on this Proposed Action:

$$TPY_{CO} = (T_h \times (HP \times LF) \times EF_{co} \times N \times D)/C1$$

$$TPY_{CO} = (8 \times (174 \times 0.41) \times 0.008 \times 1 \times 15)/2000$$

$$TPY_{CO} = 68.486/2000$$

$$TPY_{CO} = 0.034$$

Table 6: Annual Construction Equipment Emissions

Year	Emissions (tpy)						MT[1]
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
2015	3.85	7.14	0.42	0.37	0.63	0.84	187.13
2016	0.64	1.27	0.07	0.06	0.11	0.15	30.38

[1] Metric tons are determined by multiplying short tons per year by 0.9072

2.0 CONSTRUCTION WORKER AND VENDOR VEHICLE EMISSIONS

Emissions from the commute trips for construction workers and construction vendor trucks were included in the analysis. Emission factors were taken from California Environmental Protection Agency, Air Resources Board (CARB) EMFAC2011-PL and EMFAC2011-SG databases.[5] Table 7 details the emission factors used in the analysis.

Table 7: Construction Trip Emission Factors

Year	Emissions Factors[1,2]						
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Worker Commute Emissions							
g/mile	3.956	0.373	0.051	0.024	0.004	0.254	460.774
Lbs/mile[3]	0.009	0.001	<0.000	<0.000	<0.000	0.001	1.016
Vendor Trip Emissions							
g/mile	6.163	7.351	0.303	0.236	0.010	0.729	1160.553
Lbs/mile[3]	0.014	0.016	0.001	0.001	<0.000	0.002	2.559

[1] CARB, 2013a. EMFAC2011-PL Module updated January 2013; CARB 2013b. EMFAC2011-SG Module updated January 2013.

[2] Pounds per mile were determined by multiplying grams per mile by 0.002 (grams per pound conversion).

Worker commute and vendor trip emissions for each phase were determined using the following equation. Table 8 summarizes the annual construction worker commute emissions by year and construction phase. Table 9 summarizes the annual construction emissions from vendor trips.

$$\mathbf{TPY_P = (M \times EF_P)/C1}$$

Where:

TPY_P = tons per year of pollutant

M = miles as determined by number of days per phase (Table 1), time # trips per phase and miles per trip (Table 4).

EF_P = Emission Factor for the given pollutant (lbs/hp-h)

C1 = Conversion from lbs to tpy (2,000)

A sample calculation for CO worker commute emissions from the grading phase CO on this Proposed Action:

$$\mathbf{TPY_{CO} = (M \times EF_{co})/C1}$$

$$TPY_{CO} = (6{,}750 \text{ miles} \times 0.009)/2000$$

$$TPY_{CO} = 60.75/2{,}000$$

$$TPY_{CO} = 0.03$$

[5] Due to the difference in emission factors resulting from California vehicle regulations and non-California vehicle regulations, the emissions factors for vehicles from 2009 were used to present a conservative emissions analysis.

Where:

M = number of days x number of trips per phase x miles per trip
M= 15 x 15 x 30
M = 6,750

Table 8: Annual Worker Commute Emissions

Phase	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2
	(tons/phase)						(MT/phase[1])
2015							
New Construction							
Site Preparation:	0.012	0.001	0.000	0.000	0.000	0.001	1.244
Grading	0.029	0.003	0.000	0.000	0.000	0.002	3.110
Building Construction	1.225	0.115	0.016	0.007	0.001	0.079	129.386
Paving	0.013	0.001	0.000	0.000	0.000	0.001	1.382
Architectural Coating	0.024	0.002	0.000	0.000	0.000	0.002	2.543
2016							
New Construction							
Building Construction	0.102	0.010	0.001	0.001	0.000	0.007	10.782
Architectural Coating	0.064	0.006	0.001	0.000	0.000	0.004	6.746
Building Upgrade							
Building Construction	0.306	0.029	0.004	0.002	0.000	0.020	32.346
Architectura l Coating	0.042	0.004	0.001	0.000	0.000	0.003	4.423

*Values presented in the table may not match the sample exactly due to rounding.
[1] Metric tons are determined by multiplying short tons per year by 0.907

Table 9: Annual Vendor Trip Emissions

Phase	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2
	(tons/phase)						(MT/phase[1])
2015							
Building Construction	0.734	0.875	0.036	0.028	0.001	0.087	125.340
2016							
New Construction							
Building Construction	0.061	0.073	0.003	0.002	0.000	0.007	10.445
Building Upgrade							
Building Construction	0.183	0.219	0.009	0.007	0.000	0.022	31.335

[1] Metric tons are determined by multiplying short tons per year by 0.907

3.0 CONSTRUCTION ARCHITECTURAL COATING AND ADHESIVE EMISSIONS

Emissions from architectural coating are based on the total square footage to be built and the estimated square footage of the existing building to be remodeled. The area to be painted was based on the default values in the CalEEMod model (CAPCOA, 2013) for the new building and extrapolated areas for the renovation of the existing building. It is assumed that one coat of primer and two coats of paint would be used for both interior and exterior of both buildings. For the new building it was assumed that 184,508 square feet would be primed and painted and for the existing building it was assumed that 59,965 square feet would be primed and painted. The area requiring water proofing and gymnasium floor sealants, along with the traffic striping for parking lot and cross walk were determined from the detailed cost estimate[6] for the proposed action. The square footage requiring waterproofing is 99,900 square feet and it requires two coats. The gymnasium floor area is 5,152 square feet, and the sealant requires only one coat. Total coverage area for traffic striping is 3,500 square feet and requires only 1 coat.

Emissions from adhesives are based on the area of coverage for the type of flooring or roofing needing adhesives. These areas were determined from the detailed cost estimate[7] for the proposed action. All adhesives require only one coat. Total area of carpet padding that would be covered by adhesive is estimated at 653 square feet[8]. Total area of carpet adhesive coverage required is 10,450

[6] Fairfax County Public Schools (FCPS). 2013. Updated Project Proposal under Program for Construction, Renovation, Repair or Expansion of Public Schools Located on Military Installations. December 5, 2013.

[7] FCPS 2013

[8] Carpet pad adhesive is applied in a random pattern used to tack down the padding and is not applied over the whole floor area. Therefore, area for adhesive coverage for padding is assumed at 1/16th of the total floor area to be carpeted.

feet, total area of the carpet. Vinyl tile will be used over approximately 75,052 square feet of the building. Adhesive coverage for the gymnasium floor padding is estimated at 322 square feet[9] while adhesive coverage for the gymnasium floor itself is estimated at 5,152 square feet. Total adhesive coverage area for ceramic tile is estimated at 1,600 square feet, the total area to be tiled. Adhesive is applied to all areas of the roof that will not be metal. The total area of non-metal roofing is 4,330 square feet.

The following equation was used to determine VOC emissions painting activities. Table 10 summarizes the tons per year of VOCs anticipated from the construction and renovation activities.

$$\mathbf{TPY_{VOC} = (EF_g \times G \times N)/C1}$$

Where:

TPY_{VOC} = tons per year of VOCs

EF_g = Emission factors for VOCs in paint (2.09 lbs/gallon). Emission factor is based on 250 g/L for VOCs, which is the U.S. Environmental Protection Agency (EPA) default[10]

G = Number of gallons needed. Based on coverage rates of 350 square feet per gallon for paint and 200 square feet per gallon for primer[11]

N = Number of coats

C1 = Conversion from lbs to tpy (2,000)

A sample calculation for architectural coating for the primer of the newly constructed building on this Proposed Action:

$$\mathbf{TPY_{VOC} = (EF_g \times G \times N)/C1}$$
$$TPY_{VOC} = (2.09 \times 923 \times 1)/2{,}000$$
$$TPY_{VOC} = (1{,}929.07)/2{,}000$$
$$TPY_{VOC} = 0.96$$

Where:

G = 184,508 square feet/200 square feet per gallon

G = 923 gallons

[9] Gymnasium floor pad adhesive is applied in a random pattern used to tack down the padding and is not applied over the whole floor area. Therefore, area for adhesive coverage for padding is assumed at 1/16th of the total gymnasium floor.

[10] CAPCOA 2013. *California Emissions Estimator Model Version 2013 2.2*.

[11] LOWE's 2014. Paint Calculator. http://www.lowes.com/cd_Paint+Calculator_1352225126183_ (Accessed February 26, 2014).

Table 10: Architectural Coating and Adhesive Emissions

Source	EF_g	G	N	VOC (lbs)	VOC (tons)
New Building:					
Wall primer	2.09	923	1	1,925	0.96
Wall painting	2.09	527	2	2,200	1.10
Wall waterproofing[1]	3.34	666	1	2,223	1.11
Traffic striping[2]	1.25	3	1	3	<0.00
Gym floor sealant[3]	2.92	7	2	43	0.02
Gym floor pad adhesive[4,5]	2.09	59	1	123	0.06
Gym floor adhesive[4,6]	1.25	103	1	129	0.06
Carpet pad adhesive[4,5]	2.09	119	1	249	0.12
Carpet adhesive[4,7]	1.25	105	1	131	0.07
Vinyl tile adhesive[4,7]	2.09	469	1	979	0.49
Ceramic tile adhesive[4,7]	1.08	32	1	35	0.02
Roof adhesive primer[4,8]	2.09	72	1	151	0.08
Roof adhesive[4,8]	2.09	72	1	151	0.08
Total					4.17
Existing Building					
Primer	2.09	300	1	626	0.31
Painting	2.09	171	2	715	0.36
Total					0.67

[1] Waterproofing sealant (3.34 lbs/gallon) Emission factor is based on Ozone Transport Commission requirement of 400 g/L for VOCs. (VEXCON 2013). Waterproofing sealant based on coverage rate of 150 square feet per gallon. (Thompson's WaterSeal. 2014)

[2]. Traffic striping (1.25 lbs/gallon). Emission factor based on EPA default requirements of 150 g/L for VOCs. (EPA 1998). Traffic striping based on coverage rate of 1,350 square feet per gallon. (Trantex Incorporated. 2014.)

[3] Gymnasium floor sealant (2.92 lbs/gallon). Emission factor based on Ozone Transport Commission requirement of 350 g/L for VOCs. Gymnasium floor sealant based on coverage rate of 700 square feet per gallon. (Athletic Business 2009).

[4.] Gymnasium floor pad adhesive, vinyl tile adhesive, carpet s pad adhesive, roof adhesive primer, and roof adhesive (2.09 lbs/gallon). Emissions based on EPA default requirements of 250 g/L. Carpet adhesive and gymnasium floor adhesive (1.25 lbs/gallon). Emissions based on EPA default requirements of 150 g/L. Ceramic tile adhesive (1.08 lbs/gallon). Emission based on EPA default requirement of 130 g/L. (EPA 2008).

[5] Gymnasium floor pad and carpet pad adhesive based on coverage rate of 5.47 square feet per gallon. (Henkel Corporation, 2012).

[6] Gymnasium floor adhesive based on coverage rate of 50 square feet per gallon (Robbins Sports Surfaces 2012).

[7] Carpet floor adhesive based on coverage rate of 100 square feet per gallon. Vinyl tile adhesive based on coverage rate of 160 square feet per gallon. Ceramic tile adhesive based on 50 square feet per gallon. (PSC 2014)

[8] Roof adhesive primer and roof bonding based on coverage rate of 60 square feet per gallon. (Best Materials LLC. 2014)

*Values presented in the table may not match the sample exactly due to rounding.

4.0 ASPHALT CURING

Asphalt paving would result in emissions from the operation of the paving equipment, the worker commute trips, as well as the VOC offgasing from the curing process. Paving equipment emissions and worker commute trips have already been analyzed under sections 1 and 3 above. Therefore, this section deals only with the VOC emissions from the curing process. The following equation was used to determine VOC emissions asphalt curing.

$$\mathbf{TPY_{VOC} = (EF_A \times A)/C1}$$

Where:

TPY_{VOC} = tons per year of VOCs
EF_A = Emission factor in lbs VOC/acre = 2.46 lbs VOC/acre[12]
A = Area paved 2.12 acres.[13]
C1 = Conversion from lbs to tpy (2,000)

VOC emissions from asphalt curing for the project are:

$$\mathbf{TPY_{VOC} = (EF_A \times A)/C1}$$
$$TPY_{VOC} = (2.46 \times 2.12)/2{,}000$$
$$TPY_{VOC} = 0.003$$

5.0 FUGITIVE EMISSIONS

Emissions of fugitive dust are based on the area graded and the hours of soil movement. Emissions equations were taken from the CalEEMod User Guide (SCAQMD, 2011)[14]. Grading emissions are the actual grading of the disturbed, the fugitive dust emitted from the grader moving soil onsite. In addition to the grader operation, "grading" activities also include bulldozer or tractor/loader activities where soil is physically moved from one location onsite to another.

The following equations were used to determine PM_{10} and $PM_{2.5}$ emissions grading.

$$\mathbf{TPY_P = (VMT \times EF_P \times D)/C1}$$

Where:

TPY_P = tons per year of PM_{10} or $PM_{2.5}$
VMT = Vehicle Miles traveled. Determined by:

[12] SCAQMD 1993. *CEQA Air Quality Handbook*. April 1993
[13] Fairfax County Public Schools (FCPS). 2013. Updated Project Proposal under Program for Construction, Renovation, Repair or Expansion of Public Schools Located on Military Installations. December 5, 2013.
[14] South Coast Air Quality Management District 2011. *California Emissions Estimator Model Version 2011.1 User's Guide.* February 2011.

$= ((A/W) \times SF)/F_M)$
$= ((8/12) \times 43{,}560)/5{,}280$
$= 5.5$

Where:

A = area graded in acres = 8[15]
W = width of the blade in feet = 12 = default value
SF = square feet per acre = 43,560
F_M = feet per mile = 5,280

EF_P = Emission factor in lbs for PM_{10} or $PM_{2.5}$

$EF_{PM10} = EF_{PM15} \times F_{PM10}$
$= 0.75 \times 0.6$
$= 0.45$

$EF_{PM2.5} = EF_{TSP} \times F_{PM2.5}$
$= 5.37 \times 0.03$
$= 0.16$

Where:

$EF_{PM15} = 0.015 \times S^2$
$EF_{PM15} = 0.015 \times (7.1)^2$
$EF_{PM15} = 0.76$
F_{PM10} = Scaling factor for PM_{10} = 0.6
S = mean vehicle speed = 7.1 (default value)
$EF_{TSP} = 0.04 \times S^{2.5}$
$EF_{TSP} = 0.04 \times (7.1)^{2.5}$
$EF_{TSP} = 5.37$
$F_{PM2.5}$ = Scaling factor for $PM_{2.5}$ = 0.03

D = Number of Days of Grading (project specific value of 15)
C1 = Conversion from lbs to tpy (2,000)

PM_{10} emissions from grading for the project are:

$$TPY_{PM10} = (VMT \times EF_{PM10} \times D)/C1$$
$$TPY_{PM10} = (5.5 \times 0.45 \times 15)/2{,}000$$
$$TPY_{PM10} = 0.02$$

$PM_{2.5}$ emissions from grading for the project are:

$$TPY_{PM2.5} = (VMT \times EF_{PM2.5} \times D)/C1$$
$$TPY_{PM2.5} = (5.5 \times 0.167 \times 15)/2{,}000$$
$$TPY_{PM2.5} = 0.007$$

[15] Based on Estimate from Google Earth.

The following equations were used to determine PM_{10} and $PM_{2.5}$ emissions from onsite soil movement.

$$\mathbf{TPY_P = (EF_P \times hr \times D)/C1}$$

Where:

TPY_P = tons per year of PM_{10} or $PM_{2.5}$

EF_P = Emission factor in lbs for PM_{10} or $PM_{2.5}$

$EF_{PM10} = EF_{PM15} \times F_{PM10}$

$= 1 \times 0.75$

$= 0.75$

$EF_{PM2.5} = EF_{TSP} \times F_{PM2.5}$

$= 3.94 \times 0.11$

$= 0.43$

Where:

$EF_{PM15} = (C_{PM15} \times S^{1.5})/M^{1.4}$

$EF_{PM15} = (1 \times 6.9^{1.5})/(7.9)^{1.4}$

$EF_{PM15} = 1.00$

C_{PM15} = arbitrary coefficient used by AP-42 = 1

S = material silt content (percent) = 6.9

M = material moisture content (percent) 7.9

F_{PM10} = Scaling factor for PM_{10} = 0.75

$EF_{TSP} = (C_{PM15} \times S^{1.5})/M^{1.4}$

$EF_{TSP} = (5.7 \times 6.9^{1.2})/(7.9)^{1.3}$

$EF_{TSP} = 3.94$

C_{TSP} = arbitrary coefficient used by AP-42 = 5.7

$F_{PM2.5}$ = Scaling factor for $PM_{2.5}$ = 0.11

hr = hours per day (project specific default value of 8)

D = Number of Days of Grading (project specific value of 15)

C1 = Conversion from lbs to tpy (2,000)

PM_{10} emissions from soil movement for the Proposed Action are:

$$TPY_{PM10} = (EF_{PM10} \times hr \times D)/C1$$
$$TPY_{PM10} = (0.75 \times 8 \times 15)/2{,}000$$
$$TPY_{PM10} = 0.05$$

$PM_{2.5}$ emissions from soil movement for the Proposed Action are:

$$TPY_{PM2.5} = (EF_{PM2.5} \times hr \times D)/C1$$
$$TPY_{PM2.5} = (0.43 \times 8 \times 15)/2{,}000$$
$$TPY_{PM2.5} = 0.03$$

6.0 NATURAL GAS EMISSIONS

The school is assumed to be adequately heated and has additional natural gas usage as well. Total annual natural gas usage for the school is estimated at 5,522 MBH or 5,522,000 BTU per year. Emission factors are presented in lbs/million cubic feet. There are 1,020 BTU per cubic foot of natural gas, which means the Proposed Action uses 5,413.73 cubic feet annually. Emission factors were taken from EPA AP-42, Section 1.4.[16] The following equation is used to determine emissions from natural gas usage. Table 11 shows the emissions and emission factors for the natural gas consumption of the Proposed Action.

$$\mathbf{TPY_P = (EF_P \times M_{CF/y})/C_P}$$

Where:

TPY_P = tons per year of the pollutant
EF_P = Emission factor in lbs per million cubic feet
$M_{CF/Y}$ = million cubic feet per year (project specific value = 0.005)
C_P = Conversion from lbs to tpy (2,000) or lbs to MT/y (2,204.62)

A sample calculation for CO emissions from the combustion of natural gas for the Proposed Action:

$$\mathbf{TPY_{CO} = (EF_{CO} \times M_{CF/y})/C_{CO}}$$
$$TPY_{CO} = (84 \times 0.005)/2{,}000$$
$$TPY_{CO} = 0.0002$$

Table 11: Annual Natural Gas Emissions

	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2
Emission Factor (lbs/ 10^6 cubic feet)	84	100	7.6	7.6	0.6	5.5	120000
lbs/year	0.455	0.541	0.041	0.041	0.003	0.030	649.647
tons/year	<0.000	<0.000	<0.000	<0.000	<0.000	<0.000	N/A
Metric tons/year	N/A	N/A	N/A	N/A	N/A	N/A	0.295

*Values presented in the table may not match the sample exactly due to rounding.

The operation of a natural gas generator onsite would also result in emissions of criteria pollutants and carbon dioxide equivalents from the combustion of natural gas. The generator would be used as an emergency back-up power source and therefore would have limited hours of operation. Typical hours of operation are estimated at a maximum of 50 hours per year. The 50 hours represents approximately 6 to 10 hours annually for testing and maintenance with the remaining

[16] USEPA 1995. Compilation of Air Pollutant Emission Factors Volume I: Stationary Point and Area Sources. January 1995.

40 to 44 hours of actual emergency operation. The generator is 35 KW (48 hp). There are limited emissions from natural gas generators, and the analysis focuses on NO_X, CO, and CO_2 emissions.

The following equation is used to determine emissions from natural gas consumption by the generator.

$$\mathbf{tpy_P = ((U \times EF_P)/C1)/ C_P}$$

Where:

TPY_P = tons per year of the pollutant
U = Usage either kW-h/year or hp-hr/year. Project specific values = 1750 kW-h/year and 2400 hp-hr/year.
EF_P = Emission factor in g/kW-hr or g/hp-hr
C1 = 453.59 g/lb.
C_P = Conversion from lbs to tpy (2,000) or lbs to MT/y (2,204.62)

CO emissions from the combustion of natural gas for the Proposed Action's emergency generator:

$$\mathbf{Tpy_{CO} = ((U \times EF_{CO})/C1)/C_{CO}}$$
$$Tpy_{CO} = ((1750 \times 4.4 \text{ g/kW-hr})/453.59)/2000$$
$$Tpy_{CO} = 7700/453.59/2000$$
$$Tpy_{CO} = 0.008$$

NO_X emissions from the combustion of natural gas for the Proposed Action's emergency generator:

$$\mathbf{Tpy_{NOX} = ((U \times EF_{NOX})/C1)/C_{NOX}}$$
$$Tpy_{NOX} =((1750 \times 2.7 \text{ g/kW-hr})/453.59)/2000$$
$$Tpy_{NOX} = 4724/453.59/2000$$
$$Tpy_{NOX} = 0.005$$

CO_2 emissions from the combustion of natural gas for the Proposed Action's emergency generator:

$$\mathbf{Tpy_{CO2} = ((U \times EF_{CO2})/C1)/C_{CO2}}$$
$$Tpy_{CO2} = ((2400 \times 420.92 \text{ g/hp-hr})/453.59)/2204.62$$
$$Tpy_{CO2} = 1{,}010{,}208/453.59/2204.62$$
$$Tpy_{CO2} = 1.01$$

7.0 OPERATIONAL VEHICLE TRAFFIC

Emissions from commute trips for school staff, trips for buses transporting students to and from school, and for parents dropping off and picking up students will result in pollutant emissions and therefore were included in the analysis. Emission factors were taken from California Environmental Protection Agency, Air Resources Board (CARB) EMFAC2011-PL and EMFAC2011-SG databases.[17]. Table 12 details the emission factors used in the analysis.

Table 12: Operational Trip Emission Factors

Year	Emissions Factors[1,2]						
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2e
Bus Emissions							
gr/mile	2.966	11.830	1.337	0.856	0.012	0.760	1,321.344
lbs/mile	0.007	0.026	0.003	0.002	<0.000	0.002	2.913
gr/hr	45.272	107.275	2.398	2.206	0.063	7.323	6,636.445
lbs/hr	0.100	0.237	0.005	0.005	<0.000	0.016	14.631
Staff Commute Emissions							
gr/mile	4.179	0.389	0.051	0.024	0.004	0.355	463.473
lbs/mile	0.009	0.001	<0.000	<0.000	<0.000	0.001	1.022
Parent Commute							
g/mile	5.956	0.517	0.053	0.025	0.004	1.162	485.065
Lbs/mile	0.013	0.001	<0.000	<0.000	<0.000	0.003	1.069

[1] CARB, 2013a. EMFAC2011-PL Module updated January 2013; CARB 2013b. EMFAC2011-SG Module updated January 2013.

[2] Pounds per mile were determined by multiplying grams per mile by 0.002 (grams per pound conversion).

Annual Operational trip emissions were determined using the following equation. Table 13 summarizes the tons per year emissions by vehicle type and pollutant.

$$\mathbf{TPY_P = (M_C \times EF_P)/C_P}$$

Where:

TPY_P = tons per year of pollutant

M_C = miles as determined by: $D \times V_C \times T_C \times M_t$

$M_{bus} = 183 \times 10 \times 4 \times 15 = 109{,}800$

$M_{staff} = 183 \times 82 \times 2 \times 15 = 450{,}180$

$M_{parent} = 183 \times 148 \times 4 \times 3 = 325{,}008$

[17] Due to the difference in emission factors resulting from California vehicle regulations and non-California vehicle regulations, the emissions factors for vehicles from 2009 were used to present a conservative emissions analysis.

D = number of days per year = Project Specific value = 183

V_c = number of vehicles per vehicle class = Project specific values = 10 buses, 82 staff, 87 parents

$T_{C=}$ number of trips per vehicle per class = Project specific values = 4 for buses and parents, 2 for staff

M_t = miles per trip where a trip is a one-way trip = Project specific values = 15 for buses and staff and 3 for parents

EF_P = Emission Factor for the given pollutant (lbs/mile)

C_P = Conversion from lbs to tpy (2,000) or lbs to MT/y (2,204.62)

A sample calculation for CO emissions from staff vehicles for the Proposed Action:

$$\mathbf{TPY_{CO} = (M_C \times EF_{CO})/C_{CO}}$$

$$TPY_{CO} = (450{,}180 \times 0.009)/2{,}000$$

$$TPY_{CO} = 2.03$$

Annual bus idling emissions were determined using the following equation. Emissions for bus idling are included in Table 13 in tons per year.

$$\mathbf{TPY_P = (H_{bus} x\ EF_P)/C_P}$$

Where:

TPY_P = tons per year of pollutant

H_{bus} = hours per year as determined by: D x V_C x H_d

H_{bus} = 183 x 10 x 1 = 1,830

D = number of days per year = Project Specific value = 183

V_c = number of vehicles per vehicle class = Project specific values = 10 buses

$H_=$ number of hours idling per day = 1 for each bus

EF_P = Emission Factor for the given pollutant (lbs/hr)

C_P = Conversion from lbs to tpy (2,000) or lbs to MT/y (2,204.62)

A sample calculation for CO emissions from bus idling for the Proposed Action is as follows:

$$\mathbf{TPY_{co} = (H_{bus} x\ EF_P)/C_P}$$

$$TPY_{CO} = (1{,}830 \times 0.1000)/2{,}000$$

$$TPY_{CO} = 0.09$$

Table 13: Annual Operational Trip Emissions

Source	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2
	tons/year						MT/year
Bus (total)	0.450	1.648	0.167	0.108	0.002	0.107	173.315
running	0.359	1.432	0.162	0.104	0.001	0.092	145.084
idling	0.091	0.216	0.005	0.004	0.000	0.015	13.387
Staff	2.074	0.193	0.026	0.012	0.002	0.176	208.647
Parent	1.254	0.109	0.011	0.005	0.001	0.245	92.673

*Values presented in the table may not match the sample exactly due to rounding.

8.0 EMISSIONS FROM ELECTRICITY CONSUMPTION

Indirect Greenhouse Gas (GHG) emission result from the consumption of electricity. GHG emissions from electricity are based on the carbon intensity factor for electricity with respect to each of the GHGs, the annual usage, and the global warming potential of each GHG. The analysis focuses on three main GHGs: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O). In order to combine emissions to a single number the emissions for each GHG must be multiplied by their global warming potential. The global warming potential for CO_2 is 1, for CH_4 is 21, and for N_2O is 310 (CCAR, 2009).[18] Multiplying the emissions by their global warming potential allows total emissions to be presented as a single number in terms of carbon dioxide equivalents (CO_2e). Emission factors for the GHGs were taken from the California Climate Action Registry's *General Reporting Protocols (*CCAR 2009). Annual demand is estimated at 626 kW annually with a consumption of 1,021.022 MWh/year. Annual GHG emissions from electricity consumption were determined using the following equation. This equation was taken from SCAQMD, 2011.

$$\text{MT } CO_2e=[(MWH \times EF_{CO2}) + (MWH \times EF_{CH4} \times GWP_{CH4}) + (MWH \times EF_{N2O} \times GWP_{N2O})]/C1$$

Where:

MT CO_2e = metric tons per year of carbon dioxide equivalents
MWH = Consumption in annual megawatt hours = Project Specific based on 626 kW max demand for 9 hours per day and 183 days per year and 1 megawatt hour per 1000 kW hours = 1,031.022

EF_{CO2} = 1134.88[19] lbs/MWH CO_2
EF_{CH4} = 0.0238[20] lbs/MWH CH_4
EF_{N2O} = 0.0198[21] lbs/MWH N_2O

[18] California Climate Action Registry. 2009. *General Reporting Protocol Version 3.1.* January 2009
[19] California Climate Action Registry. 2009. *General Reporting Protocol Version 3.1.* January 2009
[20] California Climate Action Registry. 2009. *General Reporting Protocol Version 3.1.* January 2009
[21] California Climate Action Registry. 2009. *General Reporting Protocol Version 3.1.* January 2009

C1 = conversion from lbs to metric tons = 2,204.62

CO_2 emissions from the consumption of electricity at the Proposed Action:

$$\mathbf{MT\ CO_2e = [(MWH \times EF_{CO2}) + (MWH \times EF_{CH4} \times GWP_{CH4}) + (MWH \times EF_{N2O} \times GWP_{N2O})]/C1}$$

$$MT\ CO_2e = [(1{,}031.022 \times 1134.88) + (1{,}031.022 \times 0.0238 \times 21) + (1{,}031.022 \times 0.0198 \times 310)]/2{,}204.62$$

$$MT\ CO_2e = [1{,}170{,}086.2 + 515.305 + 6{,}328.413]/2{,}204.62$$

$$MT\ CO_2e = 1{,}176{,}929.9$$

$$MT\ CO_2e = 533.85$$

9.0 EMISSIONS FROM ELECTRICAL CONSUMPTION DUE TO WATER CONSUMPTION

Indirect Greenhouse Gas (GHG) emission result from the consumption of electricity resulting from obtaining water supply, treating the water supply, distribution of the water supply, and wastewater treatment. GHG emissions from electricity are based on the carbon intensity factor for electricity with respect to each of the GHGs, the annual water consumption, and the global warming potential of each GHG. Emission factors for the GHGs were taken from CCAR, 2009. Annual water demand is estimated at 4.259736 million gallons. The estimate water consumption and energy rates were taken from the CalEEMod Model (CAPCOA, 2013). Annual GHG emissions from electricity use due to water supply were determined using the following equation for each segment of the water supply. These equations were taken from the South Coast Air Quality Management District's CalEEMod Model's User's Guide (SCAQMD, 2011).

$$\mathbf{MT\ CO_2e =[(MG \times E_S \times IF_{CO2}) + ((MG \times E_S \times IF_{CH4}) \times GWP_{CH4}) + ((MG \times E_S \times IF_{N2O}) \times GWP_{N2O})]/C1}$$

Where:

$MT\ CO_2e$ = metric tons per year of carbon dioxide equivalents
MG = Consumption in millions of gallons = Project Specific = 4.26
E_S = Energy rate for the Water Segment = Project Specific:
- E_{is} Energy rate for water supply = 5,922 kWhr/MG
- E_{it} Energy rate for water treatment = 111 kWhr/MG
- E_{id} Energy rate for water distribution = 1,272 kWhr/MG
- E_{is} Energy rate for wastewater treatment = 1,911 kWhr/MG

IF_{CO2} = 1.13 lbs/kWh
IF_{CH4} = 0.0000238 lbs/kWh
IF_{N2O} = 0.0000198 lbs/kWh
GWP_{CH4} = 21
GWP_{N2O} = 310
C1 = conversion from lbs to metric tons = 2,204.62

CO_2 emissions from the electricity consumption for water supply for the Proposed Action:

$$\mathbf{MT\ CO_2e = [(MG \times E_{iS} \times IF_{CO2}) + ((MG \times E_{iS} \times IF_{CH4}) \times GWP_{CH4}) + ((MG \times E_{iS} \times IF_{N2O}) \times GWP_{N2O})]/C1}$$

$$MT\ CO_2e = [(4.26 \times 5{,}922 \times 1.13) + (4.26 \times 5{,}922 \times 0.0000238 \times 21) + (4.259736 \times 5{,}922 \times 0.0000198 \times 310)]/2204.62$$

$$MT\ CO_2e^{22} = [28{,}628.66 + 12.61 + 154.84]/2204.62$$

$$MT\ CO_2e^{23} = 13.062$$

CO_2 emissions from the electricity consumption for water treatment for the Proposed Action:

$$\mathbf{MT\ CO_2e = [(MG \times E_{it} \times IF_{CO2}) + ((MG \times E_{it} \times IF_{CH4}) \times GWP_{CH4}) + ((MG \times E_{it} \times IF_{N2O}) \times GWP_{N2O})]/C1}$$

$$MT\ CO_2e = [(4.26 \times 111 \times 1.13) + (4.26 \times 111 \times 0.0000238 \times 21) + (4.259736 \times 111 \times 0.0000198 \times 310)]/2204.62$$

$$MT\ CO_2e^{24} = [536.61 + 0.24 + 2.9]/2204.62$$

$$MT\ CO_2e^{25} = 0.25$$

CO_2 emissions from the electricity consumption for water distribution for the Proposed Action:

$$\mathbf{MT\ CO_2e = [(MG \times E_{id} \times IF_{CO2}) + ((MG \times E_{id} \times IF_{CH4}) \times GWP_{CH4}) + ((MG \times E_{id} \times IF_{N2O}) \times GWP_{N2O})]/C1}$$

$$MT\ CO_2e = [(4.26 \times 1{,}272 \times 1.14) + (4.26 \times 1{,}272 \times 0.0000238 \times 21) + (4.259736 \times 1{,}272 \times 0.0000198 \times 310)]/2204.62$$

$$MT\ CO_2e^{26} = [6{,}149.22 + 2.71 + 33.26]/2204.62$$

$$MT\ CO_2e^{27} = 2.81$$

CO_2 emissions from the electricity consumption for wastewater treatment for the Proposed Action:

$$\mathbf{MT\ CO_2e = [(MG \times E_{iw} \times IF_{CO2}) + ((MG \times E_{iw} \times IF_{CH4}) \times GWP_{CH4}) + ((MG \times E_{iw} \times IF_{N2O}) \times GWP_{N2O})]/C1}$$

$$MT\ CO_2e = [(4.26 \times 1{,}911 \times 1.14) + (4.26 \times 1{,}911 \times 0.0000238 \times 21) + (4.26 \times 1{,}911 \times 0.0000198 \times 310)]/2204.62$$

$$MT\ CO_2e^{28} = [9{,}238.33 + 4.07 + 49.97]/2204.62$$

$$MT\ CO_2e^{29} = 4.22$$

[22] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

[23] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

[24] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

[25] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

[26] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

[27] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

[28] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

10.0 EMISSIONS FROM WASTEWATER GENERATION

Indirect Greenhouse Gas (GHG) emissions result from the treatment of wastewater generated by the project. Wastewater is assumed to be predominantly by anaerobic lagoon treatment styles. Anaerobic digester emissions also result in the generation of GHG measures and from nitrous oxide in the water already. Wastewater is estimated at 90 percent of all indoor water usage. Indoor water usage for the Proposed Action was estimated at 1.19 million gallons annually. Therefore, approximately 1.07 million gallons represents the Proposed Action's wastewater generation. Of the wastewater generated, approximately 3.52 percent is treated by anaerobic digesters, and the remainder is assumed to be treated through lagoons. All equations and default values for wastewater treatment were taken from the South Coast Air Quality Management District's CalEEMod Model's User's Guide (SCAQMD, 2011).

Annual GHG emissions from wastewater treatment used the following equation for anaerobic lagoons.

$$\textbf{MT } CO_2e = [WW \times BOD \times C1 \times (1-FP) \times Bo \times MCFa \times FR \times C2] \times GWP_{CH4}$$

Where:

MT CO_2e = metric tons per year of carbon dioxide equivalents
WW = liters of waste water = Project Specific = 3,920,429.51
BOD = Concentration of BOD in mg/liter = 200 (default value)
C1 = kg/mg conversion factor = 0.000001
FP = fraction of BOD removed in primary treatment = 0 (default value)
Bo = kg CH4/kg BOD removed = 0.6 (default value)
MCFa = CH4 correction factor for anaerobic systems = 0.8 (default value)
Fr = Fraction of overall lagoon BOD removed from performance = 1 (default value)
C2 = MT/kg conversion factor = 0.001
GWP_{CH4} = global warming potential for methane = 21

CO_2 emissions from anaerobic lagoon wastewater treatment for the Proposed Action:

$$\textbf{MT } CO_2e = [WW \times BOD \times C1 \times (1-FP) \times Bo \times MCFa \times FR \times C2] \times GWP_{CH4}$$

$$\text{MT } CO_2e = [3{,}920{,}429.51 \times 200 \times 0.000001 \times 1 \times 0.6 \times 0.8 \times 1 \times 0.001]\ 21$$

$$\text{MT } CO_2e = [0.376] \times 21$$

$$\text{MT } CO_2e = 7.90$$

[29] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

Annual GHG from wastewater treatment used the following equation for Anaerobic digesters.

$$\mathbf{MT\ CO_2e = [WW \times DG \times F_{CH4} \times P_{CH4} \times (1\text{-}DE) \times C1 \times C2] \times GWP_{CH4}}$$

Where:

MT CO_2e = metric tons per year of carbon dioxide equivalents
WW = gallons waste water = Project Specific = 37,786
DG = cubic feet of biogas per gallon of water = 0.01 (default value)
F_{CH4} = fraction of CH_4 in biogas = 0.65 (default value)
P_{CH4} = g/m^3 density of CH_4 at standard conditions = 662 (default value)
DE = destruction efficiency of CH_4 = 0.99 (default value)
C1 = m^3/ft^3 conversion = 0.0283
C2 = MT/kg conversion factor = 0.001
GWP_{CH4} = global warming potential for methane = 21

CO_2 emissions from anaerobic digester wastewater treatment for the Proposed Action:

$$\mathbf{MT\ CO_2e = [WW \times DG \times F_{CH4} \times P_{CH4} \times (1\text{-}DE) \times C1 \times C2] \times GWP_{CH4}}$$

MT CO_2e = [37,786 x 0.01 x 0.65 x 662x (1-0.99) x 0.0283 x 0.001] 21

MT CO_2e = [0.046] x 21

MT CO_2e = 0.97

Annual GHG from wastewater treatment used the following equation for nitrous oxide in the water.

$$\mathbf{MT\ CO_2e = [WW \times C1 \times N \times EF \times C2] \times GWP_{N2O}}$$

Where:

MT CO_2e = metric tons per year of carbon dioxide equivalents
WW = liters of waste water = Project Specific = 3,920,429.5100
C1 = kg/mg conversion factor = 0.000001
N = mg/liter of nitrogen in water = 40 (default value
EF = kg N_2O/kg N = 0.0005
C2 = MT/kg conversion factor = 0.001
GWP_{N2O} = global warming potential for nitrous oxide = 310

CO_2 emissions from the nitrous oxide in wastewater for the Proposed Action:

$$\mathbf{MT\ CO_2e = [WW \times C1 \times N \times EF \times C2] \times GWP_{CH4}}$$

MT CO_2e = [3,920,429.5100 x 0.000001 x 40 x 0.0005 x 0.001] 310

MT CO_2e = [0.00008] x 310

MT CO_2e[30] = 0.024

[30] Calculations will not be exact due to rounding of intensity factors and consumption to two or three significant figures presented in this document.

11.0 EMISSIONS FROM SOLID WASTE

Indirect GHG emission result from the collection and treatment of solid waste. Fugitive methane emissions from the land fill along are also determined in this analysis. The Proposed Action will result in four additional dumpsters, two for trash and two for recycling, all of which will be emptied three times per week. It is estimated that the dumpsters will hold 8 cubic yards. Estimating 200 lbs/cubic yard for weight of the solid municipal waste, approximately 177.6 tons of waste will be generated every year. The emissions equations were taken from the EPA *Solid Waste Management and Greenhouse Gases: A Life-cycle Assessment of Emissions and Sinks, 3rd Edition*. September 2006 (EPA, 2006). Emission factors and other variables were taken from either EPA 2006 or the California Climate Action Registry's *General Reporting Protocols (*CCAR 2009).

Annual GHG from fugitive methane used the following equation.

$$\mathbf{MT\ CO_2e = T \times EF_{CH4}}$$

Where:

MT CO_2e = metric tons per year of carbon dioxide equivalents
T = tons of solid waste per year = Project Specific = 177.6
EF_{CH4} = MT CO_2e from methane per ton of solid waste = 0.12 (default value)

CO_2 emissions from fugitive methane equals:

$$\mathbf{MT\ CO_2e = T \times EF_{CH4}}$$
$$MT\ CO_2e = 177.6 \times 0.12$$
$$MT\ CO_2e = 21.31$$

Exhaust methane emissions will result from the trash trucks. Typically with new land uses the exhaust from solid waste trucks would be included in the emissions inventory. However, as there is already existing solid waste pick-up at the site, there would be the potential for less than ¼ mile additional onsite traffic depending on where the new dumpsters are located. Therefore, additional exhaust emissions would be negligible and are not quantified as part of this analysis.

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Appendix C

Natural Resource Studies

Wetland Delineation Report
Belvoir Elementary School

Prepared for:

ATKINS
200 Daingerfield Road
Alexandria, VA 22314

PACIULLI SIMMONS & ASSOCIATES
Engineers
Planners
Surveyors
Landscape
Architects
Wetland
Specialists

December 2013

Executive Summary

Paciulli, Simmons & Associates, Ltd., (PSA) was contracted to delineate wetlands and other waters of the United States (WOUS) on a 20.4 acre study area identified as Belvoir Elementary School on Fort Belvoir. PSA used the routine methodology outlined in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Atlantic and Gulf Coastal Plain Regional Supplement (ACOE 2010) to determine potential boundaries of wetlands and WOUS.

PSA did not identify any wetlands in the study area. However, PSA identified two types of WOUS in and around the study area. Specifically, PSA found 264.0 linear feet (1553.3 square feet) of intermittent stream and 140.5 linear feet (602.2 square feet) of ephemeral stream. PSA recommends that the Army request a Jurisdictional Determination (JD) from the US Army Corps of Engineers (ACOE), Baltimore District. If the Army cannot avoid wetlands and WOUS during construction, PSA recommends obtaining a wetland permit from the appropriate regulatory authority. WOUS cannot be disturbed without a permit.

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B. Aerial Map
C. Wetland Delineation Map
D. Wetland Data Form
E. Site Photos

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Introduction

The purpose of this investigation is to identify wetlands and other waters of the United States (WOUS) that may be regulated under Section 404 of the Clean Water Act (33 USC 1344), Section 10 of the Rivers and Harbors Act (33 USC 403), or Title 62.1 of the Code of Virginia (Virginia Code 1950 §62.1 et seq). The US Army Corps of Engineers (ACOE) and the US Environmental Protection Agency (EPA) define wetlands as:

> *Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstance do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Federal Register 1980; 1982).*

Paciulli, Simmons and Associates, Ltd., (PSA) was contracted to delineate wetlands and other waters of the United States (WOUS) for the Belvoir Elementary School site at Fort Belvoir, Virginia.

The scope of services for the delineation was as follows:

1. Investigate the existing soil, vegetation, and hydrology of the study area to establish the wetland boundary, contingent upon ACOE approval. PSA marked wetland boundaries with surveyor flagging at intervals of no more than 50 feet.
2. Prepare a brief report, including data sheets, on the findings of office and field investigations.
3. Survey the wetland boundary flags and prepare a map of wetlands and other WOUS found in the study area.

Study Area

The Belvoir Elementary School study area is located on the North Post of Fort Belvoir and lies east of Woodlawn Road and north of Meeres Road. The site is accessed via Meeres Road. See the USGS and aerial Maps (Appendix A and B) for site location. PSA investigated a 20.4-acre study area to locate wetlands and other WOUS.

Hydrologic features on the site include a stormwater management area, intermittent stream and ephemeral streams. The remaining portions of the site consist of open fields, parking lots, the Belvoir Elementary School building facility and maintained lawn. Mapped soils are primarily Cut and fill, Urban land and Sassafras fine sandy loam (2-15% slopes). The site slopes gently from the southeast to the northwest. Steeper slopes are found along the edge of the forest located north and west of the existing building.

Methods

PSA used the routine methodology outlined in the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987) and the Atlantic and Gulf Coastal Plain Regional Supplement (ACOE 2010) to determine potential boundaries of wetlands and WOUS. The routine methodology defines wetlands as areas with a positive occurrence of three environmental characteristics: hydrophytic vegetation, wetland hydrology, and hydric soils.

PSA used a combination of office and on-site field investigations to locate wetlands on this site. PSA reviewed a soil survey of Fort Belvoir (Natural Resources Conservation Services (NRCS), unpublished) before the field visit to determine where hydric soils might occur. PSA also reviewed National Wetland Inventory (NWI) data, United States Geological Survey (USGS) topographic maps, hydrology data, and aerial photographs to locate potential wetland areas.

PSA employee Kevin Reilly performed site visits and field activities on November 8, 2013. PSA's detailed observations of vegetation, soils, and hydrology were recorded in a wetland data form (Appendix D) and used to delineate the boundaries of wetlands in the study area. PSA collected survey points using a professional survey crew.

Results and Discussion

Based on our office review of available data and field surveys of plant communities, soils, and hydrology, PSA believes the following wetlands and WOUS exist in the study area. Wetland and WOUS locations are shown on the wetland delineation map, Appendix C. Data points and representative photographs are provided in Appendix D and E.

No wetlands were identified on the site, however PSA found other WOUS.

> <u>Intermittent Stream (R4)</u>
> Approximately 264.0 linear feet (LF) of intermittent stream (R4) was identified. The stream begins at the outfall of a culvert from the stormwater management area located south of the stream. The stream receives hydrology from the stormwater management area as well as groundwater and sheet flow from surrounding uplands.
>
> <u>Ephemeral Stream (RE)</u>
> Approximately 140.5 linear feet (LF) of ephemeral stream (RE) was identified. The ephemeral streams are tributaries to the intermittent stream. The stream receives hydrology from surrounding uplands.
>
> Please refer to Perennial Flow Determination Report (Paciulli, Simmons & Associates, December 2013) for additional information regarding onsite streams.

PSA identified the remainder of the study area as uplands (Data Point 1, Appendix D). Upland areas include hardwood forest, turf grass, and developed areas. These non-wetland areas lack one or more of the positive indicators for wetland determination.

Conclusion

In summary, the majority of the study area is upland. One intermittent stream and two ephemeral streams were found in the study area. All potential WOUS are shown on the attached wetland delineation map (Appendix C).

This study is based on a field examination of the vegetation, soils, and hydrology of the study area, and available reference materials. Field indicators can change due to variations in hydrology and other factors. Therefore, these conclusions may not be consistent with future observations. This report assesses on-site wetlands at the time of the field investigation and does not address environmental conditions prior to PSA's site investigation, or future changes.

PSA prepared this report in accordance with generally accepted guidelines for conducting delineations of wetlands and other WOUS. PSA makes no other warranties, either expressed or implied, in this report. The findings of this report are not a recommendation to buy, sell, or develop the property in question. This report does not constitute a jurisdictional determination of the WOUS. A Jurisdictional Determination for this property can only be made by the ACOE and is subject to review by the EPA.

In order to impact jurisdictional wetlands or other WOUS, a wetland permit must be obtained under Sections 401 and 404 of the Clean Water Act (DEQ 2009). The type of WOUS and extent and type of impacts will determine the appropriate permit, mitigation, and permit fee. Wetland permits are generally obtained by submitting a Joint Permit Application to the ACOE, Virginia Department of Environmental Quality (DEQ) and the Virginia Marine Resource Commission (VMRC).

Recommendations

We recommend that a Jurisdictional Determination be requested from the ACOE, Baltimore District. If wetlands and other WOUS cannot be avoided during project planning, we recommend obtaining a wetland permit from the appropriate regulatory authority.

Kevin Reilly
Environmental Planner

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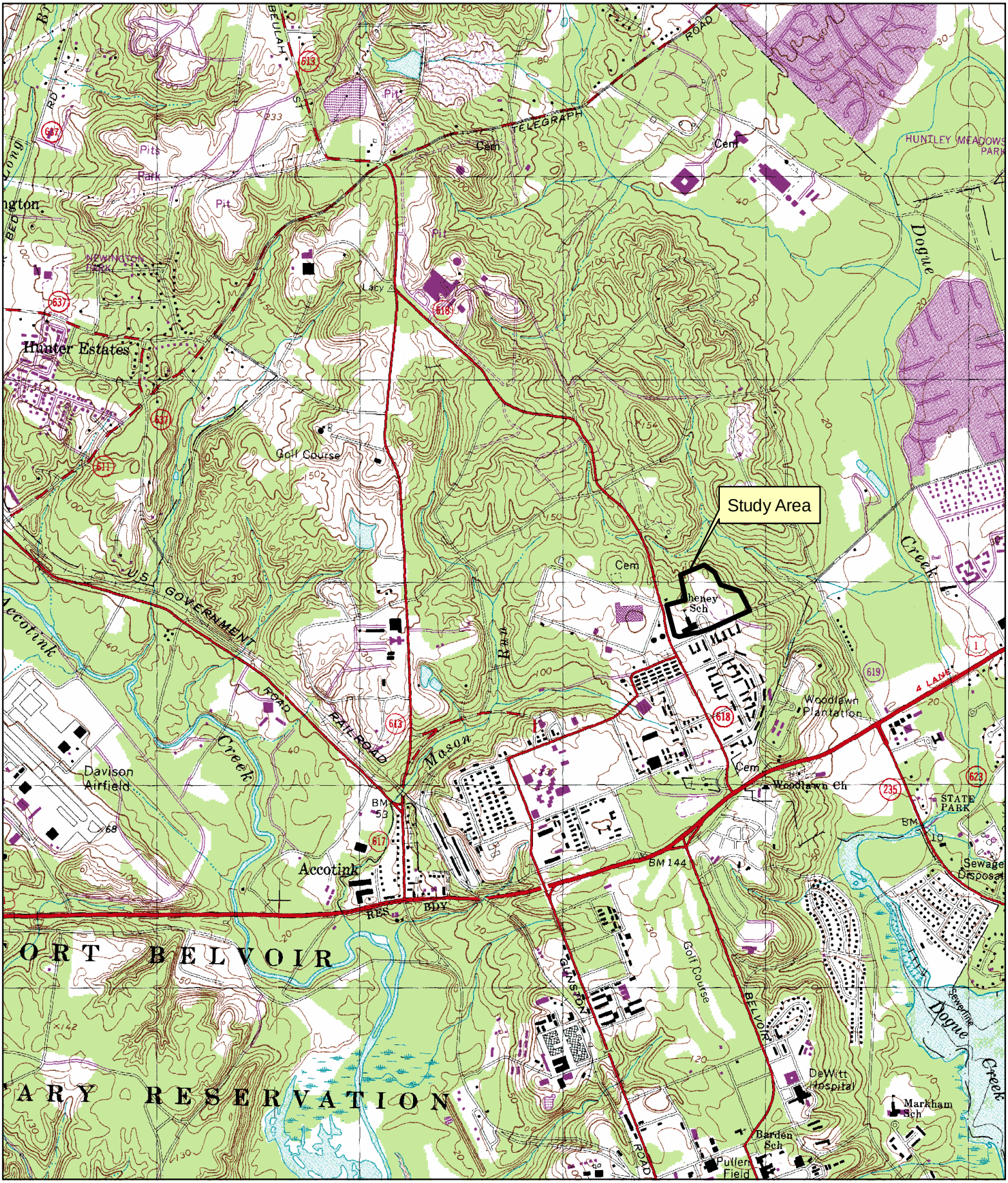
Appendix !

USGS Topographic Quad Map



0 1,000 2,000 Feet

Belvoir Elementary School
Fort Belvoir, VA

USGS QUAD MAP
FORT BELVOIR, VA-MD 1983

December 2, 2013

PACIULLI SIMMONS & ASSOCIATES

Appendix .

Aerial Map

0 250 500 Feet

Belvoir Elementary School
Fort Belvoir, VA

AERIAL MAP

December 2, 2013

PACIULLI SIMMONS & ASSOCIATES

Appendix I

Wetland Delineation

Belvoir Elementary School - Wetlands and WOUS

ID	Classification	Area (SF)	Linear Feet
Stream #1	Intermittent (R4)	1553.3	264
Stream #2	Ephemeral (RE)	563.4	131.8
Stream #3	Ephemeral (RE)	38.8	8.7

PACIULLI SIMMONS & ASSOCIATES
Established 1944

Engineering
Planning
Surveying
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Wetland Expertise
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Belvoir Elementary School
Fort Belvoir, Virginia

Wetland Delineation Map

Scale: 1"=70'
Date: 12/01/13
DRN: KMR
CKD: KMR
Sheet: 1 of 1
File No: F4608

Appendix D

Wetland Data Form

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: Belvoir Elementary City/County: Fairfax Sampling Date: 11-8-13

Applicant/Owner: Fort Belvoir State: VA Sampling Point: DP #1

Investigator(s): K. Reilly Section, Township, Range: _____

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR or MLRA): N. Coastal Plain 149A-s Lat: 38°43'21.054"N Long: 77°8'36.789"W Datum: NAD 83

Soil Map Unit Name: Cut and Fill NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** **Yes** _____ **No** ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ✓ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 2"

Wetland Hydrology Present? **Yes** ✓ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Receives hydrology from surrounding uplands, swales and culverts

VEGETATION (Four Strata) – Use scientific names of plants. Sampling Point: DP #1

Tree Stratum (Plot size: 15)	Absolute % Cover	Dominant Species?	Indicator Status
1. Platanus occidentalis; American sycamore	5	N	FACW
2. Acer rubrum; red maple	25	Y	FAC
3. Liquidambar styraciflua; sweetgum	20	Y	FAC
4. Nyssa sylvatica; blackgum	4	N	FAC
5.			
6.			
7.			
8.			
	54 = Total Cover		
50% of total cover: 27	20% of total cover: 10.8		

Sapling/Shrub Stratum (Plot size: 15)			
1. Acer rubrum; red maple	3	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	3 = Total Cover		
50% of total cover: 1.5	20% of total cover: .6		

Herb Stratum (Plot size:)			
1. Polygonum pensylvanicum; Pennsylvania smartweed	5	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	5 = Total Cover		
50% of total cover: 2.5	20% of total cover: 1		

Woody Vine Stratum (Plot size: 15)			
1. Smilax rotundifolia; greenbrier	3	Y	FAC
2.			
3.			
4.			
5.			
	3 = Total Cover		
50% of total cover: 1.5	20% of total cover: .6		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

✓ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks: (If observed, list morphological adaptations below).

Hydrophytic vegetation is present.

SOIL

Sampling Point: DP# 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1.5	10YR 3/2	99	10YR 4/6	1	C	M	Clay/loam	
1.5-6	7.5YR 4/6	100					Lmy/Clay	
6-13	10YR 5/6	97	2.5Y 6/3	3	C	M	Clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5)
___ Organic Bodies (A6) **(LRR P, T, U)**
___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
___ Muck Presence (A8) **(LRR U)**
___ 1 cm Muck (A9) **(LRR P, T)**
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Coast Prairie Redox (A16) **(MLRA 150A)**
___ Sandy Mucky Mineral (S1) **(LRR O, S)**
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Dark Surface (S7) **(LRR P, S, T, U)**
___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
___ Thin Dark Surface (S9) **(LRR S, T, U)**
___ Loamy Mucky Mineral (F1) **(LRR O)**
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Marl (F10) **(LRR U)**
___ Depleted Ochric (F11) **(MLRA 151)**
___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
___ Umbric Surface (F13) **(LRR P, T, U)**
___ Delta Ochric (F17) **(MLRA 151)**
___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
___ Anomalous Bright Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) **(LRR O)**
___ 2 cm Muck (A10) **(LRR S)**
___ Reduced Vertic (F18) **(outside MLRA 150A,B)**
___ Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
___ Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** ✓

Remarks: no evidence of hydric soils.

Appendix E

Site Photos

Culvert at headwaters of intermittent stream.

Downstream view of intermittent stream

Headwaters of ephemeral stream.

Downstream view of ephemeral stream.

Riser structure located in stormwater management area.

Data point #1, non-wetland.

Rouse Environmental Services

Environmental Consultation & Permitting

November 22, 2013

Paciulli, Simmons & Associates, Ltd.
3975 Fair Ridge Drive, Suite 300 South
Fairfax, Virginia 22033

Attn: Mr. Kevin Reilly

Subject: Project R13024, Habitat Suitability Assessment for *Isotria medeoloides* (Small Whorled Pogonia), Fort Belvoir Elementary School Expansion, Woodlawn and Meeres Roads, Fairfax County, Virginia.

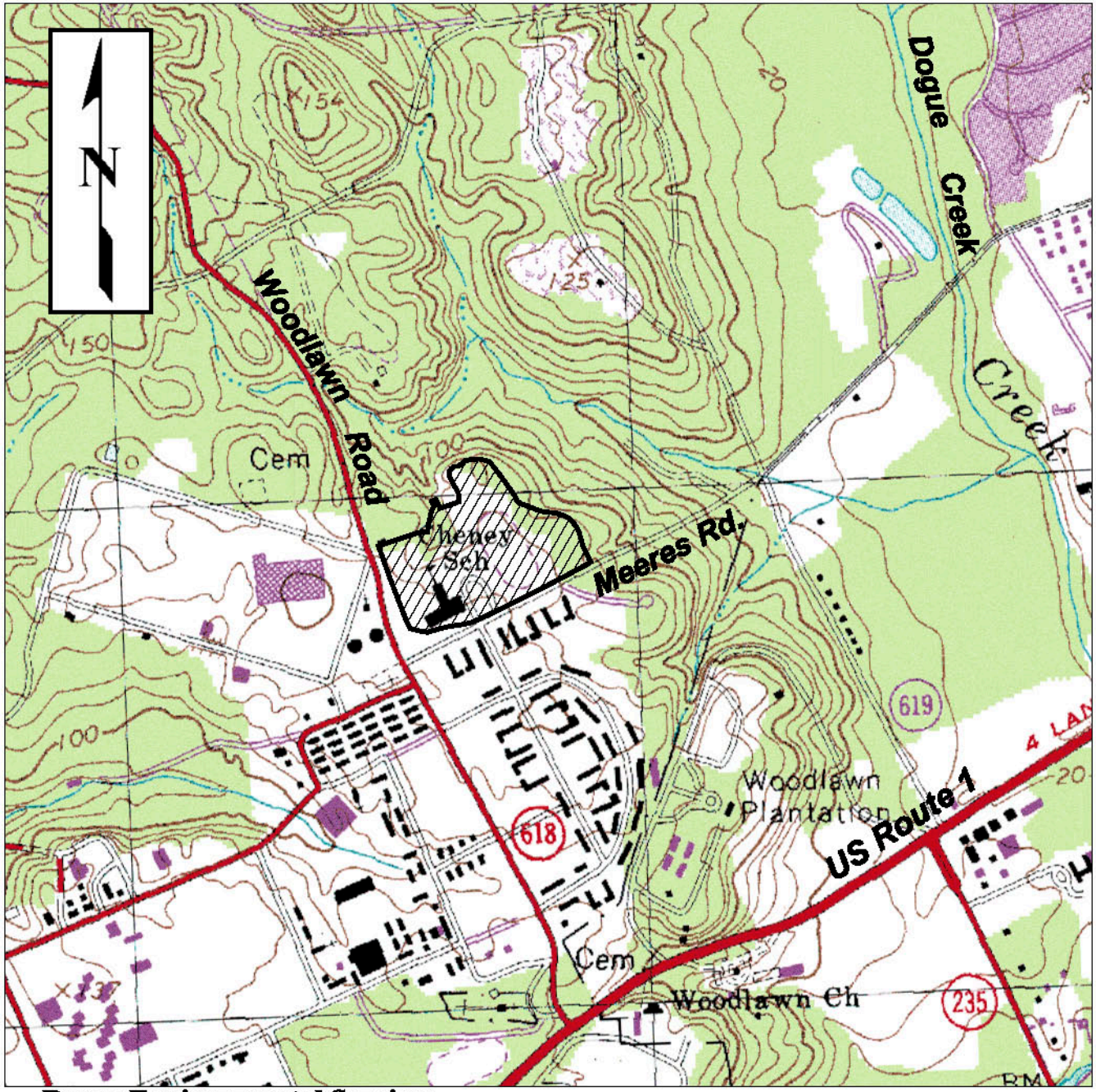
Gentlemen:

Provided here are our findings in connection with our habitat suitability assessment for *Isotria medeoloides* at the above referenced site. This letter report represents the completion of our services rendered per our proposal made by email transmittal on November 6, 2013.

1. BACKGROUND

We understand that expansion is being planned to the existing Fort Belvoir Elementary School, located at the intersection of Woodlawn and Meeres Roads, Fairfax County, Virginia. The potential extent of future improvements was highlighted to us on a GIS map titled *Fairfax County School* Site, sent as an electronic (PDF) file on November 1, 2013. The general location of the site, in relation to surrounding topographic features, is shown on our *Vicinity Map* included as Figure 1.

Improvements planned in connection with the school facility expansion may require encroachment upon, or modification to, existing streams and wetlands. It is our understanding that such activities may require a permit from the US Army Corps of Engineers (Corps). Permitting by the Corps under the Clean Water Act requires



FORT BELVOIR ELEMENTARY SCHOOL EXPANSION, FAIRFAX COUNTY, VIRGINIA

LEGEND

STUDY AREA

FIGURE 1

VICINITY MAP

SCALE: 1" = 1000'

SOURCE: USGS 7.5' TOPOGRAPHIC MAP - FORT BELVOIR QUADRANGLE (Photorevised 1983)

November 2013 R13024

Rouse Environmental Services

consideration of potential impacts to the continued existence of plant and animal species that are federally listed as *Threatened* or *Endangered* under the Endangered Species Act.

Small Whorled Pogonia (*Isotria medeoloides*) is a rare orchid which generally occurs within relatively mature, hardwood dominated forests on nearly level to moderate slopes and has been previously documented at several locations in adjoining Prince William County, Virginia. Due to its rarity and loss of potential habitat from development, *I. medeoloides* has been formally listed as *Threatened* by the US Fish & Wildlife Service (USFWS). The plant has also received formal recognition as *Endangered* by the Virginia Department of Agriculture & Consumer Services under the Commonwealth of Virginia's Endangered Plant & Insect Act.

Since the above ground parts of *Isotria medeoloides* die back completely each year, surveys for actual individuals of this species can only be conducted during certain times of the growing season. For areas north of Caroline County, Virginia the USFWS has specified a search period between June 1st and July 20th.

Alternatively, an evaluation can be made of a site as to whether it contains habitat that may be suitable for supporting populations of *Isotria medeoloides*. The objective of our study was to make an assessment of the suitability of habitat within the limits of the proposed project to support potential populations of the plant and to approximately map such habitat should any exist.

2. DATA REVIEW

A desktop review was conducted to preliminarily identify areas of potential habitat for *Isotria medeoloides* and prepare working base maps for use in the field. Our review included the following sources of information:

- Aerial infrared imagery available on US Geological Survey Digital Orthographic Quarter Quadrangles (DOQQs),
- USDA National Agriculture Imagery Program (NAIP) digital orthophotographs (visible spectrum) flown in 2011,
- Digital Raster Graphic (DRG) USGS topographic quadrangles covering the areas of study,
- Other site details, including topographic contours, wetland boundaries and project limits provided in electronic file format by Paciulli, Simmons & Associates (PS&A).

Information from the above listed sources was incorporated onto working base maps and used to prioritize subsequent ground-truthing efforts and mark-up of field observations within the targeted study areas.

3. FIELD STUDY AND SUMMARY OF FINDINGS

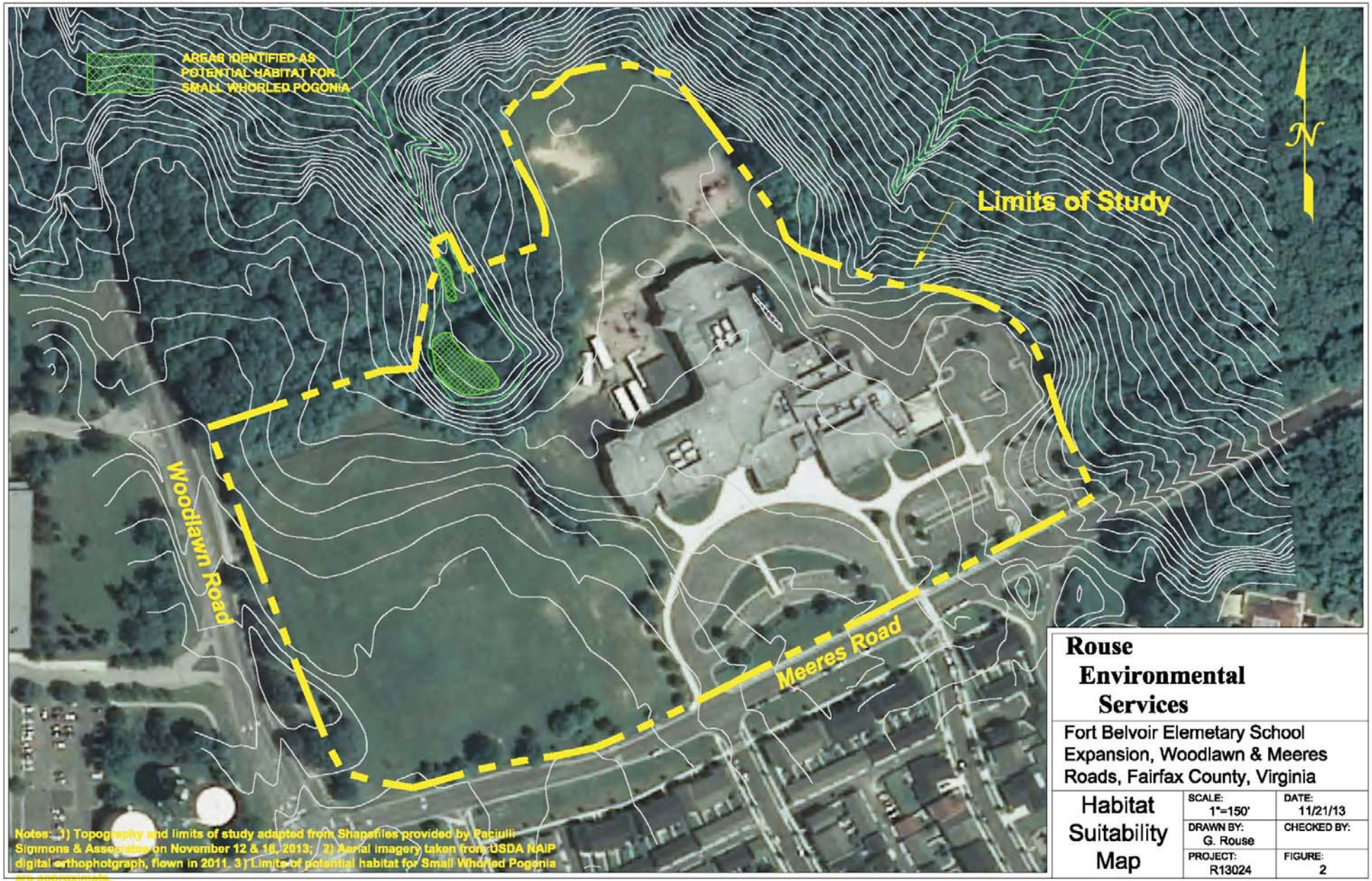
A field reconnaissance was conducted on November 14, 2013 to canvass the study area, with particular emphasis being given to those areas preliminarily identified from our desktop review. Field studies were conducted by Garrie Rouse, a botanist recognized by the USFWS as qualified to conduct surveys for *Isotria medeoloides*. We were accompanied by Mr. Kevin Reilly of PS&A, who assisted us with orientation at the site and the physical limits of the area of study.

Areas within the study area were evaluated with regard to their potential to support populations of *Isotria medeoloides* on the basis of the following criteria:

> **1) Potentially Suitable Habitat** - Areas supporting mesic, medium-aged to mature stands of mixed hardwoods, with relatively open understories, on nearly level to gentle slopes.
>
> **2) Marginally Suitable Habitat** - Areas supporting forest stands that are characterized by either being too xeric, support a preponderance of pine or other evergreens, are located on moderate to steep slopes, have heavy vegetation in the understory, or a combination of the above.
>
> **3) Unsuitable Habitat** - Areas represented by either impervious cover, open fields or other forms of heavy disturbance/aggressive maintenance, open water, seasonally to permanently saturated or flooded wetlands, pine plantations, or a combination of the above.

The majority of the study area was found to be in a developed state, consisting mostly of the existing school, and associated parking lots and playing fields. These developed areas would be considered to present unsuitable habitat for *Isotria medeoloides*.

The only wooded areas occurred near the northern edge of the prescribed study limits. Two localized areas were identified here as having potentially suitable habitat for *Isotria medeoloides*. One occurred on a small terrace on the western side of an eroded drainage channel to an unnamed tributary to Dogue Creek. The other was located at the very upper reaches of this same drainage, within a nearly level, bowl-shaped area. Both of these areas fit the criteria as described above for potentially suitable habitat and are estimated to total approximately 1.2 acres in extent. The approximate locations of potentially suitable habitat within the study area are depicted on our *Habitat Suitability Map* included as Figure 2 to this report.



Rouse Environmental Services

Fort Belvoir Elemetary School Expansion, Woodlawn & Meeres Roads, Fairfax County, Virginia

Habitat Suitability Map	SCALE: 1"=150'	DATE: 11/21/13
	DRAWN BY: G. Rouse	CHECKED BY:
	PROJECT: R13024	FIGURE: 2

Areas of marginally suitable habitat extended to the remaining wooded portions of the study area. The majority of this area generally supported a heavy understory, and/or wetlands or other drainage features, not conducive for the growth of *Isotria medeoloides*.

3. LIMITATIONS

Our study was limited to evaluating the presence of potentially suitable habitat for *Isotria medeoloides* and did not include an actual survey for populations of the plant, nor did it address the potential for other rare, threatened or endangered species which may occur at the site. Surveys of identified habitat for actual populations of *I. medeoloides* are recommended during the period prescribed by USFWS (June 1 - July 20) if any future development is planned within these locations.

In addition, our study did not include the identification or delineation of wetlands, processing of permits, meetings with local, state or federal officials, land surveying services and environmental concerns or services that were not specifically described herein. Ecological conditions and species distributions represent dynamic processes. The findings of this survey, therefore, are valid only for the time at which this study was performed.

We appreciate the opportunity to have been of service to you on this project. Please do not hesitate to contact us should you have any questions regarding the contents of this report.

Sincerely,

Garrie D. Rouse
Consulting Scientist

Rouse Environmental Services

Environmental Consultation & Permitting

August 8, 2014

Paciulli, Simmons & Associates, Ltd.
3975 Fair Ridge Drive, Suite 300 South
Fairfax, Virginia 22033

Attn: Mr. Kevin Reilly

Subject: Project R13024b, Survey for *Isotria medeoloides* (Small Whorled Pogonia), Fort Belvoir Elementary School Expansion, Woodlawn and Meeres Roads, Fairfax County, Virginia.

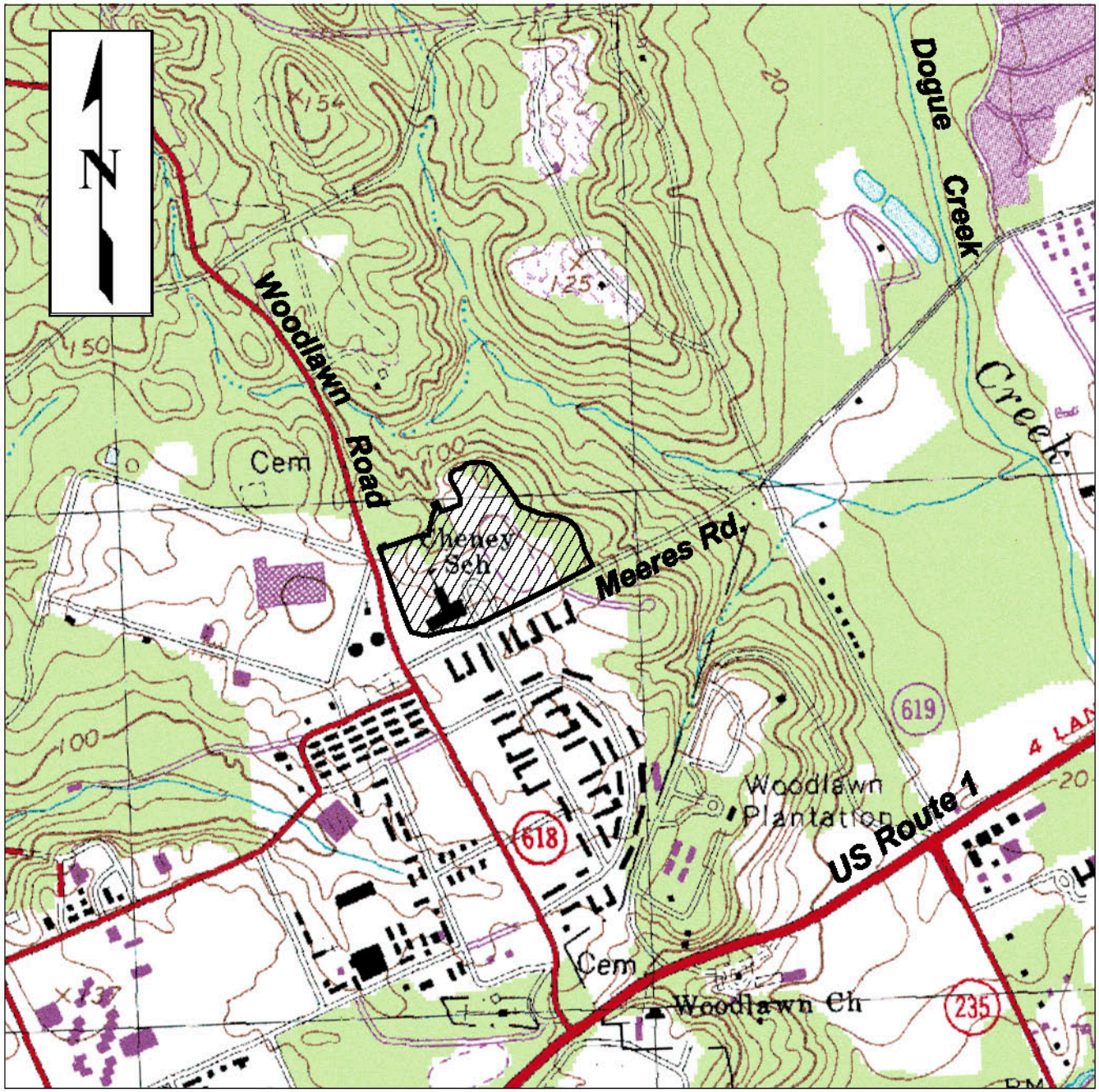
Gentlemen:

Included here are our findings in connection with a survey for potential populations of *Isotria medeoloides* (Small Whorled Pogonia) at the above referenced site. This letter report represents the completion of our services as authorized by you by email transmittal on June 10, 2014 .

1. PROJECT DESCRIPTION

We understand that expansion is being planned to the existing Fort Belvoir Elementary School, located at the intersection of Woodlawn and Meeres Roads, Fairfax County, Virginia. The potential extent of future improvements was highlighted to us on a GIS map titled *Fairfax County School* Site, sent as an electronic (PDF) file on November 1, 2013. The general location of the site, in relation to surrounding topographic features, is shown on our *Vicinity Map* included as Figure 1.

We were engaged by Paciulli, Simmons & Associates (PS&A) on November 11, 2013 to provide a habitat suitability assessment for potential populations of Small Whorled Pogonia (*Isotria medeoloides*) in connection with an environmental assessment being performed at the site. *I. medeoloides* is a rare orchid which generally occurs within relatively mature, hardwood dominated forests on nearly level to moderate slopes and has been previously documented at several locations including the Fort Belvoir North area and adjoining Prince William County, Virginia. Due to its rarity and loss of potential habitat from development, *I. medeoloides* has been formally listed as *Threatened* by the US Fish



FORT BELVOIR ELEMENTARY SCHOOL EXPANSION, FAIRFAX COUNTY, VIRGINIA

LEGEND

PROJECT LIMITS

FIGURE 1

VICINITY MAP

SCALE: 1" = 1000'

SOURCE: USGS 7.5' TOPOGRAPHIC MAP - FORT BELVOIR QUADRANGLE (Photorevised 1983)

August 2014 **R13024b**

Rouse Environmental Services

& Wildlife Service (USFWS). The plant has also received formal recognition as *Endangered* by the Virginia Department of Agriculture & Consumer Services under the Commonwealth of Virginia's Endangered Plant & Insect Act.

Since the above ground parts of *Isotria medeoloides* die back completely each year, surveys for actual individuals of this species can only be conducted during certain times of the growing season. For areas north of Caroline County, Virginia the USFWS has specified a search period beginning on June 1st and ending on July 20th. Alternatively, an evaluation can be made of a site as to whether it contains habitat that may be suitable for supporting populations of the plant. The objective of our original study was to perform such a habitat suitability assessment throughout the area potentially impacted by the planned school expansion.

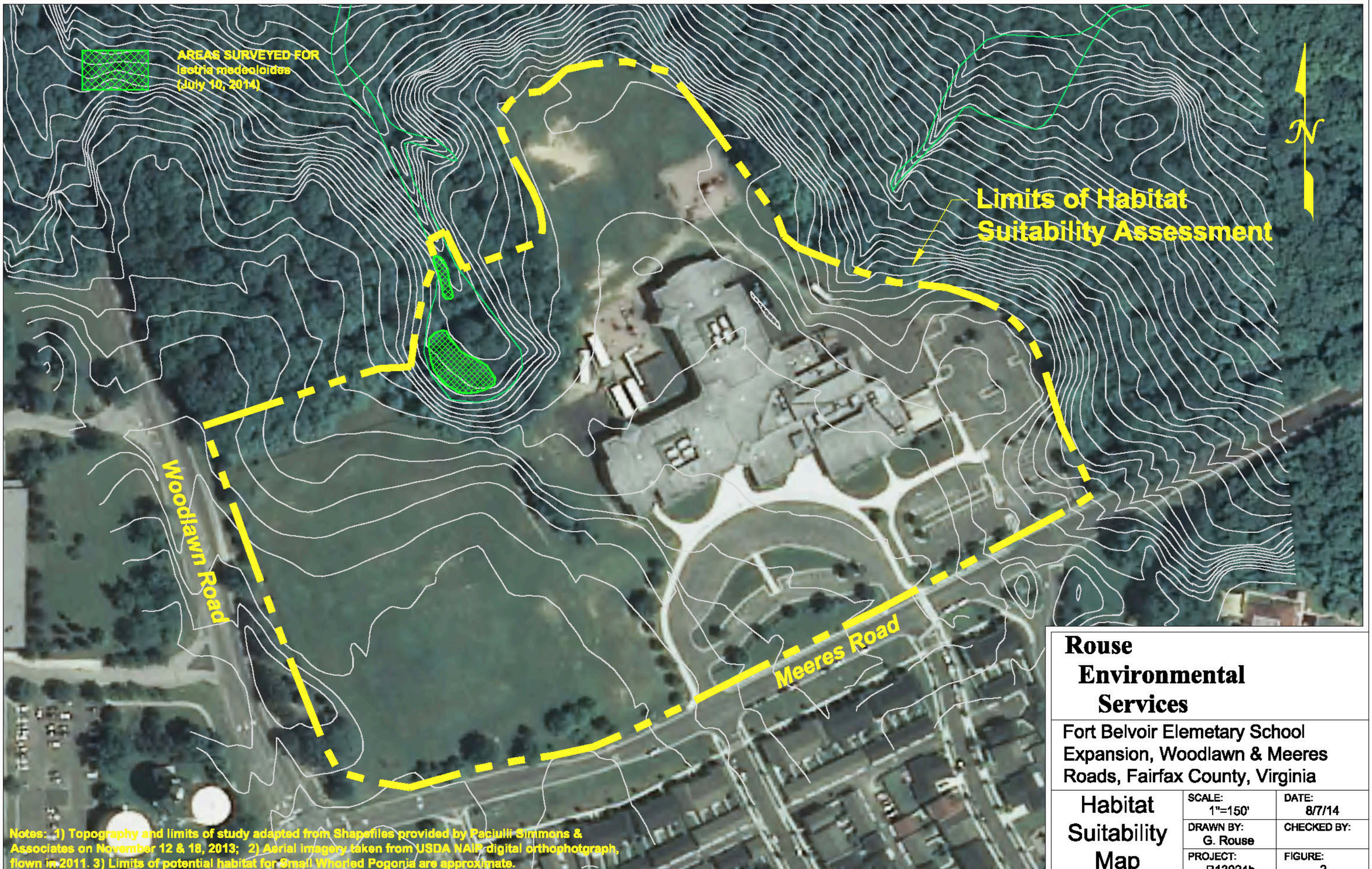
We observed two localized areas of potentially suitable habitat for *Isotria medeoloides* during the course of our desktop review and follow-up field assessment made on November 14, 2013. These areas were estimated to total approximately 1.2 acres in extent. The approximate locations of these two areas of potential habitat are shown on our *Habitat Suitability Map*, included as Figure 2. The findings from our habitat suitability assessment were provided in a report to PS&A dated November 22, 2013. The objective of our present study was to perform actual surveys for the plant, within these areas of previously identified potential habitat, during an appropriate time of the 2014 growing season as specified by the USFWS.

2. FIELD STUDY AND SUMMARY OF FINDINGS

A field reconnaissance was made by a team of two personnel on July 10, 2014, a time of year when *Isotria medeoloides* has been deemed by the USFWS as searchable in areas north of Caroline County, Virginia. The survey was led by Mr. Garrie Rouse, a botanist recognized by the USFWS as qualified to conduct surveys for the plant. We documented plant species as they were encountered during the course of our field study. A listing of these taxa is provided as an attachment to this letter report.

As noted in our previous habitat suitability assessment, the two areas of potential habitat occurred 1) on a small terrace on the western side of an eroded drainage channel to an unnamed tributary to Dogue Creek, and 2) at the very upper reaches of this same drainage, within a nearly level, bowl-shaped area. Despite our systematic search efforts of these areas, however, no individuals of *Isotria medeoloides* were observed during the course of our field visit.

Given that all previously identified, potential habitat was canvassed during a time of year when the plant is considered to be searchable, and that we were unsuccessful in locating individuals of the target species, we consider there to be a low potential for the occurrence of *Isotria medeoloides* within the project area.



Notes: 1) Topography and limits of study adapted from Shapefiles provided by Paciulli Simmons & Associates on November 12 & 18, 2013; 2) Aerial imagery taken from USDA NAIP digital orthophotograph, flown in 2011. 3) Limits of potential habitat for Small Whorled Pogonia are approximate.

Rouse Environmental Services

Fort Belvoir Elemetary School Expansion, Woodlawn & Meeres Roads, Fairfax County, Virginia

Habitat Suitability Map	SCALE: 1"=150'	DATE: 8/7/14
	DRAWN BY: G. Rouse	CHECKED BY:
	PROJECT: R13024b	FIGURE: 2

3. LIMITATIONS

Our study was limited to the survey of *Isotria medeoloides* and did not include searches for potential populations of other rare, Threatened or Endangered species which may occur within the study area. In addition, our study did not include the identification or delineation of wetlands, processing of permits, meetings with local, state or federal officials, land surveying services and environmental concerns or services that were not specifically described herein. Ecological conditions and species distributions represent dynamic processes. The findings of this survey, therefore, are valid only for the time at which this study was performed.

We appreciate the opportunity to have been of service to you on this project. Please do not hesitate to contact us should you have any questions regarding this report.

Sincerely,

Garrie D. Rouse
Consulting Scientist

Attachment 1: Checklist of Plant Species Encountered During *Isotria medeoloides* Surveys (July 10, 2014)

Attachment

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, FORT BELVOIR ELEMENTARY SCHOOL EXPANSION, FAIRFAX COUNTY, VIRGINIA

(July 10, 2014)

Rouse Environmental Services

PARTIAL CHECKLIST OF PLANT SPECIES ENCOUNTERED DURING *ISOTRIA MEDEOLOIDES* SURVEYS, FORT BELVOIR ELEMENTARY SCHOOL EXPANSION, FAIRFAX COUNTY, VIRGINIA (July 10, 2014)

Scientific Name:	**Common Name:**
Acer negundo L.	boxelder
Acer rubrum L.	red maple
Ailanthus altissima (P. Mill.) Swingle	tree of heaven
Allium vineale L.	wild garlic
Berberis thunbergii DC.	Japanese barberry
Boehmeria cylindrica (L.) Sw.	smallspike false nettle
Carex squarrosa L.	squarrose sedge
Carex swanii (Fern.) Mackenzie	Swan's sedge
Catalpa speciosa (Warder) Warder ex Engel.	northern catalpa
Celastrus orbiculata Thunb.	Asian bittersweet
Cornus florida L.	flowering dogwood
Coronilla varia L.	purple crownvetch
Diospyros virginiana L.	common persimmon
Duchesnea indica (Andr.) Focke	Indian strawberry
Elaeagnus umbellata Thunb.	autumn olive
Fraxinus americana L.	white ash
Geum canadense Jacq.	white avens
Ilex opaca Ait.	American holly
Liquidambar styraciflua L.	sweetgum
Liriodendron tulipifera L.	tuliptree
Lolium pratense (Huds.) S.J. Darbyshire	meadow ryegrass
Lonicera japonica Thunb.	Japanese honeysuckle
Lycopus sp.	a water horehound
Parthenocissus quinquefolia (L.) Planch.	Virginia creeper
Pilea pumila (L.) Gray	Canadian clearweed
Plantago lanceolata L.	narrowleaf plantain
Platanus occidentalis L.	American sycamore
Polygonum perfoliatum L.	Asiatic tearthumb
Polystichum acrostichoides (Michx.) Schott	Christmas fern
Prunus serotina Ehrh.	black cherry
Quercus palustris Muenchh.	pin oak
Quercus phellos L.	willow oak
Rosa multiflora Thunb. ex Murr.	multiflora rose
Rubus argutus Link	sawtooth blackberry
Rubus occidentalis L.	black raspberry
Rubus phoenicolasius Maxim.	wine raspberry
Smilax rotundifolia L.	roundleaf greenbrier
Toxicodendron radicans (L.) Kuntze	eastern poison ivy
Trifolium repens L.	white clover
Ulmus americana L.	American elm

Perennial Flow Determination Report
Belvoir Elementary School

Prepared for:

ATKINS
200 Daingerfield Road
Alexandria, VA 22314

PACIULLI SIMMONS & ASSOCIATES
Engineers
Planners
Surveyors
Landscape
Architects
Wetland
Specialists

December 2013

Executive Summary

Paciulli, Simmons & Associates, Ltd., (PSA) was contracted to identify and locate perennial streams on a 20.4 acre study area identified as Belvoir Elementary School on Fort Belvoir. PSA used methodology currently accepted by Fort Belvoir to determine the flow regime of on-site streams and delineate Resource Protection Areas (RPAs).

PSA identified three stream reaches in the study area. Specifically, PSA found 264.0 linear feet (1553.3 square feet) of intermittent stream and 140.5 linear feet (602.2 square feet) of ephemeral stream. The nearest perennial stream to the Belvoir Elementary School is located approximately 300 feet north of the study area boundary. The intermittent stream is a tributary to the perennial stream.

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Introduction 1
Study Area 1
Methods 1
Results and Discussion 2
Conclusion 2
References 4

Appendices

A. USGS Map
B. Aerial Map
C. Perennial Flow Determination and RPA Delineation Map
D. Perennial Stream Field Identification Protocol Data Forms
E. Site Photos

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Introduction

The purpose of this investigation is to determine the flow regime of on-site streams required to delineate Resource Protection Areas (RPAs) that may be regulated under the Virginia Chesapeake Bay Preservation Act (Virginia Code 1950 §10.1-2100 et seq.). The Virginia Administrative Code (VAC) defines an RPA as:

> *…that component of the Chesapeake Bay Preservation Area comprised of lands adjacent to water bodies with perennial flow that have an intrinsic water quality value due to the ecological and biological processes they perform or are sensitive to impacts which may result in significant degradation to the quality of state waters (9 VAC 10-20-40 2009).*

Paciulli, Simmons and Associates, Ltd., (PSA) was contracted to identify and locate perennial streams located on the Belvoir Elementary School at Fort Belvoir, Virginia.

The scope of services for the study was as follows:

1. Investigate all stream channels on the site and determine flow regime.
2. Prepare a brief report, including stream data sheets and supporting photos on the findings of field investigations.
3. Develop an RPA for the study area, using the findings from this report and the Belvoir Elementary School Wetland Delineation Report.
4. Prepare a map that depicts the location, flow regime, and associated RPA for streams found in the study area.

Study Area

The Belvoir Elementary School study area is located on the North Post of Fort Belvoir and lies east of Woodlawn Road and north of Meeres Road. The site is accessed via Meeres Road. See the USGS and Aerial maps, Appendix A and B, for site location. PSA investigated a 20.4-acre study area to identify the flow regimes of streams.

Hydrologic features on the site include a stormwater management area, intermittent stream and ephemeral streams. The remaining portions of the site consist of open fields, parking lots, the Belvoir Elementary School building facility and maintained lawn. Mapped soils are primarily Cut and fill, Urban built up and Sassafras fine sandy loam (2-15% slopes). The site slopes gently from the southeast to the northwest. Steeper slopes are found along the edge of the forest located north and west of the existing building.

Methods

PSA evaluated streams using the North Carolina Perennial Stream Field Identification Protocol (North Carolina Division of Water Quality 2010). The beginning and end of each stream reach was determined by using stream geomorphology or change in flow (i.e. headcut or confluence), an artificial structure (i.e. culvert), or an arbitrary point such as a study boundary. Sampling points, or ‘data points’ represent characteristics observed throughout the entire length of the reach.

PSA took data points for each stream reach identified on the Perennial Flow Determination and RPA Delineation Map (Appendix C). Features such as channel geomorphology, hydrology, and aquatic biota were noted and assigned values as an indication of stream perenniality. The numerical scores for each field indicator were then summed to calculate a total numerical score for the stream reach. Data sheets for each recorded data point can be found in (Appendix D), while supporting photographic documentation can be found in (Appendix E).

Generally, flow regime is determined by a protocol-specific point score. The North Carolina Protocol states that stream reaches with an indicator score of at least 19 but less than 30 should be considered intermittent, while stream reaches with a score of 30 or greater should be considered perennial. A reach that scores less than 19 using the North Carolina Protocol should be considered ephemeral.

Results and Discussion

PSA identified one intermittent stream and two ephemeral streams inside the study area boundary. The following narrative accompanies data sheets (Appendix D) and photographs (Appendix E) taken as supporting evidence for sampling protocols. PSA established data points on each reach, or length, of stream. PSA took photos at each data point.

Reach 1: This reach originates from a culvert located north of the stormwater area. The reach exhibits geomorphologic and hydrologic features that support intermittent flow. This stream reach flows offsite to the perennial stream north of the study area.

Reach 2: This reach starts at the top of a woodland swale and drains to Reach 1, the intermittent stream. Reach 2 is an ephemeral stream.

Reach 3: Reach 3 is a small ephemeral stream. It is a tributary Reach 2. This reach starts at the top of a woodland swale.

PSA used the data from this perennial flow determination and the Belvoir Elementary School Wetland Delineation (PSA, December 2013) to propose a revised RPA boundary. The proposed RPA and the existing Fort Belvoir mapped RPA are shown on the Perennial Flow Determination and RPA Delineation Map (Appendix C). No RPA exists on the Belvoir Elementary School Site. PSA did not field delineate the RPA associated with the perennial stream north of the site as this was well outside the limits of the study area. However, the existing mapped RPA has been adjusted as no perennial streams or jurisdictional wetlands are located on the Belvoir Elementary School site.

Conclusion

PSA identified three stream reaches in the study area. Specifically, PSA found 264.0 linear feet of intermittent stream and 140.5 linear feet of ephemeral stream. The nearest perennial stream to the Belvoir Elementary School is located approximately 300 feet north of the study area boundary. The Belvoir Elementary School site does not contain an RPA.

This study was based on a field examination of stream geomorphology, hydrology and biology. Field indicators can change due to variations in hydrology and other factors. This report assesses on-site conditions at the time of the field investigation and does not address environmental conditions prior to PSA's site investigation, or future changes.

PSA prepared this report in accordance with generally accepted guidelines for conducting perennial flow determinations and RPA delineations. PSA makes no other warranties, either expressed or implied, in this report. The findings of this report are not a recommendation to buy, sell, or develop the property in question.

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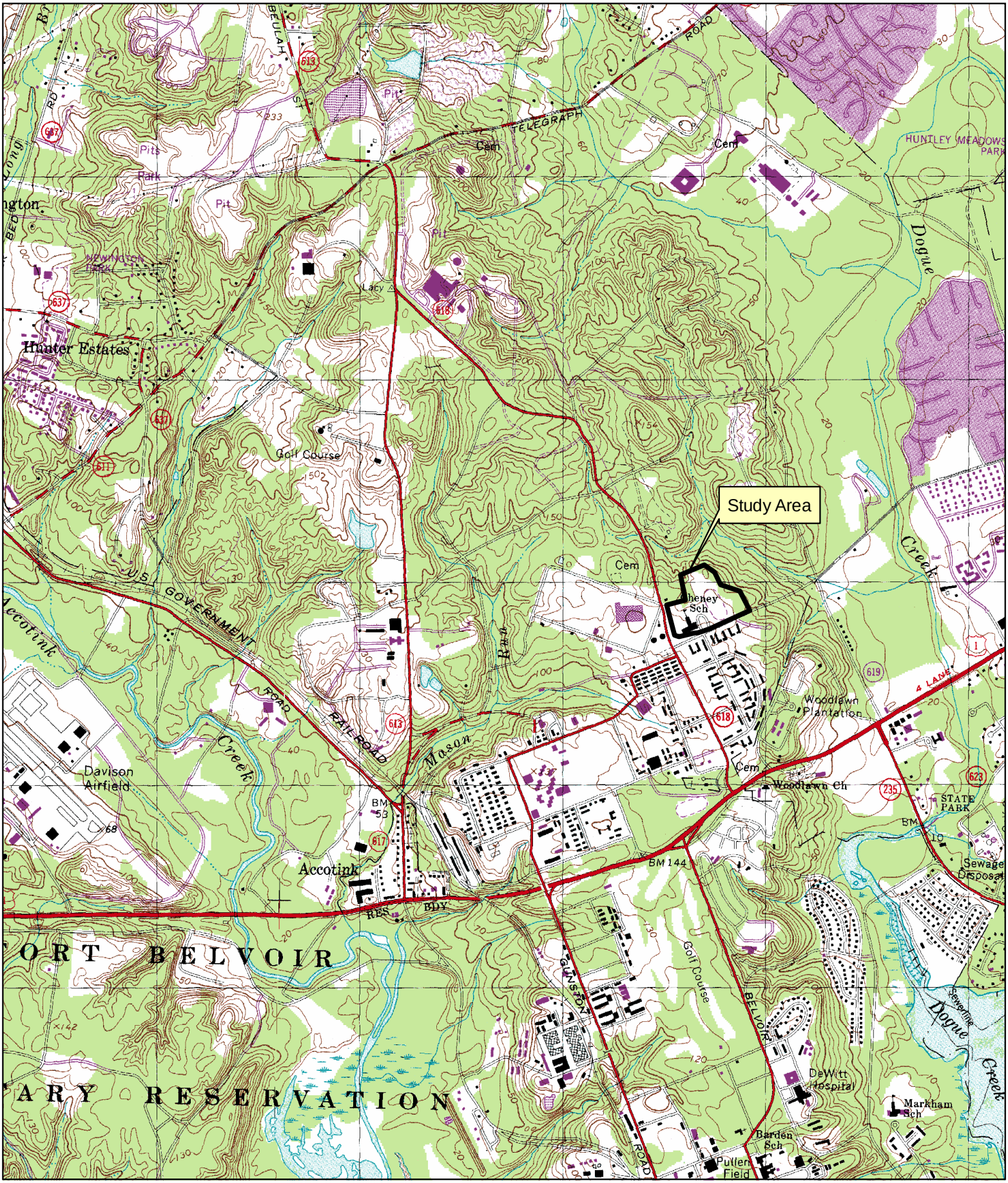
Appendix A

USGS Topographic Quad Map



0 1,000 2,000 Feet

Belvoir Elementary School
Fort Belvoir, VA

USGS QUAD MAP
FORT BELVOIR, VA-MD 1983

December 2, 2013

PACIULLI SIMMONS & ASSOCIATES

Appendix B

Aerial Map

0 250 500 Feet

Belvoir Elementary School
Fort Belvoir, VA

AERIAL MAP

December 2, 2013

PACIULLI SIMMONS & ASSOCIATES

Appendix C

Perennial Flow Determination and RPA Delineation Map

Belvoir Elementary School - PFD

ID	Classification	Area (SF)	Linear Feet
Reach 1	Intermittent (R4)	1553.3	264
Reach 2	Ephemeral (RE)	563.4	131.8
Reach 3	Ephemeral (RE)	38.8	8.7

PACIULLI SIMMONS & ASSOCIATES
Established 1944

Engineering
Planning
Surveying
Landscape Architecture
Wetland Expertise
Environmental Science

3975 Fair Ridge Drive
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Fairfax, VA 22033
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Fax 703-934-9787
E-mail fairfax@psaltd.com

Belvoir Elementary School
Fort Belvoir, Virginia

Perennial Flow Determination and RPA Delineation Map

Scale: 1"=70'
Date: 12/01/13
DRN: KMR
CKD: KMR
Sheet: 1 of 1
File No: F4608

Appendix D

Perennial Stream Identification Protocol Data Forms

NC DWQ Stream Identification Form Version 4.11

Date: 11-8-2013	**Project/Site:** DP 1	**Latitude:** 38°43'22.862"N
Evaluator: K. Reilly	**County:** Fairfax	**Longitude:** 77°8'37.611"W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 21.5	**Stream Determination (circle one)** **Ephemeral Intermittent Perennial**	**Other** Fort Belvoir *e.g. Quad Name*: o38077f2

A. Geomorphology (Subtotal = 10)	Absent	Weak	Moderate	Strong
1[a.] Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 6)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 5.5)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 11-8-2013	**Project/Site:** DP 2	**Latitude:** 38°43'23.831"N
Evaluator: K. Reilly	**County:** Fairfax	**Longitude:** 77°8'37.391"W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 13	**Stream Determination (circle one)** **Ephemeral** **Intermittent** **Perennial**	**Other** Fort Belvoir *e.g. Quad Name*: o38077f2

A. Geomorphology (Subtotal = 5.5)	Absent	Weak	Moderate	Strong
1[a] Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 5.5)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 2)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 11-8-2013	**Project/Site:** DP 3	**Latitude:** 38°43'23.959"N
Evaluator: K. Reilly	**County:** Fairfax	**Longitude:** 77°8'37.544"W
Total Points: *Stream is at least intermittent if ≥ 19 or perennial if ≥ 30** 10.5	**Stream Determination (circle one)** **Ephemeral** **Intermittent** **Perennial**	**Other** Fort Belvoir *e.g. Quad Name*: o38077f2

A. Geomorphology (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
1[a.] Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

[a] artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 4)				
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 2)				
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Appendix E

Site Photos

Culvert at headwaters of intermittent stream – Reach 1.

Downstream view of intermittent stream – Reach 1.

Further downstream view of Reach 1 – outside of study area.
Stream remains intermittent.

Intersection of intermittent stream with nearest perennial stream.
The perennial stream is located approximately 300 feet north of school site.

Headwaters of ephemeral stream – Reach 2

Downstream view of ephemeral stream – Reach 2.

Upstream view of ephemeral stream – Reach 3.

Appendix D

Agency Coordination

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
6669 Short Lane
Gloucester, Virginia 23061

Date: December 4, 2013

Online Project Review Certification Letter

Project Name: Fort Belvoir Elementary School

Dear Applicant:

Thank you for using the U.S. Fish and Wildlife Service (Service) Virginia Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA), and the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended (Eagle Act). This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

The species conclusions table in the enclosed project review package summarizes your ESA and Eagle Act conclusions. These conclusions resulted in “no effect” and/or “not likely to adversely affect” determinations for listed species and critical habitat and/or “no Eagle Act permit required” determinations for eagles regarding potential effects of your proposed project. We certify that the use of the online project review process in strict accordance with the instructions provided as documented in the enclosed project review package results in reaching the appropriate determinations. Therefore, we concur with the “no effect” and “not likely to adversely affect” determinations for listed species and critical habitat and “no Eagle Act permit required” determinations for eagles. Additional coordination with this office is not needed.

Candidate species are not legally protected pursuant to the ESA. However, the Service encourages consideration of these species by avoiding adverse impacts to them. Please contact this office for additional coordination if your project action area contains candidate species.

Should project plans change or if additional information on the distribution of listed species, critical habitat, or bald eagles becomes available, this determination may be reconsidered. This certification letter is valid for one year.

Information about the online project review process including instructions and use, species information, and other information regarding project reviews within Virginia is available at our website http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html. If you have any questions, please contact Kimberly Smith of this office at (804) 693-6694, extension 124.

Sincerely,

/s/ Cynthia A. Schulz

Cindy Schulz
Supervisor
Virginia Field Office

Enclosures - project review package

Species Conclusions Table

Project Name: Fort Belvoir Elementary School

Date: November 4, 2013

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
ESA listed species	Species not present	No effect	Will conduct species specific survey during survey season (June-mid July)
Bald eagle	Unlikely to disturb nesting bald eagles	No Eagle Act permit required	
Bald eagle	Does not intersect with an eagle concentration area	No Eagle Act permit required	

United States Department of the Interior

FISH AND WILDLIFE SERVICE
VIRGINIA ECOLOGICAL SERVICES FIELD OFFICE
6669 SHORT LANE
GLOUCESTER, VA 23061
PHONE: (804)693-6694 FAX: (804)693-9032
URL: www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2014-SLI-0455 December 04, 2013
Project Name: Fort Belvoir Elementary School Expansion

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Fort Belvoir Elementary School Expansion

Official Species List

Provided by:

VIRGINIA ECOLOGICAL SERVICES FIELD OFFICE
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2014-SLI-0455
Project Type: Development
Project Description: action consists of: Fairfax County Public Schools (FCPS) is proposing the addition of a new two-story, 38-classroom elementary school to the existing elementary school building.The current environmental review analyzes a proposed action resulting from construction of the new elementary school facility on the Fort Belvoir Military Installation and addresses potential environmental consequences on the human and natural environment.

United States Department of Interior
Fish and Wildlife Service

Project name: Fort Belvoir Elementary School Expansion

Project Location Map:

Project Coordinates: MULTIPOLYGON (((-77.1442095 38.7205658, -77.1443592 38.7205733, -77.1447025 38.721084, -77.1447776 38.7214857, -77.1449493 38.7219545, -77.1443377 38.7220801, -77.14393 38.7222642, -77.1438335 38.7221721, -77.1435116 38.7221135, -77.1433721 38.7221219, -77.1431683 38.7222475, -77.143061 38.7224567, -77.1430395 38.7226744, -77.1433936 38.7233775, -77.1431897 38.7236872, -77.1429752 38.7237625, -77.1427069 38.7237713, -77.1424924 38.7236206, -77.1422349 38.7235039, -77.1420739 38.7232025, -77.1418594 38.7229514, -77.141634 38.722792, -77.1412907 38.7227003, -77.1408723 38.7227505, -77.1406577 38.7226748, -77.1402286 38.7218043, -77.1412693 38.7213774, -77.1422349 38.7210258, -77.1429966 38.7208249, -77.1442095 38.7205658)))

Project Counties: Fairfax, VA

United States Department of Interior
Fish and Wildlife Service

Project name: Fort Belvoir Elementary School Expansion

Endangered Species Act Species List

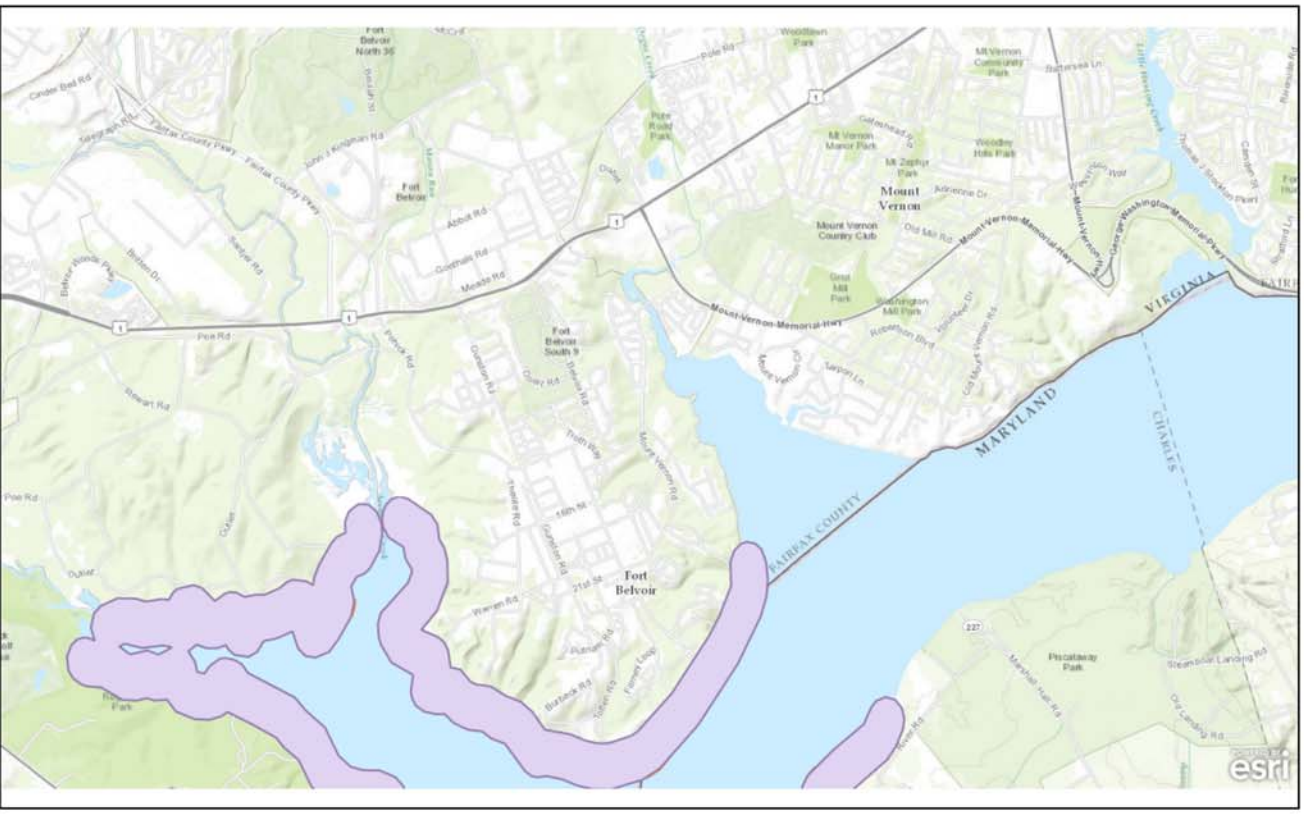
There are a total of 0 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed on the **Has Critical Habitat** lines may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.

Critical habitats that lie within your project area

There are no critical habitats within your project area.

USFWS Bald Eagle Concentration Areas - Virginia



Sources: Esri, DeLorme, HERE, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community

Mapping Portal - The Center for Conservation Biology - Windows Internet Explorer

http://www.ccbbirds.org/maps.php#eagles

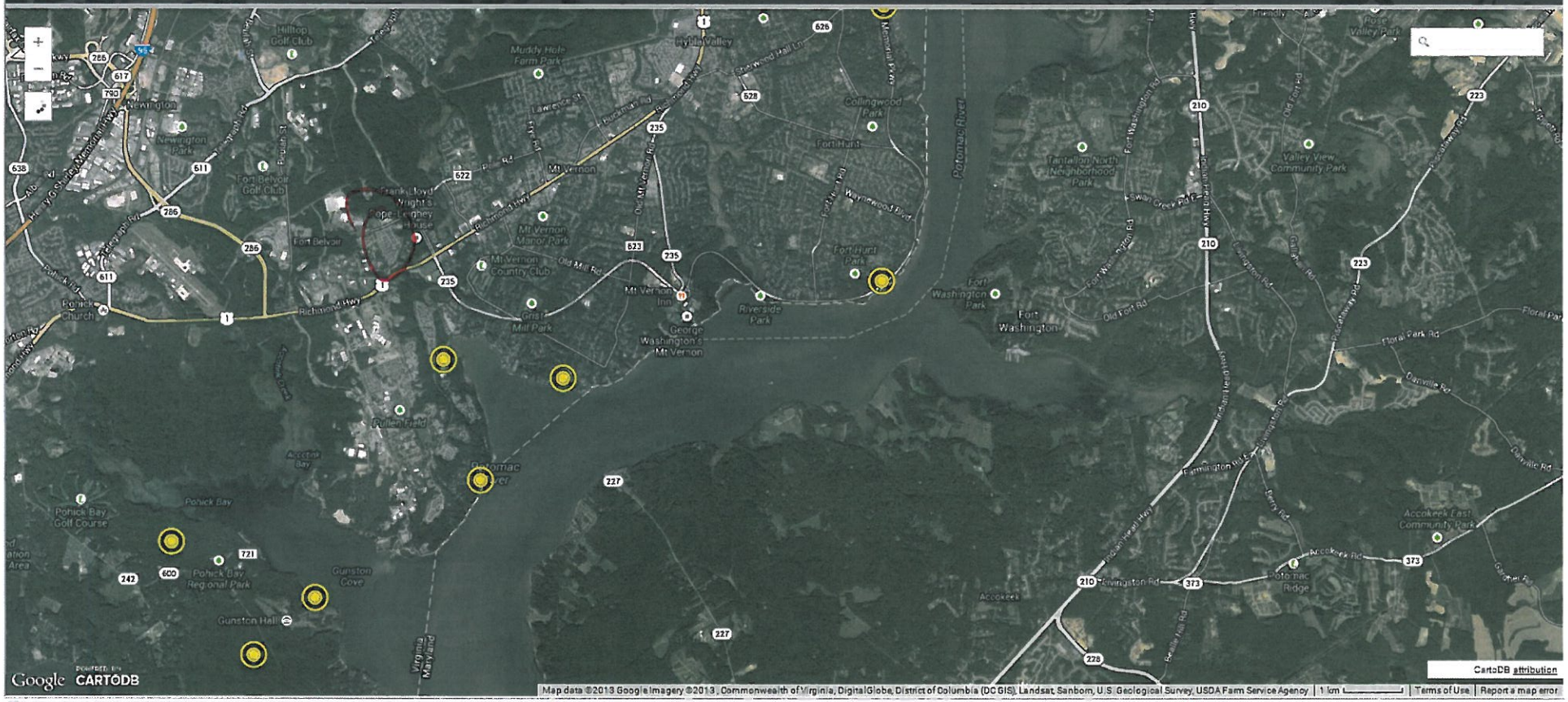
Favorites | Raleigh EAC | DOI Sharepoint Site | Charleston District Regula... | Google | WRAL | WeatherUnderground | AtkinsWebMail | OurTeamsite | USDA PLANTS | USACE-Contacts | Birds of NC

Mapping Portal - The Center for Conservation Bi...

The CENTER for CONSERVATION BIOLOGY

About | What | Resources | News | Give to CCB

MAPPING PORTAL



Done, but with errors on page.

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100%

Doug Domenech
Secretary of Natural Resources

COMMONWEALTH of VIRGINIA

Department of Game and Inland Fisheries

Robert W. Duncan
Director

November 26, 2013

Adam Efird
Environmental Scientist, Mid-Atlantic Sciences
Atkins

via email: Adam.Efird@atkinsglobal.com

Re: Fort Belvoir Elementary School Expansion

Dear Mr. Efird,

We appreciate your interest in submitting your project(s) for review by VDGIF to ensure the protection of sensitive wildlife resources during project development. Unfortunately, due to staffing limitations, we are unable to review pre-applications or scoping documents submitted to our Department. Please note that lack of a response from VDGIF does not constitute a "no comment" response, nor does it imply support of the project or associated activities. It simply means that VDGIF is unable to review your pre-application submittal.

To review your project site for the location of wildlife resources under our jurisdiction, including threatened and endangered wildlife, we recommend accessing the Virginia Fish and Wildlife Information System (VAFWIS) at http://vafwis.org/fwis/.

If you have further questions or need additional information about VDGIF's Environmental Programs, please visit: http://www.dgif.virginia.gov/environmental-programs/.

Please feel free to attach a copy of this correspondence to any applications or documents you may submit for your project to state or federal permitting agencies.

Sincerely,

Angela G. Weller
Environmental Services Section

4010 WEST BROAD STREET, P.O. BOX 11104, RICHMOND, VA 23230-1104
(804) 367-1000 (V/TDD) ***Equal Opportunity Employment, Programs and Facilities*** **FAX (804) 367-9147**

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

600 East Main Street, 24th Floor
Richmond, Virginia 23219
(804) 786-6124

December 5, 2013

Corey Gray
ATKINS
11818 Rock Landing Drive, Suite 100
Newport News, VA 23606

Re: 100036962 2000.99, Fort Belvoir Elementary School Expansion

Dear Mr. Gray:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

A fee of $90.00 has been assessed for the service of providing this information. Please find enclosed an invoice for that amount. Please return one copy of the invoice along with your remittance made payable to the Treasurer of Virginia, **DCR - Division of Natural Heritage, 600 East Main Street, 24th Floor, Richmond, VA 23219.** Payment is due within thirty days of the invoice date. Please note the change of address for remittance of payment as of July 1, 2013. Late payment may result in the suspension of project review service for future projects.

The Virginia Department of Game and Inland Fisheries (VDGIF) maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). According to the information currently in our files, Dogue Creek and Unnamed tributary to Dogue Creek, which have been designated by the Virginia Department of Game and Inland Fisheries (VDGIF) as a "Threatened and Endangered Species Water" for the Wood turtle are within 2 miles of the project area. Therefore, DCR recommends coordination with Virginia's regulatory authority for the management and protection of this species, the VDGIF, to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at (804) 692-0984. Thank you for the opportunity to comment on this project.

Sincerely,

Alli Baird

Alli Baird, LA, ASLA
Coastal Zone Locality Liaison

Cc: Amy Ewing, VDGIF

Appendix E

Section 106 Coordination

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT BELVOIR
9820 FLAGLER ROAD, SUITE 213
FORT BELVOIR, VIRGINIA 22060-5928

REPLY TO
ATTENTION OF

FEB 03 2014

Directorate of Public Works

SUBJECT: Section 106 Consultation, Fort Belvoir Elementary Expansion, Fort Belvoir, Virginia

Mr. Marc Holma
Architectural Historian
Department of Historic Resources
2801 Kensington Avenue
Richmond, Virginia 23221

Dear Mr. Holma:

Fort Belvoir proposes to construct an expansion to the existing Fort Belvoir Elementary School, Building 1700, due to capacity conditions and the need to redistribute school population among districts. The proposed expansion will include an estimated 99,000 square foot two-story expansion that will be constructed adjacent to the existing building.

The proposed expansion will also include the construction of all necessary concrete access drives, security fencing, parking lots, supporting utilities and storm water facility upgrades (concept drawings enclosed). The expansion will be constructed on an existing athletic field with a replacement athletic field to be constructed at another location.

The Area of Potential Effect (APE) for this undertaking is defined as all land within the existing Fort Belvoir Elementary School fence line and the limits of disturbance for the new school expansion (map enclosed). Fort Belvoir has undertaken historic resource identification efforts within and adjacent to the APE.

No historic architectural resources were identified within the study area. Building 1700, constructed in 1998, is less than 50 years of age and lacks the exceptional significance required for National Register listing. The Elementary School is located on a parcel within Fort Belvoir property and leased to Fairfax County Schools to operate and maintain.

Two archaeological resources, sites 44FX0619 and 44FX1492, were identified within the APE. Both sites were evaluated in 1996 as part of the *Phase II Investigations of Sites 44FX619 and 44FX1942, Cheney School Outgrant Project, U.S. Army Garrison Fort Belvoir, Fairfax County, Virginia* and were determined ineligible for National

Register listing. Fort Belvoir received State Historic Preservation Office (SHPO) documentation on these determinations on January 31, 1997 (VDHR# 94-0412-F).

Fort Belvoir has determined that no historic properties will be affected by the expansion of Fort Belvoir Elementary School as outlined above [36CFR800.4]. Please provide comment on our determination of no historic properties affected in accordance with 36CFR800.4(d). If we do not receive your comments within the required 30 days, we will assume concurrence and proceed with the project as planned. A copy of this correspondence has been sent to the Tribal Historic Preservation Office of the Catawba Indian Nation.

Point of contact is Bill Sanders, Director of Public Works, at 703-806-3017.

Sincerely,

FOR Joseph J. Pantka, Deputy
Gregory D. Gadson
Colonel, US Army
Commanding

Enclosures

DEPARTMENT OF THE ARMY
US ARMY INSTALLATION MANAGEMENT COMMAND
HEADQUARTERS, UNITED STATES ARMY GARRISON, FORT BELVOIR
9820 FLAGLER ROAD, SUITE 213
FORT BELVOIR, VIRGINIA 22060-5928

REPLY TO
ATTENTION OF

FEB 03 2014

Directorate of Public Works

SUBJECT: Section 106 Consultation, Fort Belvoir Elementary Expansion, Fort Belvoir, Virginia

Dr. Wenonah G. Haire
Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730

Dear Dr. Haire:

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Fort Belvoir has determined that no historic properties will be affected by the expansion of Fort Belvoir Elementary School as outlined above [36CFR800.4]. Please provide comment on our determination of no historic properties affected in accordance with 36CFR800.4(d). If we do not receive your comments within the required 30 days, we will assume concurrence and proceed with the project as planned. A copy of this correspondence has been sent to the Virginia SHPO.

Point of contact is Bill Sanders, Director of Public Works, at 703-806-3017.

Sincerely,

FOR Gregory D. Gadson
Colonel, US Army
Commanding

Enclosures

US Army Garrison Fort Belvoir

Section 106 Consultation; Fort Belvoir Elementary Expansion, Fort Belvoir, Virginia

VDHR File #: 2014-0136

VDHR has reviewed the above referenced project and concurs with the Army's determination of No Historic Properties Affected

Marc Holma, Architectural Historian
Office of Review and Compliance
Virginia Department of Historic Resources

14 Feb 14
Date

Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730

Office 803-328-2427
Fax 803-328-5791

February 28, 2014

Attention: Bill Sanders
Department of the Army
9820 Flagler Road, Suite 213
Fort Belvoir, Virginia 22060-5928

Re. THPO #	TCNS#	Project Description
2014-253-1		Fort Belvoir Elementary Expansion, Fort Belvoir, Virginia

Dear Mr. Sanders,

The Catawba have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. **However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project.**

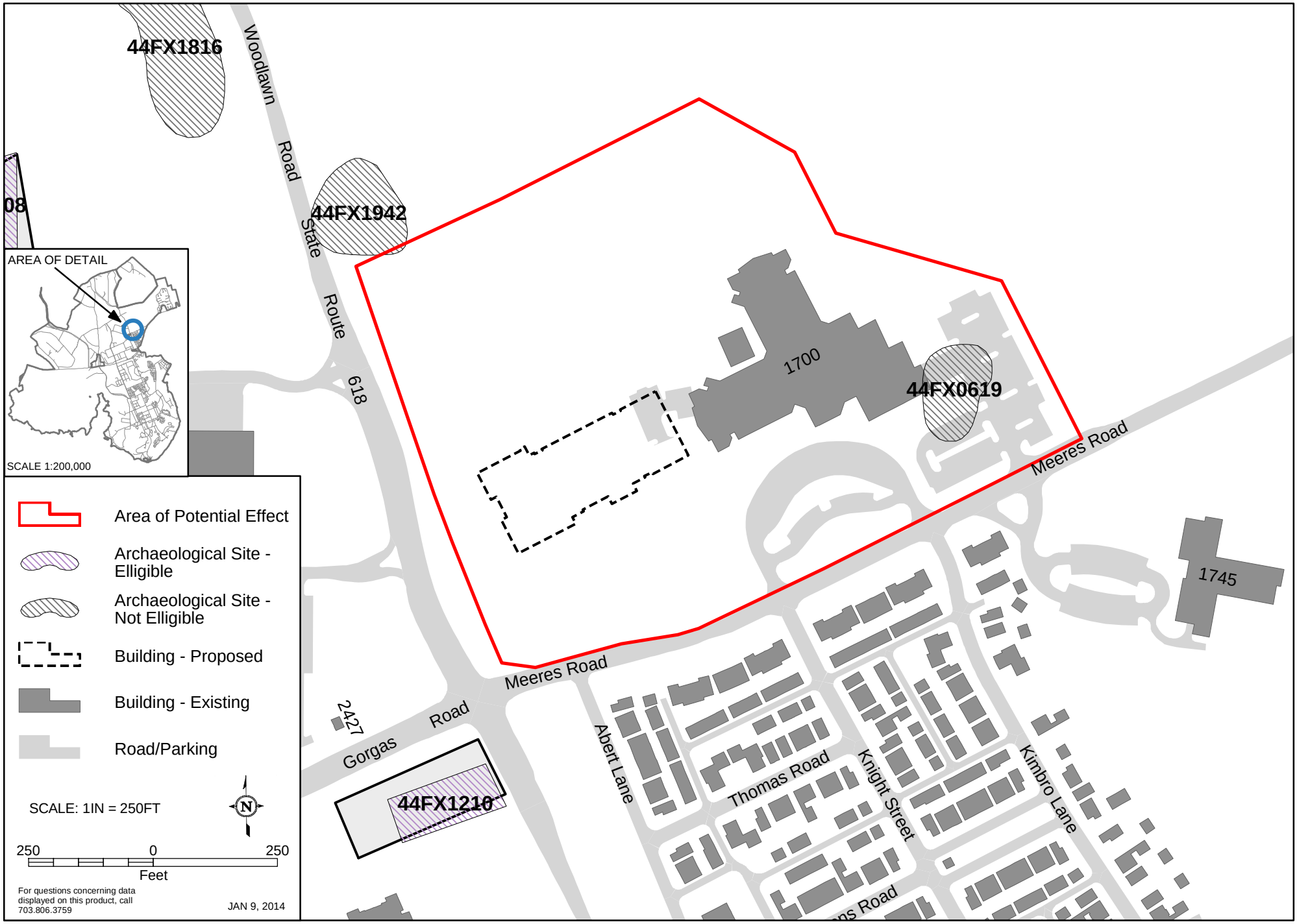
If you have questions please contact Caitlin Totherow at 803-328-2427 ext. 226, or e-mail caitlinh@ccppcrafts.com.

Sincerely,

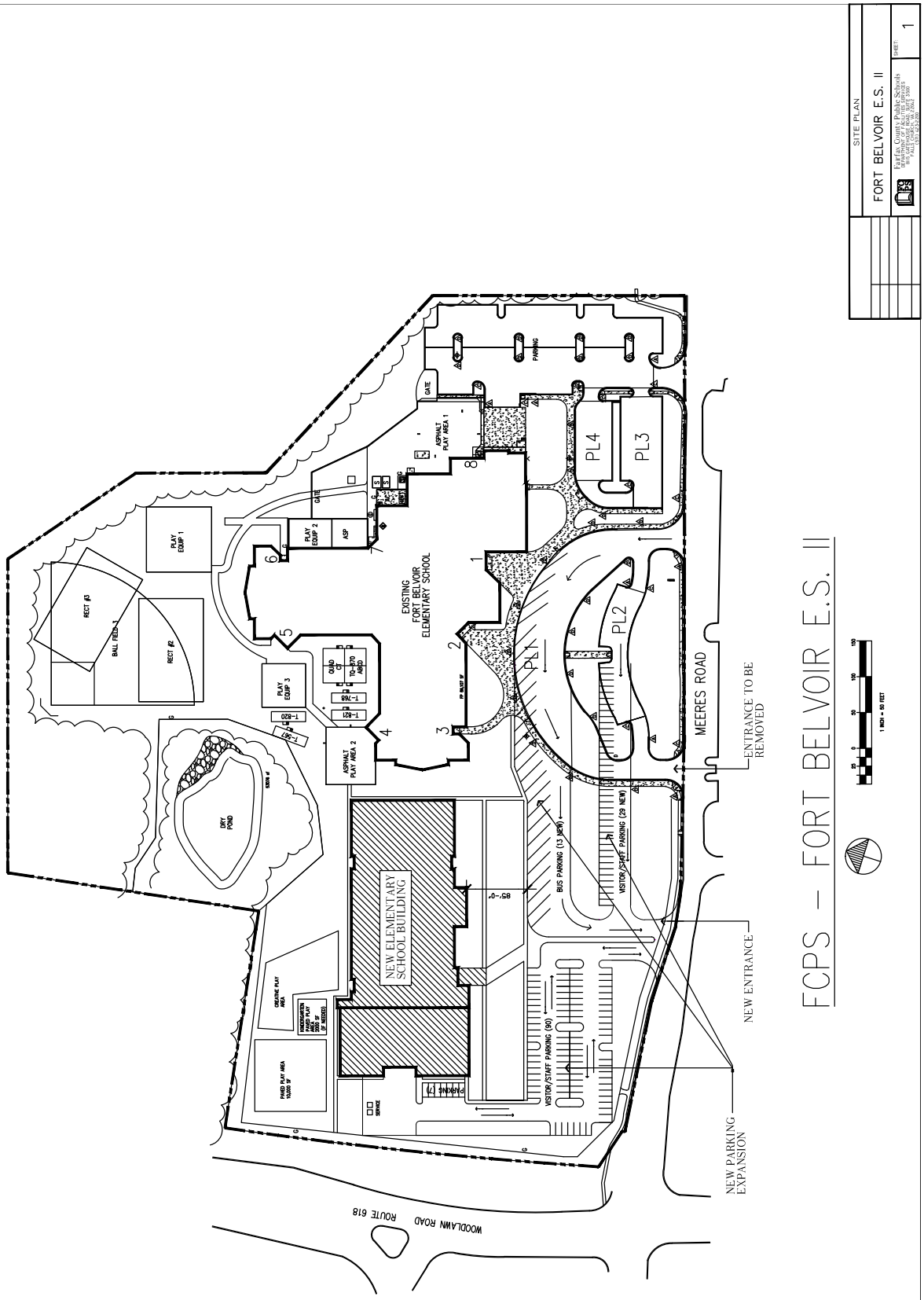
Caitlin Totherow for

Wenonah G. Haire
Tribal Historic Preservation Officer

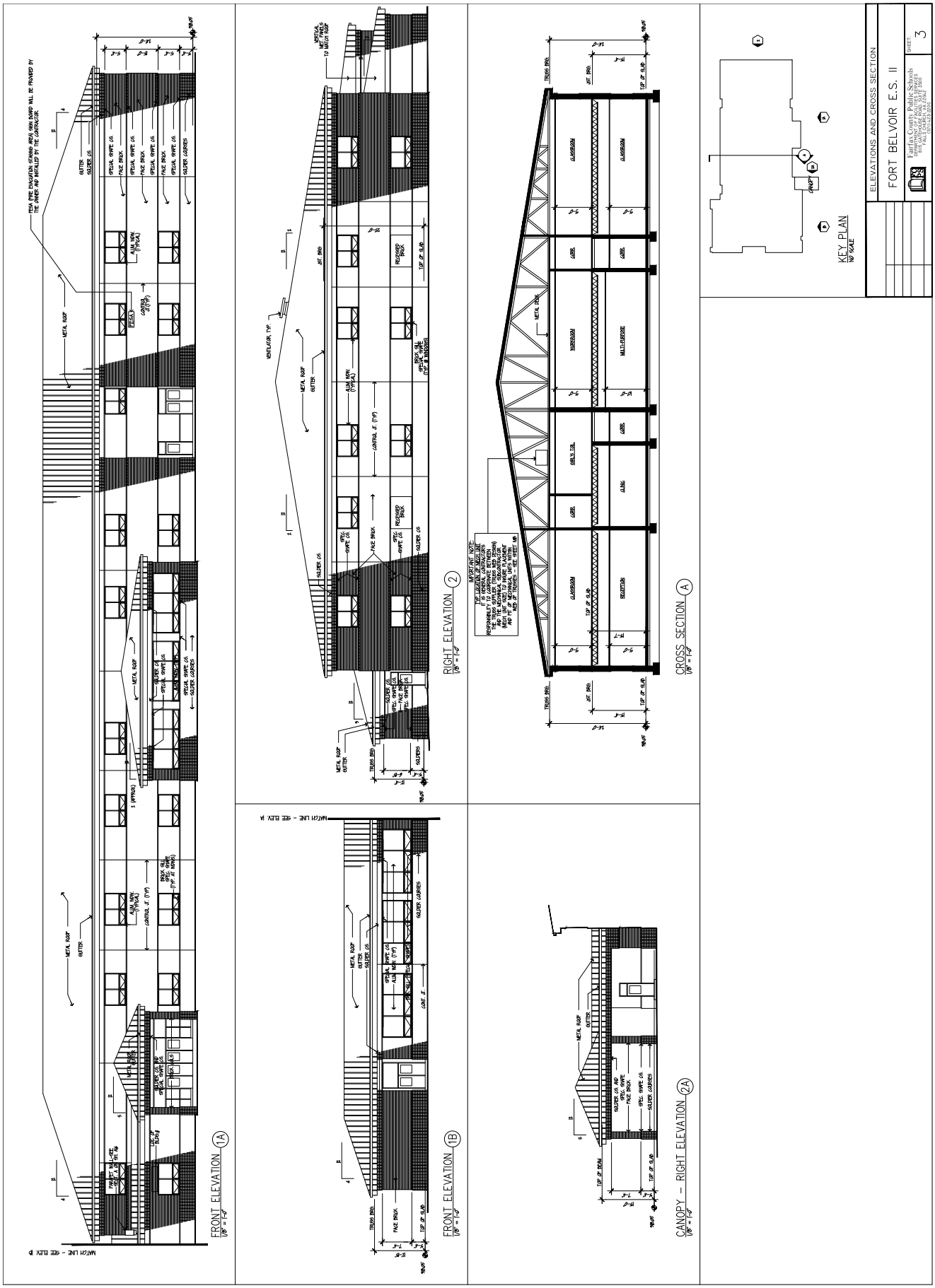
AREA OF POTENTIAL EFFECT FOR FORT BELVOIR ELEMENTARY SCHOOL EXPANSION



Ft. Belvoir Elementary II: Site Plan



Ft. Belvoir Elementary II: Elevations and Cross Section



Appendix F

Environmental Assessment Public Distribution List

Environmental Assessment
Fort Belvoir Elementary School Expansion
Public Distribution List
May 28, 2014

Pastor Robin Bemiller Accotink United Methodist Church 9041 Backlick Road Fort Belvoir, Virginia 22060	Honorable Gerry Connolly Congress Representative Annandale District Office 4115 Annandale Road, Suite 103
Ms. Katharine Kerr Advisory Council on Historic Preservation Federal Property Management Section 1100 Pennsylvania Avenue, NW, Suite 803 Washington, D.C. 20004	Honorable James P. Moran Congress Representative, District 7 333 North Fairfax Street, Suite 201 Alexandria, Virginia 22314 Honorable James P. Moran
Ms. Judy Riggin Alexandria Religious Society of Friends 2405 Nemeth Court Alexandria, Virginia 22306	Mr. Marc Holma Department of Historic Resources Architectural Historian 2801 Kensington Avenue Richmond, Virginia 23221
Dr. Wenonah Haire Catawba Indian Nation Tribal Historic Preservation Office 1536 Tom Steven Road Rock Hill, South Carolina 29730	Mr. Fred Selden Fairfax County Department Planning and Zoning 12055 Government Center Parkway, Suite 730 Fairfax, Virginia 22035-5505
Mr. Darin Steen Catawba Indian Nation Environmental Services Director 996 Avenue of the Nations Rock Hill, South Carolina 29730	Ms. Linda Cornish Blank Fairfax County Department Planning and Zoning Historic Preservation Planner 12055 Government Center Parkway, Suite 730 Fairfax, Virginia 22035
Chief Bill Harris Catawba Indian Nation 996 Avenue of the Nations Rock Hill, South Carolina 29730	Ms. Kathy Ichter Fairfax County Department of Transportation 4050 Legato Road Suite 470 Fairfax, Virginia 22033-2867

Mr. Thomas Biesiadny Fairfax County Department of Transportation4050 Legato Road, Suite 400 Fairfax, Virginia 22033	Chairman Sharon Bulova Fairfax County Board of Supervisors 12000 Government Center Parkway, Suite 530 Fairfax, Virginia 22035-0079
Mr. Robert Beach Fairfax County History Commission Fairfax Regional Library 10360 North Street Fairfax,Virginia 22030	Chairman Peter Murphy, Jr. Fairfax County Planning Commission 12000 Government Center Pkwy, Suite 330 Fairfax,Virginia 22035-0042
Mr. Mark Canale Fairfax County Department of Transportation 12055 Government Center Parkway Suite 1034 Fairfax, Virginia 22035	Mr. Edward Long, Jr. Fairfax County Executive 12000 Government Center Pkwy. Suite 552 Fairfax, Virginia 22035-0065
Mr. John Burns Fairfax County Architectural Review Board 12000 Government Center Parkway Fairfax, Virginia 22035	Mr. David Bowden Fairfax County Park Authority Planning and Development Division 12055 Government Center Parkway Suite 406 Fairfax, Virginia 22035-1118
Ms. Elizabeth Crowell Fairfax County Cultural Resources Management and Protection 2855 Annandale Road Fairfax, Virginia 22042	Supervisor Jeff McKay Franconia Government Center Fairfax County Board of Supervisors 6121 Franconia Road Franconia, Virginia 22310-2508
Mr. Anthony Barrero Fairfax County Fire Department 10700 Page Ave. Fairfax, Virginia 22030	Mr. Philip Latasa Friends of Accotink Creek 127 Poplar Road Fredericksburg, Virginia 22406-5022

Mr. Harry Glasgow Friends of Huntley Meadows C/O Huntley Meadows Park 3701 Lockheed Blvd. Alexandria, Virginia 22306	Mr. Kevin Munroe Huntley Meadows Park 3701 Lockheed Boulevard Alexandria, Virginia 22306
Mr. Matt Virta George Washington Memorial Parkway Headquarters Turkey Run Park McLean, Virginia 22101	Mr. Bryan Russell Inlet Cove Homeowners Association 12084 Cadet Court Manassas, Virginia 20109
Mr. Ronald Chase Gum Springs Historical Society 8100 Fordson Road Gum Springs, Virginia 22306	Ms. Tish Tyson Interested Party 8641 Mount Vernon Highway Alexandria, Virginia 22309
Mr. Scott Stroh Gunston Hall Plantation 10709 Gunston Road Lorton, Virginia 22079	Ms. Vicki McLeod Interested Party 7928 Central Park Circle Alexandria, Virginia 22309
Mr. Mark Whatford Gunston Hall Plantation 10709 Gunston Road Lorton, Virginia 22079	Mr. Michael Devlin Interested Party 5920 Mount Vernon Boulevard Lorton, Virginia 22079
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Supervisor Jeff McKay Lee District Association of Civic Organizations 5707 Norton Rd. Alexandria, Virginia 22303-1027	Ms. Lucia Ferguson Mason Neck Citizens Association P.O. Box 505 Mason Neck, Virginia 22196

Mr. Greg Weiler Mason Neck National Wildlife Refuge Darby Brooke Court Woodbridge, Virginia 22192	Ms. Patricia Soriano Mount Vernon Group, Sierra Club 5405 Barrister Place Alexandria, Virginia 22304
Mr. Scott Silverthorne Mayor, City of Fairfax 10455 Armstrong Street Fairfax, Virginia 22030-3627	Ms. P. William Moore, Jr. Mount Vernon Ladies Association Vice Regent for Virginia P.O. Box 1105 Mount Vernon, Virginia 22121
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Mr. Brett Kenney Mount Vernon Board of Supervisors 2511 Parkers Lane Alexandria, Virginia 22306	Mr. Marcel Acosta Executive Director National Capital Planning Commission 401 9th Street NW North Lobby, Suite 500 Washington, D.C. 20004
Chairman Jim Davis Mount Vernon Council of Citizen's Associations P.O. Box 203 Mount Vernon, Virginia 22121-0203	Ms. Mary Colligan National Oceanic Atmospheric Administration National Marine Fisheries Service Northeast Region Protected Resources 55 Great Republic Drive Gloucester, Massachusetts 01930-2276
Supervisor Gerald Hyland Mount Vernon Government Center Fairfax County Board of Supervisors 2511 Parkers Lane Alexandria, Virginia 22306-2799	Mr. Bill Bolger National Park Service Northeast Region Preservation National Historic Landmarks 200 Chestnut Street, 3rd Floor Philadelphia, Pennsylvania 19106

Mr. John Hildreth National Trust for Historic Preservation Southern Field Office 1785 Massachusetts Avenue, NW Washington, D.C. 20036-2117	Kelley Coyner Executive Director Northern Virginia Transportation Commission 2300 Wilson Boulevard, Suite 620 Arlington, Virginia 22201
Mr. Ross Bradford National Trust for Historic Preservation Associate General Council 1785 Massachusetts Avenue, NW Washington, D.C. 20036-2117	Mr. Reid Nelson Office of Federal Agency Programs Advisory Council on Historic Preservation 1100 Pennsylvania Avenue, NW, Suite 803 Washington, D.C. 20004
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Ms. Aimee Vosper Northern Virginia Regional Commission Environmental and Planning Services 3060 Williams Drive, Suite 510 Fairfax,Virginia 22031	Reverend Donald Binder Pohick Church 9301 Richmond Highway Lorton, Virginia 22076
Mr. Todd Hafner Northern Virginia Regional Park Authority Director of Planning and Development 5400 Ox Road Fairfax Station, Virginia 22039	Ms. Nick Firth President South County Federation P.O. Box 442 Mason Neck, Virginia 22199-0442
Mr. Jeffrey McKay Fairfax County Board of Supervisor Northern Virginia Transportation Commission 6121 Franconia Road Alexandria, Virginia 22310	Mr. Perry McDonald The Audubon Society of Northern Virginia11100 Wildlife Center Dr., Suite100 Reston, Virginia 20190

Ms. Edyth Kelleher Executive Director Southeast Fairfax Development Corporation6677 Richmond Highway, Alexandria, Virginia 22306	Ms. Marlys Osterhues NEPA-Oversight Team Leader U.S. Department of Transportation Federal Highway Administration 1200 New Jersey Ave, SE, HEPE-30 Washington, D.C. 20590-0001
Mr. Nathan Lott The Virginia Conservation Network 422 East Franklin Street, Suite 303 Richmond, Virginia 23219	Mr. Genevieve LaRouche Supervisor, Annapolis Field Office U.S. Fish and Wildlife Service 177 Admiral Cochrane Drive Annapolis, Maryland 21401-7307
Mr. Willie Taylor Director-U. S. Department of the Interior Office of Environmental Policy and Compliance 1849 C Street, NW, Room 2342 Washington, D.C. 20240	Ms. Cindy Schulz Virginia Field Office Supervisor U.S. Fish and Wildlife Service 6669 Short Lane Gloucester, Virginia 23061
Ms. Susan Bromm Division Director U. S. Environmental Protection Agency Office of Federal Activities 1200 Pennsylvania Avenue, NW, Room 7209 Washington, D.C. 20460-0001	Mr. John Bricker State Conservationist 1606 USDA, Natural Resources Conservation Service Santa Rosa Road, Suite 209 Henrico, Virginia 23229-5014
Mr. Jose Jimenez NEPA-Federal Facilities Director U. S. Environmental Protection Agency Region III Office of Enforcement, Compliance and Environmental Justice 1650 Arch Street Philadelphia, Pennsylvania 19103-2029	Ms. Deanna Beacham Virginia Council on Indians P.O. Box 1475 Richmond, Virginia 23218
Ms. Barbara Smith U. S. Environmental Protection Agency, Region III 1650 Arch Street Philadelphia, Pennsylvania 19103-2029	Faye McKinney Virginia Department of Conservation and Recreation-Natural Heritage 600 E. Main St., 24th Floor Richmond, Virginia 23219

Ms. Beth Reed Virginia Department of Conservation and Recreation-Recreation Planning 600 E. Main St., 24th Floor Richmond, Virginia 23219	Honorable David Albo Virginia House of Delegates-42nd District Office6367 Rolling Mill Place, Suite 102 Springfield, Virginia 22152
Ms. Ellie Irons Review Program Manager Virginia Department of Environmental QualityOffice of Environmental Impact P.O. Box 1105 Richmond, Virginia 23218	Honorable Mark Sickles Virginia House of Delegates-43rd District Office P.O. Box 10628 Franconia, Virginia 22310
Honorable Luke Torian Virginia House of Delegates- 52nd District 4222 Fortuna Plaza, Suite 659 Dumfries, Virginia 22025	Honorable Scott Surovell Virginia House of Delegates-44th District Office P.O. Box 289 Mount Vernon, Virginia 22121
Honorable David Bulova Virginia House of Delegates-37th District Office9900 Main Street, Plaza 102 Fairfax , Virginia 22031	Mr. Patrick Tremblay Virginia National Defense Industrial Authority P.O. Box 798 Richmond, Virginia 23218
Honorable Vivian Watts Virginia House of Delegates-39th District Office 8717 Mary Lee Lane Annandale, Virginia 22003	Honorable Patricia Ticer Virginia Senate 301 King Street, Room 2007 Alexandria, Virginia 22314
Honorable Timothy Hugo Virginia House of Delegates-40th District Office P.O. Box 893 Centreville, Virginia 20122	Honorable George L. Barker Virginia Senate -39th District P.O. Box 10527 Alexandria, Virginia 22310
Honorable Tim Kaine Virginia Senate 388 Russell Senate Office Bldg Washington, D.C. 20510	Honorable Mark Warner Virginia Senate 475 Russell Senate Office Bldg Washington, D.C. 20510

Honorable Adam P. Ebbin Virginia State Senate-30th District Office P.O. Box 26415 Alexandria, Virginia 22313	Supervisor Pat Herrity West Springfield Governmental Center Fairfax County Board of Supervisors 6140 Rolling Road Springfield, Virginia 22152-1579
Honorable Linda Puller Virginia State Senate-36th District Office P.O. Box 73 Mount Vernon, Virginia 22121-0073	Mr. John Riley Acting Director Woodlawn and Frank Lloyd Wright's Pope-Leighey House P.O. Box 15097 Alexandria, Virginia 22309
Pastor Travis Hilton Woodlawn Baptist Church 9001 Richmond Highway Alexandria, Virginia 22309	Pastor Lyle Morton Woodlawn United Methodist Church 7730 Fordson Road Alexandria, Virginia 22306

Appendix G

Public Comments and Army Responses

Comment Response Matrix
EA and FNSI
Fort Belvoir Elementary School Expansion

Name/Agency	Comment Number	Comment Category	Comment	Response
Federal Agency (code F)				
U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)	F-1-1	Soil and Water	Agreed that the finding of "No Significant Impact" is correct concerning the soil and water resources. The use of a previously developed site limits the impacts to these natural resources.	Comment noted.
USDA NRCS	F-1-2	Soil and Water	To protect these precious resources, it is imperative that the SWPPP be developed and followed and that erosion and sediment control measures be implemented to ensure impacts to these resources are kept to a minimum and of a temporary nature.	As described in Section 4.3 of the EA and in the FNSI, the contractor will be required to develop a Stormwater Pollution Prevention Plan and implement erosion and sediment control measures.
National Capital Planning Commission (NCPC)	F-2-1	Parking and Transportation	The EA states that 90 parking spaces will be added for visitors and staff at the new facility (FBES II). NCPC's Comprehensive Plan for the National Capital assigns a parking ratio goal range of one space for every 1.5 - 2.0 employees (1:1.5 - 2.0) for all federal facilities located outside the District of Columbia and beyond 2,000 feet of a Metrorail station. This will be the ratio NCPC staff uses in future design reviews to measure conformance with the transportation policies of the Comprehensive Plan. We encourage Fairfax County Public Schools (FCPS) to take this into consideration as it continues to develop the project plans.	Comment noted. While Fairfax County Public School employees are not federal employees, Fort Belvoir and Fairfax County Public Schools will strive to achieve the transportation goals as outlined in the Fort Belvoir Transportation Management Plan and NCPC's Comprehensive Plan.
NCPC	F-2-2	Parking and Transportation	We ask that information regarding the total employee population and employee parking supply for both the existing and proposed schools be provided when the project is submitted for preliminary review.	Comment noted. USAG Fort Belvoir and FCPS will include the appropriate information in the design review submittal.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
NCPC	F-2-3	Stormwater Management	The EA states that all stormwater management facilities will be compliant with the Virginia Department of Environmental Quality (VDEQ) stormwater regulations and Section 438 of the Energy Independence and Security Act of 2007 (EISA 438). NCPC looks forward to working with the Army and FCPS to ensure compliance as design development progresses.	Comment noted. USAG Fort Belvoir and FCPS will include the appropriate information in the design review submittal.
NCPC	F-2-4	Stormwater Management	A number of promising strategies were mentioned with the EA that could address stormwater management and help the project meet its criteria. NCPC also appreciates how FCPS will potentially retrofit existing stormwater management infrastructure to provide additional treatment.	Comment noted.
NCPC	F-2-5	Stormwater Management	Specifically with regard to the requirements under EISA 438, we recommend that any documentation intended to demonstrate compliance with this federal requirement be prepared in accordance with the Environmental Protection Agency's guidance entitled *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (December 2009). The guidance includes a section that describes how to properly document compliance and operation of stormwater management practices for a particular project. Proper documentation should include: - Evaluation of site and soil conditions - Rainfall event calculations - Design objective modifications - Site design and stormwater management practices - Design calculations for each stormwater management practice - Stormwater volume managed by each practice and as a whole - Operations and maintenance protocols	Comment noted. Fort Belvoir will recommend that FCPS use the EPA's guidance entitled *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (December 2009) in designing stormwater management for the proposed site.
NCPC	F-2-6	Energy Use	NCPC commends FCPS for seeking a Collaborative for High Performing Schools (CHPS) certification which has Leadership in Energy and Environmental Design (LEED) like program criteria. Since LEED Silver criteria is the typical standard used for buildings at Fort Belvoir, FCPS should prepare documentation showing that the CHPS criteria is equivalent to at least a LEED Silver design. This information should be included in the Final EA.	As the design progresses, sustainable design strategies will be decided upon and the CHPS credits documented. This information will be presented in the NCPC submission and equivalency with the LEED rating system can be demonstrated.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
NCPC	F-2-7	Coordination	This project will be built by FCPS with approval by the Army, who will eventually own the facility. Since this facility is located on a federal installation, both the existing elementary school and the proposed expansion should be consistent with the policies within the Federal Elements of the *Comprehensive Plan for the National Capital*. To assist in achieving consistency, coordination should continue between the Army, FCPS, and NCPC throughout the design process.	Under the terms of the lease with FCPS, Fort Belvoir will not own the facility until the lease expiration in 2046. Until that time, the new school is not considered a federal facility. The proposed expansion will be consistent with the policies within the Federal Elements of the *Comprehensive Plan for the National Capital* to the maximum extent practicable. It should be noted that Fairfax County Public Schools will operate the facility according to its policies and regulations in cooperation with the installation.
Environmental Protection Agency (EPA)	F-3-1	General	Although there are no objections to the Proposed Action, EPA has questions/comments for your consideration in the Technical Comments document which is enclosed.	Comment noted.
EPA	F-3-2	Prime and Unique Farmlands	The Army delineated prime farmland impacted by the Proposed Action regardless of the current state of cultivation. However, EPA questions whether these efforts should be coordinated with the Natural Resources Conservation Service (NRCS) or USDA Service Center. It is understand[able] that impacts to prime and unique farmland should be avoided. However, if this is not possible, the EA should explain the implications of developing the prime farmland with respect to the Farmland Protection Policy Act as well as describe the mitigation measures for those impacts.	The NRCS has reviewed the EA and had no comment concerning the designation of prime farmland. Soil map units designated as prime farmland (Sassafras sandy loam, 2 to 7 percent slopes) could be impacted if FCPS chooses to construct a step-pool outfall as part of their stormwater management plan; however, no soils within Fort Belvoir are available for agriculture and would qualify as prime farmland protected under the Farmland Protection Policy Act. No mitigation measures are proposed.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
EPA	F-3-3	Hazardous Materials	Page 3-41 states, "An underground storage tank was removed during the demolition of the former Cheney Elementary School, located on the site of the current play fields west of the existing FBES. This tank was registered with VDEQ as UST 1741A. A petroleum release was reported to VDEQ in 1994 (record 19940797). The site was remediated during the demolition of Cheney Elementary School and the record is closed with VDEQ." Although the record has been closed with VDEQ, please state if the site had been cleaned to residential standards and if construction/operation of the site would be suitable for children. In addition, how old was the Cheney Elementary School when demolished and when was it removed? Is it possible that there could be contaminants due to lead, asbestos, etc. in the soil? Please explain.	Pollution Complaint 94-0797 was initiated when a suspected release was reported to VDEQ because of a tank tightness test failure. It was later found that the test failure was due to a loose coupling. The coupling was tightened and the tank was retested and found to be tight. Visible inspections of the tank top confirmed that there wasn't an actual release for this complaint. The tank was removed on June 30, 1998. Confirmatory PID and soil samples were taken from 2 walls of the excavation, the bottom of the excavation and from the soil that was stockpiled from the excavation. All of the soil samples were analyzed for TPH DRO and the stockpiled soil was additionally analyzed Benzene, Ethylbenzene, Toluene, Xylenes and a TCLP for metals was completed for the stockpiled soil. All of the sample results were below the reporting limits confirming that there was not a release from this tank. The Cheney Elementary School was constructed in 1960 and demolished in 1998. Asbestos abatement occurred prior to demolition in accordance with regulations. All demolition debris was hauled offsite to a permitted landfill.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
EPA	F-3-4	Hazardous Materials	EPA appreciates that the EA states, "Any hazardous substance or petroleum contaminated soils encountered during construction would be disposed of in accordance with state and Federal regulations. The contractor will be required to prepare a site Health and Safety Plan to ensure the safety of construction workers at the construction site and to document procedures if hazardous materials are discovered during construction." EPA is concerned that construction/operation of the site would be suitable for children and that if hazardous substances or petroleum soils are encountered, that clean-up is conducted for the end user, children, which would require the most stringent standards compared with other site use. Please make distinction and document accordingly.	Concur. Any remedial actions that may occur would be performed only after a thorough evaluation of the site and assessment of requirements. Actions would be coordinated with the proper regulatory authority.
EPA	F-3-5	Hazardous Material	Page 3-41 states, "Emergency generators proposed for the new FBES II would be operated by natural gas; therefore, no underground or above ground storage tanks are proposed for the new school (FCPS 2014). If FCPS determinates that an emergency generator will be part of the ultimate school design, FCPS will need to obtain a Fort Belvoir Directorate of Public Works (DPW) Tank Activity Permit." If there are no underground or above ground storage tanks proposed, why will the FCPS need to obtain a Tank Activity Permit? Also because there are environmental risks to using emergency generators, please discuss the risks and precautions to be built into the design of the new school building and/or renovated school building to protect children from toxic exhaust fumes, burns, etc. Specify management of generators and necessary restrictions.	A Tank Activity Permit would be required if a tank is brought onto the school site during construction such as for refueling equipment. Currently, FCPS is proposing an emergency generator fueled by natural gas, which would not require a Tank Activity Permit. Specific requirements for the generator will be developed as design progresses and will comply with safety and building codes. An errata sheet has been prepared for the EA that indicates that a Tank Activity Permit will be required if FCPS determines that a storage tank will be required for the emergency generator.
EPA	F-3-6	Vegetation	Page 3-50 states, "A small amount of forested habitat may need to be cleared if FCPS chooses to incorporate retrofits to the extended detention pond or stepped pool outfalls as part of the stormwater management design." Please state what is considered a "small amount" of forested habitat and describe the type of habitat that may be impacted.	Retrofits for the extended detention pond would likely impact less than a half acre of forest while construction of stepped pool outfalls would likely impact less than a quarter acre of forest. These forest communities are the mixed beech-oak-tulip tree forest described in Section 3.9.4.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
EPA	F-3-7	Children	Page 3-27 references EO 13045, *Protection of Children from Environmental Health and Safety Risks*, addressing the physical construction and renovation impacts to children. It is important to note that EO 13045 addresses more than air quality impacts from dust due to construction/renovation. Many other factors can negatively impact children's health (i.e., indoor air, sufficient ventilation, drinking water, lighting, volatile emissions, building products, etc.)	Comment noted.
EPA	F-3-8	General	Page 3-25 states, "Accotink Village is a small, non-military residential area clustered near the intersection of Backlick Road and US 1 near Tulley Gate (see Figure 2-2), and surrounded by Fort Belvoir." Accotink Village is depicted on Figure 1-2 not Figure 2-2.	This typo will be fixed through an errata sheet.
EPA	F-3-9	Children	Executive Order 13045 requires each federal agency to identify and assess environmental risks to children. "Environmental health and safety risks" are defined as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest." When conducting assessments of environmental risks, the lead agency should consistently and explicitly take into account health risks to children and infants from environmental hazards. Therefore, to the extent permitted by law and appropriate, and consistent with the agency's mission, each Federal agency: - shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and - shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.	Comment noted.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
EPA	F-3-10	Stormwater Management	Please identify the total number of impervious acres to be impacted from the Proposed Action not just the construction of the new school building (i.e. paved play areas, construction of parking areas, construction of new utilities/stormwater best management practices, reconfiguring the bus loop, etc.). The increase in the amount and rate of stormwater runoff from the FBES site should include not just the constructed school building, but other created impervious areas. Please confirm the total amount of pervious area converted to impervious surface area.	A total of 4.2 acres of pervious surface will be converted to impervious surface including all play areas, parking lots, buildings, and all other facilities.
EPA	F-3-11	Children	The Executive Order recognizes that some physiological and behavioral traits of children render them more susceptible and vulnerable than adults to environmental health and safety risks. Children may have a higher exposure level to contaminants because they generally eat more food, drink more water, and have higher inhalation rates relative to their size. Children also exhibit behaviors such as spending extensive amounts of time in contact with the ground and frequently putting their hands and objects in their mouths that can also lead to much higher exposure levels to environmental contaminants. In addition, a child's neurological, immunological, digestive, and other bodily systems are also potentially more susceptible to exposure related health effects. It has been well established that lower levels of exposure can have a negative toxicological effect in children as compared to adults, and childhood exposures to contaminants can have long-term negative health effects. Examples include life-long neurological deficits resulting from exposure to lead, mercury and other metals, and the increased susceptibility to particular mater[sic] and other asthma triggers in the environment. As a result, EPA strongly encourages that great effort is employed to build a healthy school building and environment. Please reference the following comment and explore the resources that EPA provides to create an environment for children to learn safely.	Comment noted.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
EPA	F-3-12	Healthy School Environment	Page 2-2 states, "The new facility will also be compliant with the Virginia Collaborative for High Performing Schools (CHPS) Sustainable Standards which were developed by FCPS. The CHPS program seeks to create a healthy, high performance, green, sustainable learning environment for children and contains elements similar to the Leadership in Energy and Environmental Design (LEED) program (FCPS 2013b)." In addition to the sustainable standards developed by FCPS, EPA encourages the Army to use the following EPA websites to access information on EPA Schools Program which provides valuable information on creating a healthy school environment for children to learn. The links are: - www.epa.gov/schools/programs.html -http://www.epa.gov/iaq/schooldesign -www.energystar.gov	The CHPS standards were developed in coordination with a multitude of organizations and agencies, including the EPA. EPA sources related to children's health utilized to set CHPS criteria include the EPA Radon in Schools Website: http://www.epa.gov/radon/pubs/schoolm.html, EPA Travel and Environmental Implications of Schools Siting: http://www.epa.gov/smartgrowth/school_travel.htm, EPA Restricted Use Product List: http://www.epa.gov/opprd001/rup/, and the EPA Energy Star program: www.energystar.gov. Fort Belvoir will encourage FCPS to utilize other EPA resources during the design of the school.
State Agency (code S)				
Virginia Dept of Environmental Quality (VDEQ) Northern Regional Office (NRO)	S-1-1	Wetlands and Water Quality	Based on the information provided, it appears the project will not impact streams or wetlands. However, a VWP Permit from DEQ may be required should impacts to surface waters be necessary.	Comment noted
VDEQ NRO	S-1-2	Wetlands and Water Quality	DEQ NRO recommends the avoidance and minimization of surface water impacts to the maximum extent practicable as well as coordination with the Corps.	Comment noted

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
VDEQ	S-2-1	Nonpoint Source Pollution Control	The Army and its authorized agents conducting regulated land-disturbing activities on private and public lands in the state must comply with [Virginia Erosion and Sediment Control Law and Regulation] VESCL&R and [Virginia Stormwater Management Law and Regulation] VSWML&R, including coverage under the general permit for stormwater discharge from construction activities, and other applicable federal nonpoint source pollution mandates (e.g. Clean Water Act Section 313, federal consistency under the Coastal Zone Management Act). Clearing and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, borrow areas, soil stockpiles, and related land-disturbing activities that result in the total land disturbance of equal to or greater than 10,000 square feet (2,500 square feet in lands analogous to a Chesapeake Bay Preservation Areas) would be regulated by VESCL&R. Accordingly, the Army must prepare and implement an erosion and sediment control (ESC) plan to ensure compliance with state law and regulations. The Army is ultimately responsible for achieving project compliance through oversight of onsite contractors, regular field inspection, prompt action against non-compliant sites, and other mechanisms consistent with agency policy (Reference: VESCL 62.1-44.15 et seq.)	Comment noted.
VDEQ	S-2-2	Nonpoint Source Pollution Control	The owner or operator of projects involving land-disturbing activities of equal to or greater than 1 acre is required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project-specific Stormwater Pollution Prevention Plan. The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit and the SWPPP must address water quality and quantity in accordance with the VSMP Permit Regulations. General information and registration forms for the General Permit are available at www.deq.virginia.gov/Programs/Water/StormwaterManagement /VSMPPermits/ConstructionGeneralPermit. aspx.	Comment noted. The contractor will be required to prepare a SWPPP and obtain coverage under the General VSMP Permit.
VDEQ	S-2-3	Point Source Pollution Control	The DEQ NRO recommends that the project follow all applicable permitting requirements.	Comment noted.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
VDEQ	S-2-4	Pollution Prevention	We have several pollution prevention recommendations that may be helpful during the construction: • Consider development of an effective Environmental Management System (EMS). An effective EMS will ensure that the proposed facility is committed to minimizing its environmental impacts, setting environmental goals and achieving improvements in its environmental performance. DEQ offers EMS development assistance and recognizes facilities with effective Environmental Management Systems through its Virginia Environmental Excellence Program. • Consider environmental attributes when purchasing materials. For example, the extent of recycled material content, toxicity level and amount of packaging should be considered and can be specified in purchasing contracts. • Consider contractors' commitment to the environment when choosing contractors. Specifications regarding raw materials and construction practices can be included in contract documents and requests for proposals. • Choose sustainable materials and practices for infrastructure and building construction and design. These could include asphalt and concrete containing recycled materials, and integrated pest management in landscaping, among other things.	Comments noted
VDEQ	S-2-5	Pesticides and Herbicides	In general, when pesticides or herbicides must be used, their use should be strictly in accordance with manufacturers' recommendations. In addition, DEQ recommends that the responsible agent use the least toxic pesticides or herbicides effective in controlling the target species. For more information on pesticide or herbicide use, please contact the Virginia Department of Agriculture and Consumer Services (804-786-3501).	All pesticide and herbicide use on the project will be in accordance with applicable laws and regulations, as well as Army policy on integrated pest management, which incorporates the recommendations from DEQ.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
VDEQ	S-2-6	Coastal Zone Management Act Federal Consistency	Based on the review of the Federal Consistency Determination and the comments submitted by agencies administering the enforceable policies of the VCP, DEQ concurs that the proposed project is consistent with Virginia's Coastal Zone Management Program provided all applicable permits and approvals are obtained as described.	Comment noted.
VDEQ Div of Air Program Coordination	S-3-1	Air Pollution Control	All precautions are to be taken to restrict the emissions of VOCs and NOx.	Comment noted. The supporting analysis for the Record of Non-Applicability demonstrates that the project is not expected to be a significant source of VOCs or NOx.
VDEQ Div of Air Program Coordination	S-3-2	Air Pollution Control	If the implementation of the project includes the burning of vegetative debris and/or demolition and construction material, this activity must meet the requirements under 9VACS-130 et seq. of the regulations for open burning, and it may require a permit. The regulations provide for, but do not require, the local adoption of a model ordinance concerning open burning. Fort Belvoir should contact the appropriate locality to determine what local requirements, if any, exist.	No burning of vegetative or construction debris will be permitted for this project.
VDEQ Div of Air Program Coordination	S-3-3	Air Pollution Control	During construction, fugitive dust must be kept to a minimum by using control methods outlined in 9VAC5-50-60 *et seq*. of the Regulations for the Control and Abatement of Air Pollution. These precautions include, but are not limited to, the following: • Use, where possible, water or chemicals for dust control; • Install and use hoods, fans and fabric filters to enclose and vent the handling of dusty materials; • Cover open equipment for conveying materials; and • Promptly remove spilled or tracked dirt or other materials from paved streets and dried sediments resulting from soil erosion.	The contractor will be required to adhere to fugitive dust control regulations through implementation of applicable best management practices.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
VDEQ Div of Air Program Coordination	S-3-4	Air Pollution Control	A precaution, which typically applies to road construction and paving work (9VAC5-40-5490 et seq.), places limitations on the use of "cut-back" (liquefied asphalt cement, blended with petroleum solvents), and may apply to the project. The asphalt must be "emulsified" (predominantly cement and water with a small amount of emulsifying agent) except when specified circumstances apply. Moreover, there are time-of-year restrictions on its use from April through October in VOC emission control areas.	Comment noted. The contractor will be required to adhere to 9VAC5-40-5490 et seq. as appropriate.
VDEQ Div of Air Program Coordination	S-3-5	Air Pollution Control	Fuel-burning equipment (boilers, generators, compressors, etc.) or any other air-pollution-emitting equipment may be subject to registration or permitting requirements.	Fort Belvoir will coordinate with VDEQ as appropriate concerning fuel-burning equipment and any updates to the emissions inventory for the Title V permit.
VDEQ Div of Land Protection and Revitalization (DLPR)	S-4-1	Solid and Hazardous Waste Management	Solid and hazardous waste issues were generally addressed in the EA, but the EA did not include results of solid and hazardous waste database searches. The DEQ DLPR staff has reviewed the submittal, conducted a cursory database search for zip code 22060 (Fort Belvoir), and identified the following sites with unknown proximity to the project site. [list included in comments]	Fort Belvoir DPW ENRD has reviewed these sites and has determined that they are unlikely to affect the project.
VDEQ DLPR	S-4-2	Solid and Hazardous Waste Management	Contact DEQ NRO to determine if the office has additional information that should be evaluated on the identified petroleum releases.	Fort Belvoir has coordinated with DEQ on petroleum releases and has determined that it is unlikely that they present a risk to the project.
VDEQ DLPR	S-4-3	Solid and Hazardous Waste Management	Contact Environmental Compliance Branch Chief (Kelly Lease at 703-806-0020), Directorate of Public Works, Environmental and Natural Resource Division, Fort Belvoir for information concerning CERCLA obligations at Fort Belvoir's Main Post.	Ms. Lease has been consulted for this project and will continue to be involved as necessary and appropriate.
VDEQ DLPR	S-4-4	Solid and Hazardous Waste Management	DEQ encourages all projects and facilities to implement pollution prevention principles, including: • the reduction, reuse and recycling of all solid wastes generated; and • the minimization and proper handling of generated hazardous wastes.	Comment noted. Current Army policy for construction projects addresses these principles.
VDEQ DLPR	S-4-5	Solid and Hazardous Waste Management	Advise the CERCLA contact prior to initiating any land, sediment or groundwater disturbing activities at or near Military Munitions Response Program range areas and Main Post Solid Waste Management Units (SWMUs).	Comment noted.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
VDEQ DLPR	S-4-6	Solid and Hazardous Waste	Report evidence of a new petroleum release, if discovered during construction of this project, to DEQ NRO as authorized by Code of Virginia 62.1-44.34.8 through 9 and 14-23, and 9VAC25-580-10 et seq.	Comment noted.
VDEQ DLPR	S-4-7	Solid and Hazardous Waste	Characterize and properly dispose of petroleum-contaminated soils and ground water generated during the construction of this project.	Comment noted.
VDEQ DLPR	S-4-8	Solid and Hazardous Waste	Characterize all construction and demolition debris, including any excess soil, in accordance with the Virginia Hazardous Waste Management Regulations prior to disposal at an appropriate offsite facility, as applicable.	Comment noted. The contractor will have waste manifest reporting requirements to DPW ENRD to ensure compliance with Virginia Hazardous Waste Management Regulations and Army policy.
VDEQ DLPR	S-4-9	Solid and Hazardous Waste	Conduct the removal, relocation or closure of any regulated petroleum storage tanks - aboveground storage tanks (ASTs) or underground storage tank (USTs) - in accordance with the requirements of the Virginia Tank Regulations 9VAC25-91-10 et seq. for ASTs and 9VAC25-580-10 et seq. for USTs.	Comment noted. No removal, relocation, or closure of ASTs or USTs is expected.
VDEQ DLPR	S-4-10	Solid and Hazardous Waste	Report the installation or use of any portable aboveground petroleum storage tank (>660 gallons, 9VAC5-91-10 et seq.) for more than 120 days to DEQ NRO.	Comment noted. No petroleum storage tanks >600 gallons are anticipated to be used for this project.
VDEQ DLPR	S-4-11	Solid and Hazardous Waste	All structures being demolished or removed should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM and LBP are found, in addition to the federal waste-related regulations mentioned above, state regulations 9VAC20-81-640 for ACM and 9VAC20-60- 261 for LBP must be followed.	Comment noted. Material to be demolished will be tested for ACM and LBP as required. No ACM or LBP is expected to be present due to the structure's age.
Virginia Dept of Conservation and Recreation (VDCR) Div of Natural Heritage (DNH)	S-5-1	Natural Heritage Resources	Biotics documents the presence of natural heritage resources in the project area. However, due to the scope of the activity and the distance to the resources, we do not anticipate that this project will adversely impact these natural heritage resources.	Comment noted.
VDCR DNH	S-5-2	Natural Heritage Resources	There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.	Comment noted.
VDCR DNH	S-5-3	Natural Heritage Resources	The proposed project will not affect any documented state-listed plants or insects.	Comment noted.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
VDCR DNH	S-5-4	Natural Heritage Resources	Re-submit project information and map to DCR DNH for an update on this natural heritage information if the scope of the project changes and/or six months has passed before it is utilized.	Comment noted.
Virginia Department of Game and Inland Fisheries (DGIF)	S-6-1	Wildlife Resources	According to DGIF's records, state-listed threatened wood turtles have been documented from the project area. Dogue Creek and a tributary to it, located just northeast of the project site, have been designated Threatened and Endangered Species Waters due to the presence of this species. It does not appear that impacts upon Dogue Creek, its perennial tributary, or areas within 300 meters of these waters are currently proposed. Assuming that is the case, DGIF does not anticipate this project to result in adverse impacts upon wood turtles. Further information about wood turtles can be found online at www.dgif.virginia.gov/wi/dlife/species/disp/ay.asp?id=030062. Bald eagle nests, roosts, and concentration zones have been documented from the project area; however, DGIF does not anticipate this project to result in adverse impacts upon bald eagles. In addition, Dogue Creek has been designated an Anadromous Fish Use Area.	Comment noted.
DGIF	S-6-2	Wildlife Resources	DGIF generally does not support proposals to mitigate wetland impacts through the construction of stormwater management ponds or support the creation of in-stream stormwater management ponds.	No stormwater management ponds are proposed as wetlands mitigation and no in-stream stormwater management ponds will be created.
DGIF	S-6-3	Wildlife Resources	DGIF recommends coordination with the FWS regarding possible impacts upon bald eagles.	Fort Belvoir will coordinate with FWS as necessary to ensure compliance with the Bald and Golden Eagle Protection Act.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
DGIF	S-6-4	Wildlife Resources	DGIF has the following recommendations to protect wood turtles: • Coordinate with DGIF regarding the protection of wood turtles if instream work in tributaries of Dogue Creek or work within 300 meters of such waterways is proposed. • Ensure that all contractors associated with work at this site be made aware of the possibility of encountering wood turtles on site and become familiar with their appearance, status and life history prior to the commencement of work because they may be encountered on site during construction even if instream work is not proposed. • Distribute the attached information sheet to contractors and employees. • Immediately remove wood turtles from danger, if they are encountered and are in jeopardy during the development or construction of this project, and move them safely to suitable habitat in or near the closest perennial stream. • Report any relocations to DGIF and submit the completed wood turtle observation form (attached) to DGIF.	Comments noted.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response

DGIF	S-6-5	Wildlife Resources	DGIF has the following recommendations to protect Dogue Creek:
			• Adhere to a time-of-year restriction from February 15 through June 30 of any year for any instream work in Dogue Creek and/or its tributaries.
			• Conduct any in-stream activities during low or no-flow conditions,
			  ○ using non-erodible cofferdams or turbidity curtains to isolate the construction area,
			  ○ blocking no more than 50% of the streamflow at any given time,
			  ○ stockpiling excavated material in a manner that prevents reentry into the stream,
			  ○ restoring original streambed and streambank contours,
			  ○ revegetating barren areas with native vegetation, and
			  ○ implementing strict erosion and sediment control measures.
			• Ensure that the Tremie method used to install concrete, grout bags and traditional pouring of concrete occur only in the dry, allowing all concrete to harden and cure prior to contact with open water, to minimize harm to the aquatic environment and its residents.
			• Construct stream crossings via clear-span bridges due to future maintenance costs associated with culverts, and the loss of riparian and aquatic habitat. However, if this is not possible, countersink any culverts below the streambed at least 6 inches, or use bottomless culverts, to allow passage of aquatic organisms.
			• Install floodplain culverts to carry bankfull discharges.
				Comments noted.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
DGIF	S-6-6	Wildlife Resources	To minimize overall impacts to wildlife and natural resources, DGIF offers the following comments about development activities: • Avoid and minimize impacts to undisturbed forest, wetlands, and streams to the fullest extent practicable. Avoidance and minimization of impact may include relocating stream channels as opposed to filling or channelizing as well as using, and incorporating into the development plan, a natural stream channel design and wooded buffers; • Maintain undisturbed naturally vegetated buffers of at least 100 feet in width around all on-site wetlands and on both sides of all perennial and intermittent streams; • Maintain wooded lots to the fullest extent possible; Design stormwater controls for this project to replicate and maintain the hydrographic condition of the site prior to the change in landscape. This should include, but not be limited to, utilizing bioretention areas, and minimizing the use of curb and gutter in favor of grassed swales. Bioretention areas (also called rain gardens) and grass swales are components of Low Impact Development (LID). They are designed to capture stormwater runoff as close to the source as possible and allow it to slowly infiltrate into the surrounding soil. They benefit natural resources by filtering pollutants and decreasing downstream runoff volumes; • Adhere to a time-of-year restriction from March 15 through August 15 of any year for all tree removal and ground clearing activities to protect nesting resident and migratory songbirds; and • Adhere to erosion and sediment controls during ground disturbance.	Comments noted.
Virginia Department of Historic Resources	S-7-1	Historic and Archaeological Resources	DHR reviewed this in February pursuant to Section 106 of the National Historic Preservation Act. We concurred with a determination of No Historic Properties Affect. We reiterate this finding for the EA.	Comment noted.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Virginia Department of Health (VDH) Office of Drinking Water (ODW)	S-8-1	Public Water Supply	There are no apparent impacts to public drinking water sources due to this project. No public groundwater wells are within a 1-mile radius of the project site. The project is not within Zone 1 (up to 5 miles into the watershed) or Zone 2 (greater than 5 miles into the watershed) of any public water sources.	Comment noted.
Virginia Department of Transportation (VDOT) Northern Virginia District (NOVA)	S-9-1	Transportation	In terms of potential for impact to traffic and the transportation network, the draft FONSI indicates that traffic analysis for 2017 identified no level of service (LOS) issues attributed to the construction of the school. Although minor localized effects at intersections are possible, mitigation measures have been identified and could be included in the final project design. In summary, the document concludes that no significant impacts to traffic from construction of the school are anticipated.	Comment noted.
Local Government (code L)				
Fairfax County Department of Planning and Zoning (DPZ)	L-1-1	Stormwater	Staff is pleased to see a commitment to designing and building the school to meet the Collaborative for High Performing School criteria and the commitment to low impact development components to the stormwater management of the school property.	Comment noted.
Fairfax County Department of Public Works and Environmental Services (DPWES)	L-2-1	Stormwater	The application of useful and visible stormwater management facilities promotes environmental awareness and allows the students and teachers to use these facilities as part of their curriculum. Cisterns can be a beautiful and functional addition to any school. A great example of a 5,000 gallon cistern can be viewed at Longfellow Middle School in Falls Church. The county agrees with the proposal to retrofit the existing dry pond to an extended detention pond with step pool system at the outfall. This will provide a reduction in the volume and velocity of stormwater as well as sediment to the receiving waters.	Comment noted. Please note that all of the best management practices will not necessarily be carried through to the final design, as some may be eliminated due to site specific constraints or permitting issues.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response

Fairfax County DPWES	L-2-2	Stormwater	The Fairfax County DPWES has the following recommendations based on Figure 3-6: Potential Stormwater Management BMPs:
			• Use pervious pavement throughout the parking area. However, as per the Virginia BMP Clearinghouse, the parking area for the buses may require a thick aggregate base and, in the case of porous asphalt and pervious concrete, may require the addition of an admixture for strength or a specific bedding design.
			  ○ Sand should not be applied for winter traction or be stored where it may runoff onto the pavement.
			• Consider installing a partial green roof since the proposed cisterns may not receive enough rooftop drainage to be practical if the full green roof is installed.
			  ○ Consider removing the cistern on the west side of the building if the green roof is implemented on this side.
			  ○ Consider applying the green roof to only a portion of the roof, leaving the other side as a standard flat roof. The runoff from the standard roof in a cistern should be collected to be used later. There is a proposed "Creative Play Area" behind the school. If this is intended to be a garden area, then a cistern along this side of the school could provide the needed water to keep the plants thriving.
			  ○ Use an appropriately sized cistern to capture and use the water from the roof.
			  ○ Consider the final application of the water before sizing the cistern, which will allow the school to have the correct size for the use.
			  ○ Design the roof drainage system in a way that it can be easily tapped into by the cistern. (Le. enough of the roof should drain toward an external downspout intended for the cistern.)
			  ○ Consider disconnection in areas where the downspout may not be connected to a cistern.
				Comments noted. Fairfax County Public Schools will consider these treatment methods when designing the stormwater plans for the site.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Fairfax County DPWES, cont'd	L-2-2	Stormwater	• Consider soil amendments as another application where possible. • Consider coordinating with Fairfax County on stormwater plans for the school expansion.	Comments noted. Fairfax County Public Schools will consider these treatment methods when designing the stormwater plans for the site.
Citizen (code C)				
Ms. Catherine C. Ledec	C-1-1	Traffic and Transportation	Although there is a lot of information dealing with vehicle traffic in the reports prepared, there is very little information in this report describing any plans for how pedestrians will be handled and sidewalks will be installed and any associated safety precautions.	The site plans for the new elementary school used to develop the EA are still conceptual in nature and do not show specific locations of pedestrian facilities such as sidewalks and crosswalks. Locations for sidewalks and crosswalks will be shown on the site plans that will be submitted to Fort Belvoir Directorate of Public Works (DPW) review and approval.
Ms. Catherine C. Ledec	C-1-2	Traffic and Transportation	During morning drop off and evening pick up times at a school the roads all around the school will be teeming with children, parents, teachers, crossing guards, etc. There needs to be a very clearly demarcated area - separate from the bus drop area - for pedestrians. These pedestrians typically spill out into the streets, curbs and sometimes into traffic regardless of signage or painted areas on the sidewalk that ask one not to do this. Personally I have witnessed uncontrolled pedestrian traffic around our schools and this is worrisome for those existing or entering the school but it is also very worrisome for those who drive past the school. Also while we always hope they will, unfortunately bus drivers sometimes do not closely follow traffic rules. The bus drop off area should be clearly separated from the morning drop off areas used by parents so as to eliminate any hazards with the children in the way of the buses pulling in to drop off or pick up children.	Conceptual plans show the bus loop separated from the Kiss and Ride drop-off areas. FCPS maintains policies for student drop-off and pick-up to protect the safety of the students. At the existing Fort Belvoir Elementary School (FBES), staff supervises student arrival and dismissal at the bus loop and Kiss and Ride areas to guide and protect pedestrians at the school. No issues with traffic or pedestrians have been reported by FCPS or FBES.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Ms. Catherine C. Ledec	C-1-3	Traffic and Transportation	It is highly likely that a police officer will need to be stationed at the school during morning drop off and evening pick up times to manage the flow of traffic and pedestrians.	At the existing FBES, a crossing guard is used to manage pedestrian traffic crossing Meeres Road during arrival and dismissal times. There are no known issues with crossing Meeres Road. Crossing guards are expected to manage pedestrian traffic crossing Meeres Road for FBES II. If pedestrian safety concerns are recognized after the construction of FBES, Fort Belvoir Directorate of Emergency Services will evaluate the need for additional measures.
Ms. Catherine C. Ledec	C-1-4	Traffic and Transportation	Installing an on-demand pedestrian light (Hawk Light) at 1 or two locations in front of the school will provide safe crossing for all during off peak times. This is important since many times children and families return to the school for after school activities, events or for recreation and sports either on their own or through school organized events. During these off peak times, maintaining safe passage for those coming and going to the school property should remain a high priority.	The need for on-demand pedestrian light to cross Woodlawn Road or Meeres Road will be evaluated by FCPS and Fort Belvoir DPW during site plan review and approval.
Ms. Catherine C. Ledec	C-1-5	Traffic and Transportation	New off-post teachers, administrators and other off-post employees coming on-base for the new school are very likely to offset any traffic reductions from students who were formerly being transported off base.	The immediate effect of faculty and staff travel commuter distance to the new school is unknown; however, it is expected that eliminating the need to transport nearly 400 students off post would have a positive effect on traffic.
Ms. Catherine C. Ledec	C-1-6	Community Facilities and Services	There is mention of the "loss of play fields currently utilized by students at the existing FBES; however proposed and existing paved play areas will meet the recreational needs of students." Currently the area just to the north of Fort Belvoir on Richmond Highway in Fairfax County is significantly underserved with regard to recreational areas and green space for our children and families. All Fairfax County school properties including this one on Fort Belvoir need to maximize the utility of the property to provide recreation for children and families that live in these communities after hours and on weekends. Benefit: These facilities are known to families and children who live nearby and attend these schools.	The proposed school will meet FCPS standards for recreation and physical education. Fort Belvoir has no authority to address recreational facilities on FCPS properties off-Post.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Ms. Catherine C. Ledec	C-1-7	Community Facilities and Services	There is mention of existing facilities in the report. This is a unique opportunity to include renovations to improve these existing recreational facilities in order to provide easy access to recreation areas and green space for children and families who live nearby and attend this school.	On-Post recreational facilities are managed by the Fort Belvoir Office of Morale, Welfare and Recreation (MWR). MWR has not indicated that the loss of the play fields at FBES will require any additional recreational facility expansion on-Post.
Ms. Catherine C. Ledec	C-1-8	Community Facilities and Services	Play areas should not just be paved over with concrete. We all know that concrete surfaces contribute to stormwater runoff that should be either contained on site for re-use, or should be absorbed through the use of construction materials that allow the water to be absorbed by soils.	The proposed school site design was developed to meet FCPS programming needs. This includes play areas with pavement, as well as non-paved areas. During final site design, FCPS will seek to minimize the impervious surface at the site so as to reduce the stormwater treatment requirements.
Ms. Catherine C. Ledec	C-1-9	Community Facilities and Services	Some grassy areas could be converted garden space for the students to practice environmental science and to learn about how important it is that they interact with and understand their role in the natural world. With current research showing "nature deficit" in our children what better a place to re-connect the students that during the day time hours when they are at school. Larger grassy areas could be converted to multi-use fields that families and children can use after hours and on weekends.	The existing FBES has outdoor classrooms that include native plant gardens and vegetable gardens that enable students to collect authentic data concerning the natural environment. The proposed FBES II will utilize similar programming. The proposed site is constrained in space, prohibiting the retention of the grassy area west of the existing FBES; however, the multi-use fields north of the existing FBES will remain available for school activities.
Ms. Catherine C. Ledec	C-1-10	Natural Resources	In this section of the report there is discussion of this project being situated on the site of the former Cheney Elementary School and that this will minimize impacts on natural resources. It is likely however that there will be CDD Waste that will be uncovered during construction and will need to be removed.	Cheney Elementary School was demolished in 1998. Waste from the demolition was disposed of offsite; therefore, there is low likelihood that additional CDD waste would be uncovered during construction. Should unsuitable material, including CDD waste, be uncovered during the construction of FBES, the contractor would be required to dispose of it according to applicable Army policy and state and federal law.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Ms. Catherine C. Ledec	C-1-11	Natural Resources	Developers from recent local construction projects including Tysons Corner re-development and the Laurel Hill Adaptive Re-use project in Lorton indicate that they are recycling as much as 75% of their CDD. In fact the Laurel Hill project in Lorton has agreed to proffer than 100% of CDD will be recycled for their project. It is hoped that with Recycling this project can serve as an important best practice model for others to follow by proffering in recycling (by all contractors hired for this project) as much as 75% of all Construction and Demolition Debris (CDD) waste from the project. This should be directed towards a recycling facility rather than to a CDD landfill. As another example construction project in my community (Pavilions at Huntington Metro) will recycle 100% of CDD waste. None will be brought to a CDD Landfill.	Army policy requires that 50 percent of construction waste be diverted from landfills. In an effort to meet the Army waste diversion standards, Fort Belvoir requests monthly reports by item description and weight of any materials removed for recycling or reuse by the contractor. In addition, the CHPS rating system (similar to LEED) used on the project has credits for CDD recycling that offer additional incentive to recycle.
Ms. Catherine C. Ledec	C-1-12	Natural Resources	Any trees, brush or other organic material that will be cut down to clear space for the project should be recycled into mulch for use on site, rather than being transported off site.	Comment noted.
Ms. Catherine C. Ledec	C-1-13	Natural Resources	Native trees should be preserved wherever possible if their diameter is greater than about 4 inches. Tree protection fencing should be installed securely and clearly sign posted as such to protect trees all around the perimeter/boundary of and throughout the site.	Fort Belvoir Policy Memorandum #27 requires the maximum retention and protection of trees before considering removal. Tree protection measures for retained trees are required for all construction. All on-Post construction projects are required to have a DPW approved landscape plan that identifies trees to be removed, trees to remain, and protection measures for the remaining trees.
Ms. Catherine C. Ledec	C-1-14	Natural Resources	Impacts to any forested habitat should be minimized, including through stormwater pond design. Early successional forest is the preferred habitat for some wildlife species. If any native trees are located in these areas, they should be preserved and protected.	FCPS will be required to minimize impacts to forested habitat. Fort Belvoir Policy Memorandum #27 requires the maximum retention and protection of trees before considering removal. Tree protection measures for retained trees are required for all construction. All on-Post construction projects are required to have a DPW approved landscape plan that identifies trees to be removed, trees to remain, and protection measures for the remaining trees.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Ms. Catherine C. Ledec	C-1-15	Natural Resources	Yes, performing work outside the bird breeding season is important. This work should only be done between late August and March.	FCPS will be limiting tree clearing operations during the breeding season (April through August).
Ms. Catherine C. Ledec	C-1-16	Energy Use	The flat rooftop of this building is an ideal location for the installation of rooftop solar. I urge you to take this recommendation seriously. It will provide this project with the opportunity to lead and set a strong example within Fairfax County and particularly the School System for others to follow. This could provide an opportunity for a solar energy project that could result in other solar development on other school building rooftops. This is also an enormous educational opportunity for the children at this school.	The final design for the roof the school is still being developed. A sloped roof may be utilized in the final design based on cost, aesthetics, etc. All opportunities for renewable energy systems will be evaluated during the design process.
Ms. Catherine C. Ledec	C-1-17	Stormwater	A sustainable landscape such as those described in the US Botanic Garden's Landscape for Life program manages stormwater on-site. See www.landscapeforlife.org for details on this program. I urge you to consider the installation of cisterns, rain barrels, rain gardens, vegetative buffers, bioswales and the like should be used throughout the site to manage stormwater and rainwater on site rather than allowing it to run off into stream[s] and rivers.	FCPS will be required to meet standards set in Section 438 of the Energy Independence and Security Act of 2007. These standards require that stormwater be managed onsite and incorporate a suite of potential best management practices such as cisterns, pervious pavement, bioswales, and bioretention. Possible stormwater management options are discussed in Section 3.4.3 of the EA.
Ms. Catherine C. Ledec	C-1-18	Stormwater	Minimizing the use of pesticides will support local wildlife as will using native plantings throughout the site which serve to absorb storm and rainwater runoff.	Pesticide use at the proposed FBES II will need to comply with Fort Belvoir Memorandum #32, Integrated Pest Management and the Fort Belvoir Integrated Pest Management (IPM) Plan, as well as applicable federal and state laws and regulations. The IPM objective is to identify operational procedures that use the least toxic method to control pest populations in a cost-effective, environmentally sound method. Native plantings will be utilized as applicable to meet CHPS certification and tree mitigation requirements.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Ms. Catherine C. Ledec	C-1-19	Natural Resources	Just to the north of Fort Belvoir is Huntly Meadows Park a widely known hot spot for birds (and Virginia Birding Trail site) all seasons of the year. In particular during migration large numbers of migrating birds pass through and stop over in this area. Care needs to be taken to protect the populations of these species.	The proposed project will not affect bird populations at Huntly Meadows Park. Impacts to Partners in Flight identified habitat have been minimized through the utilization of previously developed areas.
Ms. Catherine C. Ledec	C-1-20	Natural Resources	The Fort Belvoir Property is located in an area of Fairfax County that is directly to an in some places directly part of the Atlantic Coast Migration Corridor. I urge you to consider using Bird Friendly Architecture as recommended by the American Bird Conservancy's and described at: http://collisions.abcbirds.org/ We also recommend a partnership with the American Bird Conservancy, The Plains, Virginia to ensure bird friendly architecture and design to minimize collisions with any structures including windows, guy wires (if used), power transmission wires, and the like. This should include eliminating the use of mirrored glass. Large windows should have bird friendly protection measures to prevent collisions. No guy wires used for any tall structures. Bird collision protection measures can easily be worked into the architectural designs of a building when it is in the planning stages. Please consider implementing this at all projects that occur on Fort Belvoir.	Fort Belvoir will recommend that FCPS consider incorporating elements of Bird Friendly Architecture, as practicable, into the design for FBES II. No mirrored glass is anticipated to be used in the construction of FBES II.
Ms. Catherine C. Ledec	C-1-21	Natural Resources	If there are pesticides and herbicides used anywhere on Fort Belvoir green space, including naturally occurring pesticides such as BT used in a suppression program for the Fall Cankerworm, these should be cancelled so as to allow the natural balance of the biodiversity that supports our area to recover for such damaging activities. Songbirds, butterflies and moths have been experiencing important declines in their populations and human actions such as the use of pesticides negatively impacts these species. Trees, flora and fauna have a natural ability to manage the ebbs and flows of insect populations. Any human intervention due to spraying disrupts the natural balance and results in a pesticide treadmill that is extremely difficult to stop. Maintaining the natural balance by leaving the natural cycles to occur serves to best support the flora and fauna of our area.	Pesticide use throughout Fort Belvoir is outside of the scope of this EA.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Ms. Catherine C. Ledec	C-1-22	General	Fort Belvoir, as US Army Garrison is in the unique position to implement this project as a best practice on many fronts. Where possible the minimum requirements will be followed but this is not enough for the work to be considered a best practice. Exceeding the minimum requirements will set the stage for a best practice project that will be a model for others to follow.	FCPS and USAG Fort Belvoir have committed to develop the proposed elementary school as a verified Collaborative for High Performance Schools (CHPS) facility. This program encourages a variety of green and sustainable development practices that are above and beyond the minimum standards set by FCPS for the construction of a new school.
Ms. Catherine C. Ledec	C-1-23	Natural Resources	Fort Belvoir's property has a high number of mature trees all of which serve as habitat for bats. Care needs to be taken to protect the bat populations which are struggling due to White Nose syndrome and the effects of limited knowledge of the importance of bats to the overall ecological balance in our area. Bats are a nocturnal species and are not seen by the general public. We need to take care to protect these important species from harm due to unnatural human interventions such as development and or pesticide uses. Bats do a wonderful job at naturally managing insect populations.	Impacts to mature trees will be minimized through implementation of Fort Belvoir Policy Memorandum #27 and the review and approval of FCPS' landscape plan by Fort Belvoir DPW.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Ms. Catherine C. Ledec	C-1-24	Natural Resources	We recommend a partnership with the Sustainable Sites Initiative (SITES™) (http://www.sustainablesites.org/) which is a program based on the understanding that land is a crucial component of the built environment and can be planned, designed, developed, and maintained to protect and enhance the benefits we derive from healthy functioning landscapes. Sustainable landscapes create ecologically resilient communities better able to withstand and recover from episodic floods, droughts, wildfires, and other catastrophic events. They benefit the environment, property owners, and local and regional communities and economies. The SITES program provides tools for those who influence land development and management practices and can address increasingly urgent global concerns such as climate change, loss of biodiversity, and resource depletion. They can be used by those who design, construct, operate, and maintain landscapes, including but not limited to planners, landscape architects, engineers, developers, builders, maintenance crews, horticulturists, governments, land stewards, and organizations offering building standards.	FCPS and USAG Fort Belvoir have committed to develop the proposed elementary school as a verified CHPS facility. This program encourages a variety of green and sustainable development practices that are very similar to the Sustainable Sites Initiative.

Comment Response Matrix, cont'd

Name/Agency	Comment Number	Comment Category	Comment	Response
Ms. Catherine C. Ledec	C-1-24, cont'd	Natural Resources	The SITES program offers a systematic, comprehensive rating system designed to define sustainable sites, measure their performance, and ultimately elevate the value of landscapes. The SITES Rating System can apply to development projects located on sites with or without buildings, including: - Open Spaces - local, state, and national parks; botanic gardens arboretums - Streetscapes and plazas - Commercial - retail and office areas; corporate campuses - Residential - neighborhoods or individual yards - Educational/Institutional - public and private campuses; museums; hospitals - Infrastructure - Government - Military - Industrial	FCPS and USAG Fort Belvoir have committed to develop the proposed elementary school as a verified CHPS facility. This program encourages a variety of green and sustainable development practices that are very similar to the Sustainable Sites Initiative.