4.10 SOCIOECONOMICS

4.10.1 AFFECTED ENVIRONMENT

This section describes the contribution of Fort Belvoir to the economy and the social conditions in the region, including environmental justice and protection of children. The socioeconomic indicators used for this study include regional economic activity (employment and income), population, housing, and quality of life (availability of public and social services, recreational opportunities, community facilities). These indicators characterize the region of influence (ROI) that would be most affected by the proposed action at Fort Belvoir.

An ROI is a geographic area selected as a basis on which economic and social impacts of the proposed action are analyzed. The criteria used to determine the ROI are the residency distribution of Fort Belvoir employees; the commuting patterns, distances, and times; and the location of businesses providing goods and services to Fort Belvoir, its personnel, and their dependents. Fort Belvoir is in Fairfax County, Virginia, which is part of the National Capitol Region (NCR). Fort Belvoir functions as an administrative support center for the NCR. Washington, DC and the adjacent communities have a high degree of economic and social integration. The federal government is the core of the region, providing jobs and procuring goods and services throughout the area, of which Fort Belvoir is a part. Employees of Fort Belvoir and the other federal agencies that would relocate to Fort Belvoir because of the BRAC action reside throughout the NCR. On the basis of these criteria, the ROI for the socioeconomic environment is composed of the following counties and cities: Alexandria City, Arlington County, Fairfax City, Fairfax County, Falls Church City, Loudoun County, Manassas City, Manassas Park City, Prince William County, and Stafford County, Virginia; Calvert, Charles, Frederick, Montgomery, and Prince George's Counties in Maryland; and Washington, DC. The ROI is a large land area encompassing 2,782 square miles, and is shown in Figure 1-3.

The baseline year for socioeconomic data is 2005, the date of the BRAC Commission's announcement of the Fort Belvoir realignment. Where 2005 data are not available, the most recent data available are presented. Projections beyond 2005 are also provided, as appropriate, to illustrate trends.

4.10.1.1 Economic Development

4.10.1.1.1 Employment and Industry

The Fort Belvoir installation supports a working population of approximately 22,000, of which about 6,400 are military personnel, and the remainder is civilians and contractors. Fort Belvoir is home to two Army major command headquarters and elements of 10 others; 19 different agencies and direct reporting units of the Army; 8 elements of the U.S. Army Reserve and the Army National Guard; 26 DoD agencies; a Marine Corps detachment; a U.S. Air Force activity; and a Department of the Treasury agency (Fort Belvoir, 2006c).

The ROI supports a working population of more than 2.7 million. The number of jobs in the ROI increased by about 119,000 between 2001 and 2005 (Table 4.10-1). The largest employment sectors in the ROI are the professional and business services sector, which accounts for 23 percent of total ROI employment, and the government sector (federal, state, and local), which accounts for 22 percent of total ROI employment. Of that 22 percent, 12 percent are federal civilian jobs and 9 percent are state and local government jobs. While direct federal government

jobs have fallen from about 22 percent of total employment in 1980, sharp increases in federal government contracting has more than offset this decline in direct employment and helped push up ROI wages, home prices, and cost of living (McMillion, 2006).

Table 4.10-1
ROI Employment by Industry

NAICS Industry	Year 2001	Year 2005	Change 2001–2005	
			Number	Percent
Natural Resources & Mining	1,406	1,671	265	19%
Manufacturing	70,083	59,622	(10,461)	-15%
Construction	152,561	168,598	16,037	11%
Trade, Transport, & Utilities	361,180	366,652	5,472	2%
Information	128,118	97,224	(30,894)	-24%
Financial Activities	143,313	153,396	10,083	7%
Professional and Business Services	558,579	611,099	52,520	9%
Educational & Health Services	256,776	275,852	19,076	7%
Leisure & Hospitality	209,201	233,742	24,541	12%
Other Services	138,789	145,617	6,828	5%
Government	571,587	599,543	27,956	5%
Federal	324,842	336,969	12,127	4%
State	68,510	67,353	(1,157)	-2%
Local	178,235	195,221	16,986	10%
Unclassified/Other	2,954	873	(2,081)	-70%
Total	2,594,547	2,713,889	119,342	5%

Source: MWCOG, 2006a

Employment forecasts estimate ROI employment would increase by almost 322,000 jobs or 11 percent between 2005 and 2010, and by about 1,186,000 jobs or 39 percent between 2005 and 2030 (Table 4.10-2). Jurisdictions projected to have the highest percentage growth are Loudoun County, Falls Church City, Stafford County, and Prince William County. The highest increases in the number of jobs are forecast for Fairfax County, Prince George's County, Montgomery County, and Loudoun County.

The ROI 2005 annual unemployment rate was 3.4 percent (or about 93,000 persons unemployed)—lower than the national unemployment rate of 5.1 percent (BLS, 2006). The ROI's unemployment rate was relatively stable between 2001 and 2005, averaging a low 3.7 percent. The presence of the federal government provides some stability to the ROI during periods or economic recession, resulting in less fluctuation in unemployment than may be experienced in other regions or on a national level.

Table 4.10-2
Employment forecast

	Number of jobs			Change 2005–2010		Change 2005-2030	
	Year 2005	Year 2010	Year 2030	Number	Percent	Number	Percent
Alexandria City, VA	105,600	113,300	148,000	7,700	7%	42,400	40%
Arlington County, VA	195,200	217,800	275,800	22,600	12%	80,600	41%
Fairfax City, VA	29,200	31,300	39,300	2,100	7%	10,100	35%
Fairfax County, VA	600,500	683,900	844,600	83,400	14%	244,100	41%
Falls Church City, VA	9,500	11,800	20,300	2,300	24%	10,800	114%
Loudoun County, VA	122,700	153,700	271,200	31,000	25%	148,500	121%
Manassas City, VA	23,300	24,600	26,800	1,300	6%	3,500	15%
Manassas Park City, VA	3,000	4,500	4,900	1,500	50%	1,900	63%
Prince William County, VA	111,600	128,600	186,000	17,000	15%	74,400	67%
Stafford County, VA	38,300	46,100	73,400	7,800	20%	35,100	92%
Calvert County, MD	29,400	32,900	35,600	3,500	12%	6,200	21%
Charles County, MD	56,500	62,900	69,100	6,400	11%	12,600	22%
Frederick County, MD	122,200	142,400	167,300	20,200	17%	45,100	37%
Montgomery County, MD	500,000	545,000	670,000	45,000	9%	170,000	34%
Prince George's County, MD	358,700	390,000	544,700	31,300	9%	186,000	52%
Washington, DC	745,000	783,600	860,000	38,600	5%	115,000	15%
ROI	3,050,700	3,372,400	4,237,000	321,700	11%	1,186,300	39%

Source: MWCOG, 2006a

4.10.1.1.2 Income

The ROI had a per capita personal income (PCPI) of about $47,500 in 2004, one of the highest in the nation. This PCPI ranks in the top 5 in the United States and was 144 percent of the national average of $33,050. The ROI 2004 PCPI reflects an increase of 6.6 percent from 2003, compared to the national change of 5.0 percent. The 1994–2004 average annual growth rate of the ROI PCPI was 4.4 percent. The national average annual PCPI growth rate for the same time period was 4.1 percent (BEA, 2006).

4.10.1.1.3 Population

Table 4.10-3 presents population statistics for the ROI. Fort Belvoir is in a densely populated and robust region. In 2005 the ROI population was more than 4.9 million (Table 4.10-3), a 9 percent increase over the 2000 population of about 4.5 million. Fairfax County population alone exceeds one million. ROI population density is about 1,600 persons per square mile; the population density of the United States is about 80 persons per square mile (U.S. Census Bureau, 2006b). Three counties in the ROI were among the fastest-growing counties in the nation between 2000 and 2005: Loudoun, Stafford, and Prince William Counties, Virginia (U.S. Census Bureau, 2006a). Strong population growth is expected through 2030 (MWCOG, 2005a). This projected population growth is based on the anticipated long-term strength of the region's economy, high rates of inmigration and international migration, and declines in average household size less rapid than previously expected (MWCOG, 2005a).

Fort Belvoir is in Fairfax County and Northern Virginia's I-95 corridor. Fairfax County's population (including Fairfax City and Falls Church City) is forecast to increase by about 95,000

persons (9 percent) between 2005 and 2010. Northern Virginia's I-95 corridor (including Fairfax County, Fairfax City, Falls Church City, Prince William County, Manassas and Manassas Park City, and Stafford County) is forecast to increase its population by about 177,000 persons (11 percent) by 2010.

Table 4.10-3
Population projections

	Number of persons			Change 2005–2010		Change 2005-2030	
	Year 2005	Year 2010	Year 2030	Number	Percent	Number	Percent
Alexandria City, VA	135,900	143,900	169,400	8,000	6%	33,500	25%
Arlington County, VA	198,300	212,200	249,600	13,900	7%	51,300	26%
Fairfax City, VA	22,100	23,500	26,500	1,400	6%	4,400	20%
Fairfax County, VA	1,040,900	1,132,500	1,330,900	91,600	9%	290,000	28%
Falls Church City, VA	10,600	12,300	15,400	1,700	16%	4,800	45%
Loudoun County, VA	247,300	318,100	480,600	70,800	29%	233,300	94%
Manassas City, VA	37,600	38,600	41,900	1,000	3%	4,300	11%
Manassas Park City, VA	12,900	15,000	16,800	2,100	16%	3,900	30%
Prince William County, VA	352,100	416,800	556,300	64,700	18%	204,200	58%
Stafford County, VA	107,100	121,700	195,800	14,600	14%	88,700	83%
Calvert County, MD	82,800	91,000	101,400	8,200	10%	18,600	22%
Charles County, MD	138,000	147,400	204,200	9,400	7%	66,200	48%
Frederick County, MD	220,900	243,200	339,700	22,300	10%	118,800	54%
Montgomery County, MD	942,000	1,000,000	1,155,800	58,000	6%	213,800	23%
Prince George's County, MD	852,900	872,600	993,100	19,700	2%	140,200	16%
Washington, DC	577,500	608,700	733,800	31,200	5%	156,300	27%
ROI	4,978,700	5,397,600	6,609,900	418,900	8%	1,632,600	33%

Source: MWCOG, 2005b

4.10.1.2 Sociological Environment

4.10.1.2.1 Housing

On-post Housing. Fort Belvoir has 2,070 family-housing units. The housing units are mainly at the southern edge of the South Post, except Lewis Heights and Woodlawn Village, which are at the North Post's eastern edge. The installation has barracks that house about 1,200 single enlisted personnel and 462 temporary units for visitors and new arrivals (USACE, 2002).

Off-Post Housing. There were about 1,920,000 housing units in the ROI in 2005 (Table 4.10-4). Of these units, about 1,808,000 (94 percent) were occupied. Of the vacant housing units, about 31,000 were identified as available to rent and about 11,000 were for sale (U.S. Census Bureau, 2006c).

Table 4.10-4
Number of housing units

City or county	Year 2000	Year 2005	Change in number of units	Percent change
ROI	1,790,464	1,920,723	130,259	7%
Alexandria City, VA	64,251	68,406	4,155	6%
Arlington County, VA	90,426	92,622	2,196	2%
Fairfax County, VA	359,411	386,856	27,445	8%
Loudoun County, VA	62,160	93,374	31,214	50%
Prince William County, VA	98,052	125,667	27,615	28%
Stafford County, VA	31,405	40,220	8,815	28%
Calvert County, MD	27,576	31,652	4,076	15%
Charles County, MD	43,903	50,154	6,251	14%
Frederick County, MD	73,017	83,173	10,156	14%
Montgomery County, MD	334,632	356,603	21,971	7%
Prince George's County, MD	302,378	314,221	11,843	4%
Washington, DC	274,845	277,775	2,930	1%

Source: U.S. Census Bureau, 2006c
Notes:
Fairfax County includes Fairfax City and Falls Church City.
Prince William County includes Manassas City and Manassas Park City.

The number of housing units in the ROI increased by 7 percent (about 130,300 units) between 1990 and 2000. The largest numbers of housing units were built in Fairfax, Loudoun, Prince William, and Montgomery Counties. More than 30,000 housing units were constructed in Loudoun County and about 27,000 were built in Fairfax and Prince William Counties.

Housing costs in the ROI are considerably higher than the national averages. The median value of owner-occupied housing units in the region was about $388,000, or 232 percent of the national average of $167,500. Median rent was about $862, or 143 percent of the national median rent of $602 (U.S. Census Bureau, 2006c). The average sales price for homes in the ROI increased significantly between during the past 6 years. Since 1999, the region's average home sales price has more than doubled, appreciating by 119 percent, equating to almost a $250,000 increase in price. The average home sales price in 2005 for all types of housing units in the metropolitan Washington, DC area was $454,000. Demand for housing is forecast to grow through 2010, although not at the rates experienced in the first half of the decade. The key factor in housing demand is job growth (GMU, 2006), and the ROI would grow by about 321,000 jobs between 2005 and 2010 (see Table 4.10-2).

The number of homes sold in the region jumped dramatically between 2001 and 2005, from 86,966 in 2001 to 106,920 units in 2005 (MWCOG, 2006a). Fairfax County had the most homes sold in the region in 2005, with 23,114, followed by Montgomery, Prince George's, and Prince William counties (Table 4.10-5) (MWCOG, 2006a).

The number of new, privately owned housing units (single family and multi-unit) construction permits authorized in the region decreased from 34,646 in 2004 to 32,849 in 2005 (MWCOG, 2006a). The average number of permits issued between 2001 and 2005 was 33,387. Of the construction permits that were issued in 2005, 59 percent were issued in the Virginia counties of the ROI, 33 percent were issued in the Maryland counties, and 9 percent were in Washington,

DC. Fairfax County (including Fairfax City and Falls Church City), Prince William County, and Stafford County had a total of 11,471 permits issued (Table 4.10-6). In the first quarter of 2006, 6,909 residential construction permits were issued in the ROI (MWCOG 2006d).

Table 4.10-5
Net home sales in 2001 and 2005

Jurisdiction	2001	2005
ROI	86,966	106,920
Alexandria City, VA	2,975	3,256
Arlington County, VA	3,086	3,490
Fairfax City, VA	332	424
Fairfax County, VA	21,205	23,114
Falls Church City, VA	172	196
Loudoun County, VA	6,190	9,123
Manassas City, VA	890	1,194
Manassas Park City, VA	270	480
Prince William County, VA	7,687	11,920
Stafford County, VA	2,035	2,962
Calvert County, MD	1,620	1,675
Charles County, MD	2,201	3,157
Frederick County, MD	3,807	4,672
Montgomery County, MD	15,543	17,011
Prince George's County, MD	11,270	15,067
Washington, DC	7,683	9,179

Source: MWCOG, 2006a.

Table 4.10-6
New privately owned housing units authorized in 2005

Jurisdiction	Total	Single family
ROI	32,849	22,145
Alexandria City, VA	1,017	195
Arlington County, VA	1,275	166
Fairfax City, VA	28	28
Fairfax County, VA	4,353	2,276
Falls Church City, VA	24	24
Loudoun County, VA	5,199	4,716
Manassas City, VA	154	154
Manassas Park City, VA	188	81
Prince William County, VA	5,427	5,140
Stafford County, VA	1,639	1,452
Calvert County, MD	488	488
Charles County, MD	1,309	931
Frederick County, MD	1,872	1,414
Montgomery County, MD	3,591	1,700
Prince George's County, MD	3,425	3,255
Washington, DC	2,860	125

Source: MWCOG, 2006a.

4.10.1.2.2 Law Enforcement, Fire Protection, and Medical Services

The Fort Belvoir Directorate of Emergency Services (DES) oversees professional law enforcement and fire protection and response for the installation. Law enforcement is provided by the 212th Military Police (MP) Detachment. The MP provide physical security and perform community law enforcement operations including specialized traffic, canine, and investigation operations (Fort Belvoir, PAO 2004). Fort Belvoir has three fire stations: No. 465 on the South Post, No. 463 on the North Post, and No. 466 at Davison Army Airfield. These stations are staffed by five fire companies (three engine companies, one ladder truck company, and one airport crash company) with a total staff of about 65 firefighters (Fort Belvoir DPW ENRD, 2002). The South Post fire station has been identified as inadequate in terms of configuration and condition and needs to be renovated or replaced. The Fort Belvoir Fire Department is in need of one additional engine company (Sullivan, personal communication, 2007). There are no police, fire, or emergency services on EPG. Because of the physical separation, Main Post facilities are not adequate to support EPG because they cannot meet adequate emergency response times. Fort Belvoir's Fire Station 463 takes about 10 minutes to respond to EPG. The closest fire station to EPG is Fairfax County's Station 422 on Backlick Road, which can respond to EPG in about 3 to 5 minutes (Sullivan, personal communication, 2007).

Fort Belvoir has automatic and mutual aid police- and fire-service agreements with Fairfax County. Fort Belvoir is also a party to the Northern Virginia Emergency Services Mutual Response Agreement. This memorandum of agreement provides for the automatic mutual response of fire, rescue, and emergency services among Northern Virginia jurisdictions including Arlington County, City of Alexandria, City of Fairfax, Fairfax County, Fort Belvoir, Metropolitan Washington Airports Authority, and Loudoun County (Northern Virginia Emergency Services, no date). The closest civilian fire stations to Fort Belvoir are Fairfax County Fire Stations 424 on Lukens Lane, 437 off of Telegraph Road, and 419 in Lorton. Their response time to Fort Belvoir is about 5 to 8 minutes (Sullivan, personal communication, 2007).

City, county, and state police departments from other agencies provide law enforcement in the ROI. The ROI had more than 20,000 law enforcement employees (about 15,000 officers and 5,000 civilians) as of 2004 (DOJ–FBI, 2006). Fire protection in the ROI is provided by 111 career or volunteer fire departments with a total of 501 fire stations. The majority of the fire departments (86 departments or 77 percent) are volunteer and the remaining 25 departments are staffed by career or mostly career firefighters (NFPA, 2005; USFA, 2006).

The DeWitt Army Community Hospital on Fort Belvoir provides health care services to active and retired military personnel and their families residing in Northern Virginia. DeWitt Hospital is a 43-bed facility with an intensive care unit, medical/surgical ward, labor and delivery, mother/baby ward, a pharmacy and a pharmacy refill annex at the main PX on-post, and an emergency room. It is the only military inpatient facility in Northern Virginia and operates a 24-hour emergency room. However, DeWitt Hospital does not meet the requirements of a modern medical treatment facility. The hospital's utility systems require renovation, and there are patient privacy issues throughout the facility. Dental care on Fort Belvoir is provided at the on-post dental clinic, Building 1099. This facility is considered substandard because of poor facility conditions.

The DeWitt Health Care Network is recognized as the primary care base for the Walter Reed Health Care System. The DeWitt Health Care Network operates two Family Health Care Clinics on military installations, at Fort Belvoir and Fort Myer, as well as two off-post Family Health

Care Clinics in Fairfax and Woodbridge, Virginia. Adult inpatient and partial programs are provided through Walter Reed Army Medical Center. The National Naval Medical Center in Bethesda, Maryland, provides adolescent inpatient services. Malcolm Grow Medical Center at Andrews Air Force Base offers substance abuse inpatient and partial hospitalization programs.

There are more than 50 medical facilities in the ROI, including hospitals, medical centers, and special care facilities such as hospices and mental health institutes, and more than 9,000 patient beds (AHD, 2006; GUH, 2007; WHS, 2007). Virtually all modern medical services are available in the ROI. The civilian hospital nearest Fort Belvoir is the Inova Mount Vernon Hospital, a 140-bed facility about 5 miles northeast of the installation.

4.10.1.2.3 Schools

The U.S. Department of Education provides federal impact aid to school districts that have federal lands within their jurisdiction as authorized under Public Law 103-282. When military children attend public schools, enrollment is increased, but local tax revenue is not generated because military families live or shop on federal property, which is not taxed. The federal government acts as the local taxpayer by funding the Federal Impact Aid program for local school districts (DoD, 2005a). Total federal impact aid varies year by year according to congressional appropriations for the program. In FY 2004 federal impact aid ranged from $450 to $2,200 per student (DoD, 2005a).

Children living on Fort Belvoir attend schools that are part of the Fairfax County Public School System (FCPS). The FCPS has a total of 228 schools including elementary, middle, and high schools; alternative high schools; and special education, alternative program, and alternative learning centers. Student enrollment is about 166,500, making it the largest school system in Virginia and the 13th largest in the United States (FCPS, 2006). FCPS has been challenged to meet the demand for new schools and additional classroom space generated by the county's continuing population growth. Consequently, many schools are operating at or near full capacity. Mobile classrooms are used to provide additional classroom space.

As of the 2000 Census, 87 percent of school-aged children living on Fort Belvoir (Census tracts 4162 and 4219) attended public schools. From Fairfax County enrollment data, about 74 percent of students from Fort Belvoir were in grades kindergarten through sixth grade (elementary school) (USACE, 2003).

The Fort Belvoir Elementary School, located on the installation, is one of the largest elementary school in FCPS, serving more than 1,200 students from kindergarten through sixth grade (FCPS, 2006). Projected enrollment for September 2006 is 1,258 students (FCPS, 2006). Like many schools in Fairfax County, Fort Belvoir Elementary has experienced an effective reduction in capacity because of reduced class sizes and the space needed by special programs. As a result, although the design capacity of the school was for 1,500 students, the school is functionally over capacity and mobile classrooms are used to provide necessary extra space (USACE, 2003).

Fort Belvoir middle and high school students attend off-post FCPS schools. Fort Belvoir Elementary feeds into the Mount Vernon High School pyramid, and students attend the Whitman Middle School. Total enrollment projected for September 2006 is 933 for Whitman Middle School and 1,769 students for Mount Vernon High School. Both of these schools are close to Fort Belvoir, and students are bused to the schools. Students living on Fort Belvoir also have access to

other Fairfax County schools through countywide programs and authorized transfers, as well as private and religious schools in the area (USACE, 2003).

Children of military personnel residing off-post attend the school district for the area in which they live. In addition to FCPS, the following public school districts serve the ROI: Alexandria City School District, Arlington County Public Schools, Falls Church City Public Schools, Loudoun County Public Schools, Manassas City Public Schools, Manassas Park City Public Schools, Prince William County Public Schools, Stafford County Public Schools, Calvert County Public Schools, Charles County School District, Frederick County School District, Montgomery County Public Schools, Prince George's County Public Schools, and the District of Columbia Pubic Schools. Together these school districts have more than 1,100 schools, and total enrollment was almost 758,000 students (NCES, 2005). The median student-to-teacher ratio was 13.5:1, lower than the U.S. average of 15.9:1 (NCES, 2005). Some of these school districts, in particular those in counties experiencing strong population growth, have schools operating at or above capacity. Portable classrooms are used to house the students to maintain low student-to-teacher ratios and small class sizes. Having sufficient funding to meet the needs of enrollment growth, building new schools, hiring new teachers and other support staff such as guidance counselors, teacher salary agreements, and instructional materials continues to be a challenge because of budget constraints and the rising cost of education.

4.10.1.2.4 Family Support and Social Services

Army Morale, Welfare and Recreation (MWR) is a comprehensive network of support and leisure services designed to enhance the lives of Soldiers (active, Reserve, and Guard), their families, civilian employees, military retirees, and other eligible participants. MWR contributes to the Army's strength and readiness by offering services to support Soldiers and their families, which helps Army recruitment and retention (U.S. Army MWR, 2007). MWR is financed through Nonappropriated Funds (NAF); that is, MWR is not funded by Congress through taxpayer dollars, but by revenues earned from the purchase of MWR services.

MWR provides programs and services at each installation including family, child, and youth programs. MWR family support programs at Fort Belvoir are Army Community Service (ACS); Army Family Action Plan; Army Family Team Building; Family Advocacy Program; and Child and Youth Services. Fort Belvoir's ACS program provides a variety of Soldier and family support services programs, including relocation assistance; the Exceptional Family Member Program; the Consumer Affairs/Financial Assistance Program; and newcomer Orientation (Fort Belvoir PAO, 2004). Fort Belvoir's personnel and social service activities are in two buildings on-post, causing customers to travel to different locations to receive services, which has a negative impact on customer service and Soldier and family morale. Current space is also inadequate to support the required ACS programs, and parking is insufficient to allow clients, especially Exceptional Family Member clients, easy access to services.

Child and youth services are available through MWR for military families that require child care and preschool educational services. The North Post Child Development Center (CDC) offers about 200 full-day care spaces (including kindergarten) and 60 part-day preschool spaces and the South Post CDC offers 190 full-day care spaces and about 25 hourly care spaces. The existing CDCs are at or near capacity, with waiting lists for some categories of service. The ROI has many child day care facilities as well as in-home child care options.

The region has a number of shelters and assistance programs for individuals and families in need of the following: temporary placement because of a lack of fixed, regular, or adequate residence; financial assistance; protection from abuse or neglect; and assistance to persons with disabilities. The Virginia Department of Social Services operates through the county or city local social service departments and provides assistance to all citizens of Virginia, including active duty military personnel stationed in the state and their families. Virginia Department of Social Service programs include adult and child protective services, child care, adult day care, assisted living facilities, financial assistance, food stamps, low-income energy assistance, support for adults and children with special health care needs or disabilities, domestic violence, and substance abuse counseling (VDSS, 2006).

4.10.1.2.5 Shops, Services, and Recreation

Fort Belvoir's primary shopping area is the PX Mall on North Post, a discount retail store run by the Army and Air Force Exchanges Services (AAFES) that provides goods and services to active duty military, their families, retirees, and reservists (ALA, 2007). The AAFES is self-funded (NAFs), paying operating costs from revenues. AAFES earnings are also used to fund MWR programs, build new stores, or renovate existing facilities without expense to the Federal government (AAFES 2007). The AAFES oversees operation of all other retail establishments on the installation, including shopettes, Class VI, tailor shop, military clothing store, service stations (gasoline and automobile maintenance), dry cleaner, and barber and beauty shops, with the exception of the Commissary. The Fort Belvoir Commissary, operated by the Defense Commissary Agency (DeCA), sells groceries and health and beauty aids. DeCA is funded with appropriated (tax-payer) dollars (ALA, 2007).

Other shop and service establishments on Fort Belvoir are SunTrust Bank, the Fort Belvoir Credit Union, the Religious Education Center, the Chaplain Family Life Center, the Joint Personal Property Shipping Office, the Barden Education Center, the Van Noy Library, the Veterinary Clinic, and the Self-Help Center (USACE, 2003).

Fort Belvoir's MWR program also provides many recreation, sports, entertainment, travel, and leisure activities for Soldiers, their families, retirees, and civilians. Facilities include an officer's club, community club, 45-hole golf complex (a 9-hole golf course on the South Post with club house and snack bar, and a 36-hole golf course on the North Post with full service golf club and dining facilities), tennis courts, swimming pools, athletic fields, archery range, picnic areas, playgrounds, soccer fields, football fields, softball fields, walking and running trails, youth services center, a 24-lane bowling center with snack bar, and the Sosa Community Center. The Fort Belvoir Marina has wet slips and dry-storage facilities that can be rented on an annual basis. Some of Fort Belvoir's undeveloped areas are open to recreational use for fishing, bow hunting, bird watching, nature hiking, and environmental education programs (Fort Belvoir DPW ENRD, 2002). As noted earlier, revenues from the use of these facilities provides for the continued operation of MWR and its programs.

The ROI has ample opportunity for shopping, sightseeing, and recreation. There are numerous museums and historic sites in the DC area, including the Smithsonian Institution and its many museums; historic buildings and monuments; parks and recreation centers; and many performing arts centers such as the Kennedy Center. Boating, kayaking, and sightseeing tours are conducted on the Potomac River. Washington, DC has professional baseball, basketball, football, hockey, and soccer teams. . Financial, real estate, automotive, travel, and other service establishments are

readily available. There are many plazas, malls, and downtown shopping areas. The Springfield Mall and Landmark Mall are the closest shopping malls to Fort Belvoir.

4.10.1.3 Environmental Justice

Environmental justice addresses race, ethnicity, and the poverty status of populations within the ROI. On February 11, 1994, the President issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.* The order is designed to focus the attention of federal agencies on the human health and environmental conditions in minority and low-income communities. Environmental justice analyses are performed to identify potential disproportionately high and adverse effects from proposed actions and to identify alternatives that might mitigate these effects.

To identify potential environmental-justice areas, data was collected on minority and low-income populations for Census block groups in the ROI. Block groups are subdivisions of a census tract and represent the level at which disproportionate impacts would be most noticeable. Table 4.10-7 lists the block groups that correspond to the Fort Belvoir, EPG, or GSA Parcel and block groups that are contiguous with the boundaries of those three areas. Census block groups 4219-1 and 4162-1 coincide with the land area of the Fort Belvoir installation. Block group 4220-2 coincides with Accotink Village, an enclave within Fort Belvoir.

Minority populations should be identified for environmental justice analyses where either the minority population of the affected area exceeds 50 percent or 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). The latter guidance was used for this analysis, identifying Census block groups with minority or low-income population percentages exceeding the state levels, which has a lower threshold than the 50 percent threshold (the percentage of minority populations in the state is 30 percent, and the percentage of persons below poverty level is 9.6 percent). Table 4.10-7 lists minority-population and low-income statistics for these block groups and for Virginia. Figure 4.10-1 depicts the minority and low-income block groups.

Of the 16 block groups identified in the Fort Belvoir affected area, 9 of them, or 56 percent, had a higher percentage of minority residents compared to the state, and 1 of the block groups, or 6 percent, had a higher percentage of low-income residents, compared to the state of Virginia.

Of the 5 block groups identified for EPG affected area, 4 of them, or 80 percent, had a higher percentage of minority residents compared to the state. None of the block groups exceeded the state poverty rate.

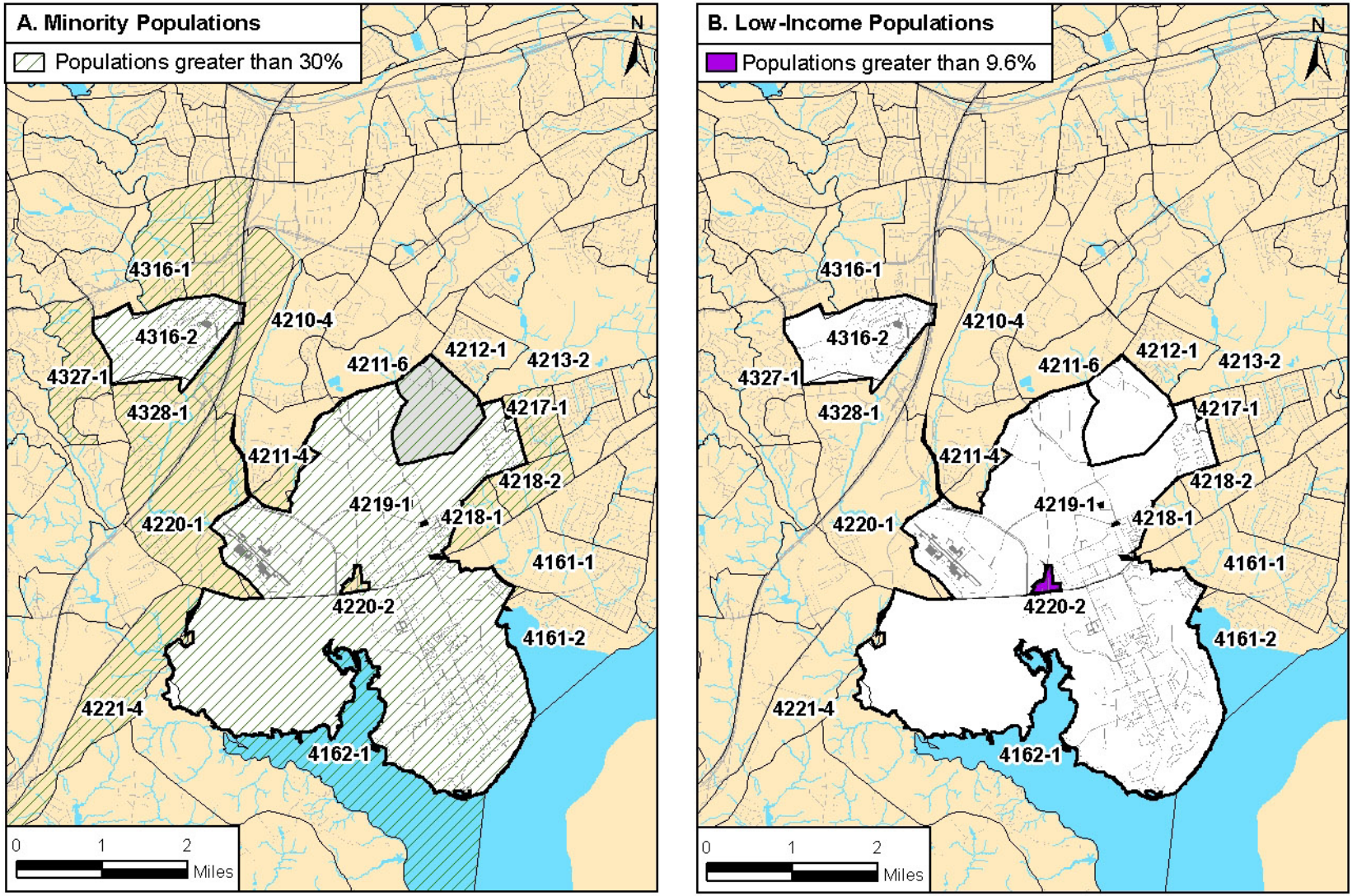
Of the two block groups identified for the GSA Parcel affected area, both had a higher percentage of minority residents compared to the state. Neither of the block groups exceeded the state poverty rate.

In summary, on the basis of Census data, there are areas with high percentages of minority or low-income populations that could potentially be affected by the proposed action. Potential disproportionate effects on minority or low-income populations are identified and addressed in Section 4.10.2 of this EIS.

Table 4.10-7
Minority or low-income population

	Minority		Low-income	
Corresponding land area	**Census tract-block group**	**Percent minority**	**Census tract-block group**	**Percent below poverty level**
Fort Belvoir	4161-1	13%	4161-1	1%
Fort Belvoir	4161-2	12%	4161-2	2%
Fort Belvoir	4162-1	46%	4162-1	5%
Fort Belvoir	4163-1	8%	4163-1	4%
Fort Belvoir	4211-4	30%	4211-4	3%
Fort Belvoir	4211-6	30%	4211-6	0%
Fort Belvoir	4211-7	32%	4211-7	6%
Fort Belvoir	4212-1	20%	4212-1	0.2%
Fort Belvoir	4213-2	29%	4213-2	0.8%
Fort Belvoir	4217-1	45%	4217-1	6%
Fort Belvoir	4218-1	55%	4218-1	6%
Fort Belvoir	4218-2	67%	4218-2	6%
Fort Belvoir	4219-1	53%	4219-1	8%
Fort Belvoir	4220-1	44%	4220-1	4%
Fort Belvoir	4220-2	56%	4220-2	16%
Fort Belvoir	4221-4	46%	4221-4	6%
EPG	4315-2	26%	4315-2	1%
EPG	4316-1	42%	4316-1	5%
EPG	4316-2	68%	4316-2	9%
EPG	4327-1	33%	4327-1	0%
EPG	4328-1	40%	4328-1	5%
GSA Parcel	4210-1	39%	4210-1	4%
GSA Parcel	4210-4	47%	4210-4	3%
Virginia	Virginia	30%	Virginia	9.6%

Source: U.S. Census Bureau, 2000.



LEGEND

Installation Property

Census Block Group Boundary

Minority and Low-Income Block Groups

Fort Belvoir, Virginia

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006; U.S. Census Bureau 2006.

Figure 4.10-1

4.10.1.4 Protection of Children

On April 21, 1997, the President issued EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO directs each federal agency to ensure that its policies, programs, activities, and standards address disproportionate environmental health or safety risks to children that may result from their actions. EO 13045 recognizes that a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health and safety risks. These risks arise because of the following facts:

- Children's neurological, immunological, digestive, and other bodily systems are still developing
- Children eat more food, drink more fluids, and breathe more air in proportion to their body weight than adults;
- Children's size and weight may diminish their protection from standard safety features
- Children's behavior patterns make them more susceptible to accidents because they are less able to protect themselves

Therefore, to the extent permitted by law and appropriate, and consistent with the agency's mission, the President directed each federal agency to (1) make it a high priority to identify and assess environmental health risks and safety risks that might disproportionately affect children; and (2) ensure that the agency's policies, programs, and standards address disproportionate environmental health risks or safety risks to children. Examples of risks to children include increased traffic volumes and industrial- or production-oriented activities that would generate substances or pollutants that children could come into contact with or ingest.

Historically, children have been present at Fort Belvoir as residents and visitors (e.g., living in family housing, attending schools, using recreational facilities). The Army has taken precautions for their safety by a number of means, including using fencing, limiting access to certain areas, and providing adult supervision. Potentially disproportionate risks to children are be identified and addressed in Section 4.10.2 of this EIS.

4.10.2 ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

4.10.2.1 Economic Development (Employment, Industry, Income, Population)

4.10.2.1.1 Land Use Plan Update

Short- and long-term minor beneficial effects could occur. The Preferred Alternative land use plan would increase the number of acres on Fort Belvoir and EPG designated as Professional/Institutional, Community, Residential, and Troop Housing, providing the opportunity for development (or redevelopment) of this land. If construction or renovation of facilities occurs on the land, it would generate short-term construction employment, income, and increased spending in the region from the purchase of construction and other materials. In the long-term, operation of new facilities would result in an increase in the numbers of maintenance, administrative, and professional personnel working at Fort Belvoir.

Table 4.10-8 presents impacts of each of the proposed BRAC action projects on economic and sociological resources.

Table 4.10-8
Effects from proposed BRAC projects on economic and social resources under the Preferred Alternative

Project #	BRAC project	Economic Change	Social change
1	NGA Administrative Facility	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
2	WHS Administrative Facility		
3	MDA		
4	Hospital	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on beneficiaries due to availability of new, state-of-the-art hospital; long-term significant adverse effects due to loss of South Post Golf Course which would be closed to accommodate hospital and NARMC
5	Dental Clinic	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on beneficiaries from availability of expanded dental clinic
6	NARMC HQ Bldg.	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term significant adverse effects due to loss of South Post Golf Course which would be closed to accommodate hospital and NARMC
7	COE Integration Offices	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
8	Infrastructure	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
9	Emergency Services Center (EPG)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects due to center which would provide rapid response to structural fires and medical emergencies in support of the agencies and activities on EPG

Table 4.10-8
Effects from proposed BRAC projects on economic and social resources under the Preferred Alternative *(continued)*

Project #	BRAC project	Economic Change	Social change
10	Network Operations Center	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
11	USANCA Support Facility		
12	Child Development Center (NGA)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects from additional child day care facility
13	Child Development Center		
14	Admin Facility (211, 214, 215, 220)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
15	Access Road/Control Point	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term significant adverse effects due to impact on recreational fields and loss of revenue to MWR
16	AMC Relocatables	No effect	No effect
17	PEO EIS Admin Facility	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand

Table 4.10-8
Effects from proposed BRAC projects on economic and social resources under the Preferred Alternative *(continued)*

Project #	BRAC project	Economic Change	Social change
18	Structured Parking, 200 Area	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
19	Modernize Barracks	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects due to new barracks for Soldiers
20	MWR Facility Travel Camp	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on quality of life from new travel camp

Methodology. Economic effects of Fort Belvoir's proposed BRAC implementation and other facilities projects have been estimated using the Economic Impacts Forecast System (EIFS) model. The EIFS model is a computer-based economic tool that calculates multipliers to estimate the direct and indirect effects of a given action. Changes in installation employment and expenditures represent the direct effects of the action. On the basis of the input data and the model's calculated multipliers, the model estimates ROI changes in sales volume, income, employment, and population for the direct and indirect effects of the action. Note that the model does not project a specific distribution of population by age, it does not project a specific distribution of the population among the counties and cities composing the ROI, and it does not project distribution of employees among occupational categories. The model projects estimated total changes in sales volume, income, employment, and population for the ROI as a whole.

For purposes of the EIFS analysis, a change is considered significant if it falls outside the historical range of ROI economic variation. To determine the historical range of economic variation, the EIFS model calculates a rational threshold value (RTV) profile for the ROI. This analytical process uses historical data for the ROI and calculates fluctuations in sales volume, income, employment, and population patterns. The positive and negative historical extremes for the ROI become the thresholds of significance (i.e., the RTVs) for economic change. If the estimated effect of an action falls above the positive RTV or below the negative RTV, the effect could be considered significant. Appendix G.1 discusses this methodology in more detail and presents the RTV's for the ROI and the model input and output tables developed for this analysis.

Note that, the EIFS model output assumes that changes occur at one time, when in fact the effects of the proposed Fort Belvoir BRAC action would be spread out over several years. Therefore, the multiyear activity was modeled using EIFS by determining the changes in amount of construction spending and employment in each year of the project cycle (2007 through 2011), and a separate EIFS model run was completed for each year. Fort Belvoir's expected construction spending for the BRAC action and associated other facility projects were input into the model as the change in

local expenditures. The estimated number of separated or newly added military or civilian jobs to the ROI were entered in the model as the changes in employment. Jobs that represent employees shifted from one location to another within the same geographic area (i.e., the ROI) are not included because they do not result in change in ROI employment. Only jobs that are coming into or leaving the ROI because of the Fort Belvoir BRAC action are entered in the EIFS model. Appendix G.1 discusses further the inputs and outputs of the EIFS model for this proposed action.

Economic impacts (employment, industry, income, population). Short-term minor beneficial effects would be expected. The installation would construct about 6.2 million square feet of new built space and renovate about 320,000 square feet of existing space between 2007 and 2011 (see Table 2-3 in Section 2.2.2.3). These facilities would be new work space for the incoming personnel and general support facilities to meet the needs of the larger working population. The construction and renovation expenditures would result in beneficial increases in ROI sales volume, income, and employment. The EIFS model outputs for each project year are presented in Appendix G.1 and Table 4.10-9. Although the proposed action's expenditures would be quite substantial, Fort Belvoir is in such an economically large and robust region that the magnitude of the expenditures relative to the regional demographic and economic forces would still fall within historical fluctuations for the ROI and therefore be considered minor. For each project year, the proposed action would result in minor economically beneficial increases in sales volume, income, and employment for the ROI. Because construction projects are, by nature, temporary, the economic stimulus from construction of the proposed BRAC and associated facilities would diminish over time as the projects reach completion in 2011.

The peak year of expenditures would be 2008, when sales volume increases directly attributable to the proposed action would be more than $2.1 billion (Table 4.10-9). Indirect sales volume would be about $3.7 billion, for a total sales volume increase of about $5.8 billion. About 9,200 jobs would be created as a result of direct expenditures associated with the BRAC action. About 16,000 indirect jobs would be created, for a total increase in ROI employment of about 25,000. ROI income would increase by about $453 million because of the creation of direct jobs, and indirect expenditures would increase income by about $797 million, for a total increase in ROI income (direct and indirect) of about $1.25 billion.

Direct employment generated by the proposed action's construction projects would peak at about 9,200 in 2008 (Table 4.10-9). The proposed action would increase demand for construction workers. The types of direct jobs that would be created include construction managers, laborers, surveyors, electricians, painters, heavy equipment operators, and brick masons, along with a variety of other trades. The ROI has a civilian labor force of about 2,700,000 individuals, with about 2,600,000 employed and 93,000 unemployed (BLS, 2006). The construction industry employs about 168,000 people in the ROI and is a growing industry. ROI employment forecasts project about 11 percent job growth (or about 321,700 jobs) between 2005 and 2010. During the peak year of 2008 (Table 4.10-9) about 9,300 direct jobs would be created, primarily in construction; this equates to about 5 percent of the 168,000 persons currently employed in the ROI construction industry. Although the construction industry is projected to grow, current ROI construction labor force might not be sufficient to fill the jobs. Employment growth is beneficial to an economy, and expansion of the industry base confers economic benefits on the region. The primary socioeconomic concerns would materialize if expansion occurs in a short time frame, or if other aspects of the economy also undergo a rapid expansion during the same time period. Possible labor shortages could occur, resulting in a rise in labor costs and ultimately a rise in overall project cost. The market would respond to a shortage with new workers entering the

construction industry from other industries, or new workers coming from outside the region to fill available jobs.

In addition to direct employment, construction activity also generates indirect and induced jobs. This is employment generated by increased business activities associated with the construction of the facilities on Fort Belvoir (business to business transactions) and consumer spending by the workforce. Table 4.10-9 (and Appendix G.1) shows estimates of secondary employment generated by the construction activity for each year, listed as induced employment in the table. In the peak year of 2008, and there would be an estimated 16,000 indirect jobs. These jobs, unlike the construction jobs, would be less specialized and would be generated in a variety of sectors including, but not limited to, services, retail trade, and transportation. Given the size of the workforce in the ROI (about 2.7 million), the unemployed labor pool of about 93,000, and the projected growth of the population and workforce, it is anticipated that these jobs would be filled by persons in the ROI.

Table 4.10-9
EIFS model output for the proposed BRAC Action at Fort Belvoir

	Projected Change				
Indicator	**2007**	**2008**	**2009**	**2010**	**2011**
Direct sales volume	$161,337,500	$2,134,221,000	$655,818,800	$578,870,800	$194,528,500
Induced sales volume	$283,954,000	$3,756,228,000	$1,154,241,000	$1,018,813,000	$342,370,200
Total sales volume	$445,291,500	$5,890,449,000	$1,810,060,000	$1,597,683,000	$536,898,700
Direct income	$34,259,020	$453,188,500	$139,259,000	$122,919,600	-$22,554,060
Induced income	$60,295,860	$797,611,700	$245,095,900	$216,338,500	$72,700,180
Total income	$94,554,870	$1,250,800,000	$384,354,900	$339,258,100	$50,146,120
Direct employment	702	9,286	2,853	2,519	-924
Induced employment	1,235	16,343	5,022	4,433	1,490
Total employment	1,937	25,628	7,875	6,951	566
Local population	0	0	0	0	-2,465

The BRAC Commission's recommendations would generate a net increase of 22,000 people in the workforce on Fort Belvoir. Most of these personnel reside within a one-hour's drive to Fort Belvoir. These personnel represent jobs that would be shifted from one location to another within the ROI (e.g., personnel at NGA in Bethesda, Walter Reed in Washington, DC, and leased space in Crystal City that would be transferred to Fort Belvoir), and would therefore not result in a change in ROI employment. It is probable that some of the affected personnel would change their home residence within the ROI to improve their commute to Fort Belvoir. The transportation model used for the proposed Fort Belvoir BRAC action estimated how population (and therefore traffic) would shift within the ROI because of the proposed Fort Belvoir BRAC action (see Section 4.3, Transportation). In keeping with the transportation model, it was assumed that 50 percent of the existing WHS, other DoD, and NGA employees would change their home residence because their job would be transferred to Fort Belvoir, and it was further assumed that these employees would be redistributed within the region as the current Fort Belvoir employees are distributed (see Figures 4.3-5, 4.3-16, and 4.3-17 in Section 4.3, Transportation). These assumptions were used to determine the redistribution of the population within the ROI. An employee's decision to move

could depend on factors such as the location of a spouse's place of employment, changing a child's school district, proximity to family and friends, or cost of housing.

WHS and other DoD agencies that would be realigned to Fort Belvoir employ about 9,200 people, and the NGA employs about 8,500. Applying the assumption that 50 percent would move because of the Fort Belvoir realignment, about 4,600 of the WHS and DoD employees and about 4,200 of the NGA employees would relocate within the ROI (see Appendix G.2 for additional data and calculations). Table 4.10-10 lists the projected redistribution of these employees within the region on the basis of the distribution of the current Fort Belvoir employees. These projections indicate that many of the employees would relocate to the Northern Virginia I-95 corridor including Fairfax County, Prince William County, and Stafford County and the city of Fredericksburg.

Table 4.10-10
Redistribution of WHS, other DoD, and NGA employees by location

District [a]	Location	Fort Belvoir % number of employees by ROI location [b]	Redistribution of 50% of WHS and other DoD employees by location [c]	Redistribution of 50% of the NGA employees by location [c]	Total employees redistributed [c]
A	Arlington/Alexandria	4%	205	165	370
B	Northern Fairfax County/Loudoun County	7%	330	290	620
C	Southern Fairfax County	38%	1,770	1,590	3,360
D	Prince William County	23%	1,050	965	2,015
E	Near South (Fredericksburg/Stafford County)	9%	425	380	805
F	Remainder of Virginia	7%	330	295	625
G	District of Columbia	1%	55	40	95
H	Prince Georges County	5%	215	210	425
I	Montgomery County	1%	50	40	90
J	Remainder of Maryland	4%	195	170	365
	Total		**4,625**	**4,145**	**8,770**

Source: VHB, 2006

Notes:

[a]District corresponds to districts shown in Section 4.3, Transportation, Figures 4.3-5, 4.3-16, and 4.3-17.

[b]About 1 percent of the Fort Belvoir employees work offsite outside the ROI.

[c]Numbers are rounded.

Demographic characteristics from the U.S. Census Bureau 2005 American Community Survey for the Washington, DC Metropolitan Statistical Area on family and non family households and average family size were used to estimate the total population relocation within the ROI (Table 4.10-11 and Appendix G.2). The BRAC action could result in the relocation of about 21,600 persons within the ROI (employees and their families; see Appendix G.2 for calculations), of which about 10,200 would be children (under the age of 18). Southern Fairfax County would be expected to receive the largest share of the population (about 9,200), followed by Prince William County (about 5,000 people), then Stafford County and the city of Fredericksburg (about 1,900 people). The BRAC actions at Fort Belvoir must be initiated no later than September 15, 2007, and completed no later than September 15, 2011, so the population shift would be expected to

occur around that same time frame, as employees would decide whether to relocate relative to their new place of employment. Population projections were available for the year 2010. Table 4.10-12 shows a comparison between the anticipated population increase from 2005 to 2010 with and without the BRAC action. The estimated population increases with the Fort Belvoir BRAC action would be slightly above current projected levels. Most jurisdictions within the ROI would experience about a 1 percent increase or less in population over the original projection. The effects of the population increase would be diminished by time; the population shift would not be expected to occur all at once, but gradually, so there would not be a sudden influx of people into one jurisdiction.

The ability of the ROI to accommodate this economic and population growth would depend on many factors, including the degree to which local infrastructure—including roads, environmental management systems, and public services—is also enhanced to meet the demand of the additional population. As mentioned previously, the ROI is an economically robust region that has experienced strong growth in the past 5 years and, on the basis of current population and employment projections, is anticipated to continue to grow. Growth is largely beneficial to the economy; however, labor, material, and housing shortages could result if expansion occurred too rapidly or if increases in infrastructure investment, including housing, lagged behind employment and population growth. Because the shift of ROI population caused by the proposed Fort Belvoir BRAC action would occur over a period of time, and the population increases would not greatly exceed current projections, the ROI economy would have time to respond to the new demands by increasing the labor force and supply of goods and services and housing, as is currently occurring in the ROI.

Table 4.10-11
Redistribution of Population by Location

District[a]	Location	Number of Adults[b]	Number of Children[b]	Total
A	Arlington/Alexandria	460	410	870
B	Loudoun County[c]	320	290	610
C	Fairfax County	4,865	4,340	9,205
D	Prince William County	2,650	2,365	5,015
E	Near South (Fredericksburg/Stafford County)	1,040	925	1,965
F	Remainder of Virginia	805	720	1,525
G	District of Columbia	115	105	220
H	Prince Georges County	575	515	1,090
I	Montgomery County	115	105	220
J	Remainder of Maryland	460	410	870
	Total	**11,405**	**10,185**	**21,590**

Notes:

[a]District corresponds to districts shown in Section 4.3, Transportation, Figures 4.3-5, 4.3-16, and 4.3-17.

[b]Numbers are rounded.

[C]Loudoun County was broken out from Fairfax County. It was assumed that 40% of the projected Northern Fairfax County/Loudoun County redistributed population would live in Loudoun, and 60% would live in Northern Fairfax County.

Table 4.10-12
Comparison of projected population growth by location

District[a]	Location	Projected 2005 to 2010 population percentage change, without BRAC	Projected 2005 to 2010 population percentage change, with BRAC redistribution	Difference
A	Arlington/Alexandria	6.6	6.8	0.20
B	Loudoun County	28.6	28.9	0.30
C	Fairfax County	8.8	9.7	0.90
D	Prince William County	16.8	18.1	1.30
E	Near South (Fredericksburg/Stafford County)	13.6	15.5	1.90
F	Remainder of Virginia	11.6	12.4	0.80
G	District of Columbia	5.4	5.4	--
H	Prince Georges County	2.3	2.4	0.10
I	Montgomery County	6.2	6.2	--
J	Remainder of Maryland	9.0	9.2	0.20

Notes:
[a]District corresponds to districts shown in Section 4.3, Transportation, Figures 4.3-5, 4.3-16, and 4.3-17.
[b]Numbers are rounded.

4.10.2.2 Sociological Environment

Under the proposed Fort Belvoir BRAC action, the region would require additional infrastructure investment to maintain the current level of public services, including teacher-student ratios, per capita hospital beds, and number of fire and police personnel per resident. Historically, public services such as schools, law enforcement, fire protection, and health care facilities have expanded to meet the needs of the region's growing population. For counties and cities in the ROI, keeping up with growth has been a major challenge; however, public services were able to accommodate the needs of the rapidly growing region. School districts in the ROI are continually constructing new facilities or expanding capacity at existing facilities. Police and fire departments have also expanded their programs and increased their personnel and their vehicle inventory to accommodate population growth. Property and sales taxes provide funding for these public services. The following identify the anticipated effects for each of the key components of the sociological environment.

4.10.2.2.1 Land Use Plan Update

Housing. Long-term beneficial effects would be expected for on-post Unaccompanied Personnel Housing. Under the Preferred Alternative land use plan, a new Troop land use area would be designated on South Post, west of Gunston Road. However, current land uses, with Troop housing in the 2100 Area on the North Post, would continue until such time as the Army could construct and occupy troop facilities in the new area on South Post. An eventual relocation of the Troop area to the South Post would be beneficial to the troops, placing them in close proximity to installation services such as healthcare, shopping, service, and recreation facilities.

Police, Fire, Medical. Short-term minor beneficial effects would be expected on-post. The land use plan designates acreage as Professional/Institutional land use on the South Post. New medical facilities could be constructed on this land area. Land on EPG also would be designated as Professional/Institutional. Police, fire, or medical emergency facilities could be constructed on this land.

Schools. No effects would be expected.

Family Support, Shops, Services, and Recreation. Long-term beneficial and adverse effects would be expected. The land use plan would reduce the number of acres designated as Outdoor Recreation, resulting in long-term adverse effects. Fort Belvoir would lose a significant amount of valuable recreational acreage. Although some of the acreage would be incorporated into Community and Open Space, the proposed land use plan would change a portion of the land use designation of the South Post golf course from Outdoor Recreation to Professional/Institutional. Also, the North Post playing field along Route 1 across from Pence Gate would change from Outdoor Recreation to Community, and hunting grounds on EPG would be lost because the land use designation would change to Professional/Institutional. The four McNaughton ballfields along Pole Road on the South Border of Woodlawn Village for the Berman Tract immediately east of Woodlawn Village would be designated as Community land use.

The proposed land use plan does include Community land use designation on the South Post, where the development of a town center could occur. A town center could consist of mixed-use development that could include recreational facilities such as a fitness center and ballfields.

4.10.2.2.2 BRAC Implementation and Facilities Projects

Housing. Long-term minor beneficial effects would be expected on Unaccompanied Personnel Housing. The troop housing on the North Post would be replaced with a new facility in the newly designated Troop area on the South Post. The new barracks would provide quality, affordable housing accommodations for Soldiers that would be in close proximity to installation services such as healthcare, shopping, service, and recreation facilities.

No effects would be expected to off-post housing. It was estimated that about 8,800 employees would change their home residence within the ROI because their job would be transferred to Fort Belvoir (see Table 4.10-10). As of 2005, the ROI housing stock had an estimated 42,000 vacant housing units, of which about 31,000 were available for rent and about 11,000 units were available for sale (U.S. Census Bureau, 2006c). Data was not yet available for several of the counties in the ROI. The number of housing units in the ROI available for sale or rent would be greater than the listed 42,000 units. The ROI experienced a surge in the housing market between 2000 and 2005, with an average of 33,000 permits issued per year for new residential housing construction. More than 100,000 home sales transactions occurred in 2005 (Table 4.10-5). Housing and rental property in the ROI are market driven. The housing stock is forecast to continue to increase with demand and would be anticipated to be able to support the projected housing demand under the proposed alternative. In addition, the resulting population shift under BRAC would not be expected to occur all at once, but gradually. The sale and purchase of homes by the relocating Fort Belvoir employees would occur over time.

The highest percentage of employees is expected to relocate along Virginia's I-95 corridor in Fairfax, Prince William, and Stafford Counties. As shown in Table 4.10-10, about 3,300 employees would relocate to Southern Fairfax County, about 2,000 in Prince William County,

and about 800 in Stafford County (assuming each employee represents one household). Between 2000 and 2005, Prince William County's and Stafford County's housing stock increased by more than 25 percent, and Fairfax County's increased by 8 percent (Table 4.10-4). Fairfax County had more than 23,000 net home sales in 2005, with a housing inventory of more than 386,000 units, and more than 4,300 new housing units permitted. As of 2005 Prince William County had almost 12,000 net home sales, a housing inventory of more than 125,000 housing units, and about 5,400 new units permitted. Stafford County had almost 3,000 home sales in 2005, a housing inventory of about 40,000, and more than 1,600 new homes authorized. As stated earlier, the BRAC-related housing transactions would be dispersed over time, so a sudden, short-term increase in housing demand in these areas would not be anticipated.

Police, Fire, Medical. Long-term beneficial effects and short-term minor adverse effects on on-post police, fire, or medical services would be expected. The proposed action would result in about 6.3 million square feet of additional built space and 22,000 additional people working on the installation. Fort Belvoir plans to construct additional emergency and medical facilities, purchase the appropriate equipment, and bring on additional personnel to provide sufficient police, fire, and medical emergency response to the new structures and to support the installation's increased population under the BRAC action.

As part of the BRAC action, a new emergency services center would be constructed on EPG. This center would provide required military police, Enhanced 911, hazardous materials response, and fire prevention and protection services for the proposed facilities that would be constructed on EPG and for the associated personnel that would be stationed at EPG. The emergency services center would provide a combined police and fire station to provide traffic control, law enforcement, and provide rapid response to structural fires and medical emergencies in support of the agencies and activities on EPG.

A new hospital would be built on the South Post to replace the Dewitt Army Community Hospital. This project would provide a hospital to support BRAC 2005 restationing actions within the ROI affecting WRAMC, National Naval Medical Center (NNMC), Malcolm Grow Medical Center (MGMC), and Dewitt Army Community Hospital at Fort Belvoir. The NCR Medical Service Market supports care for more than 439,000 beneficiaries. A larger Dewitt Community Hospital is required to support the relocation of nontertiary patient care functions consequent to the BRAC 2005 restationing actions, which includes the closure of WRAMC and closure of inpatient care at MGMC. In addition, an expanded dental clinic and a NARMC HQ building would be sited on the South Post. Locating these medical facilities in close proximity with one another would provide convenience for patients and staff. These facilities would be necessary under the proposed BRAC action to support the increase in medical and dental workload generated by the projected increase of active-duty Soldiers and civilians eligible for medical benefits at Fort Belvoir.

Short-term minor adverse effects would be expected on on-post fire and police services. The South Post Fire Station is inadequate and needs to be replaced. The existing fire station, Building 191, is inadequate for provision of fire protection for training, research and development, family housing, and administrative buildings on South Post. Continued use of this inadequate pre-WWII facility would degrade response times and quality of fire protection for Soldiers, DA civilians, and family members who live and work on Fort Belvoir's South Post. The MP station is also in need of expansion to adequately serve the incoming BRAC population. The ability to provide proper service fire protection and law enforcement would continue to degrade because of continued use of inadequate facilities and increased demand from the additional population.

However, future Master planning actions (non-BRAC) provide for the construction and staffing of new fire stations on the South Post and EPG and an expanded MP station. These actions are addressed under cumulative effects.

Short-term minor adverse effects would be expected on off-post police, fire, and medical services. The population shift under the BRAC action would result in minor increases in the forecast population of the counties and cities composing the ROI (see Table 4.10-12). The ROI is already a densely populated area that is projected to continue to experience strong population growth. Additional public safety personnel and new facilities (e.g., fire stations, police stations, healthcare clinics, hospitals) are needed to accommodate future population levels. The population increases in each jurisdiction due to the Fort Belvoir BRAC action would be minor relative to the already projected population growth (about 21,000 people within the ROI would relocate because of BRAC; the ROI population is expected to increase by about 419,000 persons between 2005 and 2010). Over time, public support services adapt to the demands of the increased population base, funded by new tax revenues. Expansion of law enforcement, fire-fighting, and medical services (i.e., increasing staff or acquiring new facilities or equipment) would be necessary to maintain service levels and emergency response times. To accommodate the sustained increase in demand that would occur under the proposed action, coordination with ROI planning officials would need to be implemented so adequate and timely planning could be conducted to ensure that public sector capacity is not exceeded.

Schools. Short- and long-term minor adverse effects would be expected on off-post schools. The population that would relocate within the ROI because of the proposed Fort Belvoir BRAC action would increase the number of primary and secondary school-age children in each jurisdiction (Table 4.10-11 and Appendix G.2). However, these estimated population increases from the BRAC action translate into minor population increases over current population projections. School districts are already planning on how to accommodate the projected 2010 population. Table 4.10-13 lists the estimated number of new children by location and school age. On the basis of Census data, the population under age 18 is about evenly divided between four age groups: nursery/preschool (25 percent); elementary school (25 percent); middle school (25 percent); and high school (25 percent) (U.S. Census Bureau, 2006c). Fairfax County and Prince William County would be expected to receive the highest number of children. Fairfax County would receive about 4,300 children (about 1,000 each in preschool, elementary, middle, and high school), which would be about a 3 percent increase over the current total FCPS student enrollment of about 166,500. Prince William County would receive about 2,300 children (about 600 each in preschool, elementary, middle, and high school), also about 3 percent more than the current enrollment of 72,500 students. The impact of these additional students would depend on how they are distributed among the schools. An increase of 20 to 30 students in a school could mean a new classroom, and an increase of 300 students could mean a new school (DoD, 2005b). If a school is operating at or above capacity, portable classrooms or other accommodations would be needed until schools can be expanded or new schools can be constructed. However, as discussed earlier, the population relocation because of BRAC would not occur at one time. The BRAC actions at Fort Belvoir must be initiated no later than September 15, 2007, and completed no later than September 15, 2011, so the population shift would be expected to occur around that same time frame, as employees would decide whether to relocate relative to their new place of employment, which would reduce the impact on schools.

Table 4.10-13
Estimated redistribution of children

District[a]	Location	Number of children redistributed by location[b]	Nursery or preschool age[b]	Elementary school[b]	Middle school[b]	High school[b]
A	Arlington/Alexandria	410	103	103	103	103
B	Loudoun County[c]	290	73	73	73	73
	Northern Fairfax County	430	108	108	108	108
C	Southern Fairfax County	3,910	978	978	978	978
D	Prince William County	2,365	591	591	591	591
E	Near South (Fredericksburg/Stafford County)	925	231	231	231	231
F	Remainder of Virginia	720	180	180	180	180
G	District of Columbia	105	26	26	26	26
H	Prince George's County	515	129	129	129	129
I	Montgomery County	105	26	26	26	26
J	Remainder of Maryland	410	103	103	103	103
	Total	**10,185**	**2,546**	**2,546**	**2,546**	**2,546**

Notes:

[a]District corresponds to districts shown in Section 4.3, Transportation, Figures 4.3-5, 4.3-16, and 4.3-17.

[b]Numbers are rounded.

[c]Loudoun County was broken out from Fairfax County. It was assumed that 40 percent of the projected Northern Fairfax County/Loudoun County redistributed population would live in Loudoun County, and 60 percent would live in Northern Fairfax County.

In the long-term, public schools would adapt to the demands of the increased population base, funded by new property tax revenues. The Federal Impact Aid Program would continue to provide some funding to local schools. However, Federal Impact Aid only pays a portion of a child's education cost and does not provide for school construction costs. In the National Defense Authorization Act for Fiscal Year 2006 (Public Law 109–163, January 6, 2006, Section 572), Congress approved $7 million to be dispensed by the DoD to the school districts that are most heavily impacted by an increase (or reduction) in military students due to BRAC (and other Army initiatives) (DoD 2005a). The law provides for financial assistance through September 30, 2010 to local education agencies that meet the eligibility requirements (eligibility depends on the number of military dependent students). In the National Defense Authorization Act for Fiscal Year 2007 (Public Law 109–364, October 17, 2006, Section 574), Congress required that the Secretary of Defense to prepare a report to Congress with a plan to provide assistance to local educational agencies that experience growth in the enrollment of military dependent students as a result of base realignment or closures, force structure changes, or the relocation of a military unit. The report will identify the military installations affected by the above listed events, the total number of military students arriving or departing from these military installations, and when they will be arriving or departing. The report also will include recommendations to provide funding assistance and outreach to affected local educational agencies (Public Law 109–364, Section 574, 2006).

The Army would continue to confer with the potentially affected school districts on potential student increases that could occur under the Preferred Alternative. Advance notice would give

the schools time to secure funding, add facilities, and hire new teachers, as necessary. Although the local school districts receive additional funding for each military dependents attending public school, school districts would bear some of the costs for additional teachers and physical space, if needed.

No effects would be expected on-post schools. The BRAC action would not change the number of on-post family housing units, and therefore would not change the on-post population or student enrollments.

Family Support and Social Services. Long-term significant adverse and long-term minor beneficial effects would occur. The proposed action would increase the on-post population resulting in a significant increase in demand for MWR family support and social services, while at the same time causing financial losses to MWR due to the loss of revenue-generating recreational facilities (e.g., the South Post golf course would be closed to accommodate the new hospital and NARMC headquarters). Adverse effects would occur because Fort Belvoir MWR would not have sufficient funds, facilities, or staff to support required MWR programs. The ability to provide proper service and meet customer demands would degrade because of continued use of inadequate facilities, continued fragmentation of services, and increased demand from the additional population. Future Master planning actions (non-BRAC) provide for the construction and staffing of a consolidated Soldier Support Center (this action is addressed under cumulative effects), but MWRs ability to build the facility would depend on their available NAF, which would be reduced by BRAC actions.

Long-term minor beneficial effects would occur from additional child day care facilities. The BRAC action includes the addition of 2 CDCs on EPG. Existing facilities would not be able to support the children of the incoming population. The new childcare facilities would be sufficient to accommodate children of the additional military and civilian personnel that would be stationed at Fort Belvoir as a consequence of BRAC. Off-post, there are many child day care facilities and in-home child care options, as well as potential future facilities that would be market driven.

Short-term minor adverse effects would be expected on off-post family and social services. The population shift under the BRAC action would result in minor increases in the forecast population of some of the counties and cities composing the ROI (see Table 4.10-12). Expansion of social services would be necessary to maintain service levels. However, the population changes due to BRAC would be minor relative to the ROI's current projected population growth. Over time, social services would adapt to the demands of the increased population base, funded by new tax revenues.

Shops, Services, and Recreation. Long-term minor beneficial and long-term significant adverse effects would be expected. A new family travel camp would be established on the South Post in a Community land use area. Currently, there are no family travel campgrounds on-post. This project would provide some outdoor camping facilities for the high demand within DoD for RV campsites and cabin sites. This project would be financed through MWR NAF.

Long-term significant adverse would occur from the loss of recreational facilities, which would impact MWR NAF in several ways: loss of assets, revenues, and staff. Facilities affected would include the South Post golf course, the walking trail surrounding the course, and the playing field on Route 1 across from Pence Gate. Proposed BRAC construction projects would site the new hospital and NARMC headquarters on the South Post golf course. MWR would have a one-time bottom-line income loss due to the loss of the South Post golf course's undepreciated fixed assets

of about $1.5 million. Loss of golf course revenue is estimated at about $500,000 annually beginning in FY08, with more than $2.6 million projected over 5 years. Theses losses could result in layoffs, with an estimated one-time severance pay for current employees of about $70,000. In addition to the loss of the South Post golf course, the Access Control Point would affect Fort Belvoir's single largest playing field area on North Post (across from the Pence Gate). The field is used for community wide celebrations (such as the 4th of July and Oktoberfest) and sporting events. No alternate location has been identified for these events. If these events would no longer be held, it would also reduce MWR revenue (MWR, 2007).

Loss of these MWR facilities also would adversely impact quality of life. The South Post golf course attracts inexperienced golfers, families, and seniors because it is a flat, relatively easy course compared to the North Post golf courses. About 20 percent of the Fort Belvoir golf course members exclusively play the South Post course, and would not play the North courses due to its level of difficulty. Closure of the South Post course would result in a 30 percent reduction in overall rounds played at Fort Belvoir's 45-hole golf complex. The increase in use of the North Post courses would cause peak period tee-time competition, frustrating patrons and reducing their opportunity to play golf. Loss of the playing field and its events would adversely impact quality of life for on-post Soldiers and their families, as well as the installation's opportunity to enhance positive community relations with off-post neighbors (MWR, 2007).

The impact of BRAC on the demand for services and the MWR NAF would adversely affect many other on-post MWR service and recreation facilities. The existing Religious Education Center is inadequate to serve the anticipated population increase. Additional physical fitness centers and outdoor recreation fields also would be required. The Main Post library would need to be expanded, as well as the Community Recreation Center, the arts and crafts and automotive centers, the bowling center, the North Post golf club house, and the Veterinary Clinic. All these facilities would be inadequate to accommodate the incoming BRAC workforce. Levels of service would decrease, causing customers to have long wait times or to return at other times. Future Master planning actions (non-BRAC) plan for the construction and staffing of these facilities (these actions are addressed under cumulative effects in Section 5.0), but MWR's ability to build and operate these facilities depends on their available NAF, which would be significantly reduced by BRAC actions.

Currently, there are no sites identified to relocate or rebuild, replace, or refit impacted MWR services and recreational areas. The estimated worst-case scenario impact of BRAC on MWR NAF is about $5 million during the first year (this includes expenses such as program closure, disposal and termination of assets, personnel severance pay, losses on undepreciated NAF assets, and lost revenue) which in turn decreases funding for capital reinvestments on Fort Belvoir (MWR, 2007).

Short-term minor adverse effects would be expected to off-post shopping and services. The increased Fort Belvoir work force would create a demand for additional shopping and services in the immediate vicinity of the installation (e.g., restaurants, gas stations, convenience stores, grocery stores, dry cleaning). Service levels would be expected to decrease as population increased, causing customers to have long wait times or to return at other times. The number and type of shopping and service businesses in proximity to Fort Belvoir would be expected to increase with demand as they would be market driven.

4.10.2.3 Environmental Justice

4.10.2.3.1 Land Use Plan Update

No effects would be expected. Implementing the Preferred Alternative land use plan would not result in disproportionately high or adverse human health or environmental effects on minority or low-income populations. The action would not be an action that has the potential to substantially affect human health or the environment by excluding persons, denying persons benefits, or subjecting persons to discrimination because of their race, color, national origin, or income level.

4.10.2.3.2 BRAC Implementation and Facilities Projects

No effects would be expected. The proposed BRAC action at Fort Belvoir would not result in disproportionately high or adverse human health or environmental effects on minority or low-income populations. Although the proposed action would create additional traffic concerns, these effects would be felt throughout the region; the minority and low-income communities would not bear a disproportionate share of negative environmental consequences resulting from the action. Low-income populations could benefit from the creation of new jobs associated with implementing this alternative.

4.10.2.4 Protection of Children

4.10.2.4.1 Land Use Plan Update

No effects would be expected. Implementing the Preferred Alternative land use plan would not result in environmental health and safety risks that might disproportionately affect children.

4.10.2.4.2 BRAC Implementation and Facilities Projects

Long-term minor adverse effects on the protection of children would be expected to occur. During the development period (2007 through 2011) there would be many construction sites in the installation cantonment area. Because construction sites can be enticing to children, construction activity could pose an increased safety risk. During construction, safety measures stated at 29 CFR Part 1926, *Safety and Health Regulations for Construction, and Army Regulation 385-10, Army Safety Program*, would be followed to protect the health and safety of on- and off-post resident, as well as construction workers. It is recommended that barriers and "No Trespassing" signs be placed around construction sites to deter children from playing in these areas and that construction vehicles and equipment be secured when not in use.

4.10.2.5 BMPs/Mitigation

4.10.2.5.1 Economic Development (Employment, Industry, Income, Population)

No BMPs or mitigation would be required.

4.10.2.5.2 Sociological Environment (Housing, Police, Fire, Medical, Schools, Family Support and Social Services, and Shops Services and Recreation)

BMP (Liaison). The relocation of personnel to Fort Belvoir would be expected to result in the movement of some of these employees, and their families, to communities closer to the installation. This would affect enrollment in primary and secondary schools. The Army should

confer with potentially affected school districts on estimated student enrollment increases that could occur if the Preferred Alternative is implemented.

4.10.2.5.3 Environmental Justice

No BMPs or mitigation would be required.

4.10.2.5.4 Protection of Children

BMPs. Secure construction vehicles and equipment when not in use and place barriers and "No Trespassing" signs around construction sites.

4.10.3 ENVIRONMENTAL CONSEQUENCES OF TOWN CENTER ALTERNATIVE

4.10.3.1 Economic Development (Employment, Industry, Income, Population)

4.10.3.1.1 Land Use Plan Update

Short- and long-term minor beneficial effects would be expected to occur. The Town Center Alternative land use plan would redesignate acreage on Fort Belvoir North and South Posts as Professional/Institutional, Community, Residential, and Troop, providing the opportunity for development (or redevelopment) of this land. If construction or renovation of facilities occurs on the land, it would generate short-term construction jobs, income, and increased spending in the region from the purchase of construction and other materials. In the long-term, operation of new facilities would result in an increase in employment, income, and spending from personnel working at the new facilities, including maintenance, administrative, and professional staff.

4.10.3.1.2 BRAC Implementation and Facilities Projects

Effects would be the same as or similar to those stated in Section 4.10.2.1.2. Under the Town Center Alternative, the siting of the BRAC facilities on Fort Belvoir would vary from the Preferred Alternative, but the economic effects from construction expenditures and the increase of Fort Belvoir personnel would be the same. Table 4.10-14 presents impacts of each of the proposed BRAC action projects on economic and sociological resources.

Table 4.10-14
Effects from proposed BRAC projects on economic and social resources under the Town Center Alternative

Project #	BRAC project	Economic Change	Social change
1	NGA Administrative Facility	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
2	WHS Administrative Facility		
3	MDA		

Table 4.10-14
Effects from proposed BRAC projects on economic and social resources under the Town Center Alternative *(continued)*

Project #	BRAC project	Economic Change	Social change
4	Hospital	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on beneficiaries due to availability of new, state-of-the-art hospital; long-term significant adverse effects due to loss of South Post Golf Course which would be closed to accommodate hospital and NARMC
5	Dental Clinic	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on beneficiaries from availability of expanded dental clinic
6	NARMC HQ Bldg.	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term significant adverse effects due to loss of South Post Golf Course which would be closed to accommodate hospital and NARMC
7	COE Integration Offices	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
8	Infrastructure	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
9	Emergency Services Center (EPG)	No effect	No effect
10	Network Operations Center	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
11	USANCA Support Facility		
12	Child Development Center (NGA)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects from additional child day care facility
13	Child Development Center		

Table 4.10-14
Effects from proposed BRAC projects on economic and social resources under the Town Center Alternative *(continued)*

Project #	BRAC project	Economic Change	Social change
14	Admin Facility (211, 214, 215, 220)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
15	Access Road/Control Point	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term significant adverse effects due to impact on recreational fields and loss of revenue to MWR
16	AMC Relocatables	No effect	No effect
17	PEO EIS Admin Facility	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
18	Structured Parking, 200 Area	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
19	Modernize Barracks	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects due to new barracks for Soldiers
20	MWR Facility Travel Camp	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on quality of life from new travel camp

4.10.3.2 Sociological Environment

4.10.3.2.1 Land Use Plan Update

Housing. Long-term beneficial effects would be expected for on-post Unaccompanied Personnel Housing. Under the Town Center land use plan, a new Troop land use area would be designated on South Post, west of Gunston Road. However, current land uses, with Troop housing in the 2100 Area on the North Post, would continue until such time as the Army could construct and occupy troop facilities in the new area on South Post. An eventual relocation of the Troop area to the South Post would be beneficial to the troops, placing them in close proximity to installation services such as healthcare, shopping, service, and recreation facilities.

Police, Fire, Medical. Long-term minor beneficial effects would be expected on-post. The Town Center Alternative land use plan designates acreage on the North Post as Professional/Institutional. New medical facilities could be constructed in this land area, which would provide improved facilities and service to beneficiaries.

Schools. No effects would be expected.

Family Support, Shops, Services, and Recreation. Long-term minor beneficial and adverse effects would be expected. The land use plan would reduce the number of acres designated as Outdoor Recreation, resulting in long-term adverse effects. Fort Belvoir would lose a significant amount of valuable recreational acreage. Although some of the acreage would be incorporated into Community and Open Space, the proposed land use plan would change a majority of the land use designation to non-recreational land uses. For example, the land use of the South Post golf course would change from Outdoor Recreation to Professional/Institutional. The North Post playing field across from Pence Gate would change from Outdoor Recreation to Community.

4.10.3.2.2 BRAC Implementation and Facilities Projects

Effects on the sociological environment would be the same or similar to those stated in Section 4.10.2.2.2. Under the Town Center Alternative, the siting of the BRAC facilities on Fort Belvoir would vary from the Preferred Alternative; however, the effects on sociological resources from BRAC implementation and the effect on population and demand for housing and public services would be similar. The significant adverse impact on MWR facilities and funds (and therefore Soldier's quality of life) also would occur under the Town Center Alternative, with the loss of the South Post golf course to accommodate the NGA and WHS administrative and parking facilities, and the impact on the North Post playing field across from Pence Gate to accommodate the Access Control Point. In addition, the Town Center Alternative also would result in the possible loss of 4 tennis courts, 3 basketball courts, picnic and park site, the Better Opportunities for Single Soldiers building, and a physical fitness facility with softball and football fields. Future Master planning actions (non-BRAC) plan for the construction and staffing of new or replacement MWR recreational and service facilities (these actions are addressed under cumulative effects in Section 5.0).

4.10.3.3 Environmental Justice

Effects on environmental justice would be the same as those stated in Section 4.10.2.3.

4.10.3.4 Protection of Children

Effects on protection of children would be the same as those stated in Section 4.10.2.4.

4.10.3.5 BMPs/Mitigation

BMPs or mitigation measures would be the same as those stated in Section 4.10.2.5.

4.10.4 ENVIRONMENTAL CONSEQUENCES OF THE CITY CENTER ALTERNATIVE

4.10.4.1 Economic Development (Employment, Industry, Income, Population)

4.10.4.1.1 Land Use Plan Update

Short- and long-term minor beneficial effects would be expected. The City Center Alternative land use plan would redesignate acreage on Fort Belvoir, EPG, and the GSA Parcel as Professional/Institutional, Community, Residential, and Troop, providing the opportunity for development (or redevelopment) of this land. If construction or renovation of facilities would occur on the land, it would generate short-term construction jobs, income, and increased spending in the region from the purchase of construction and other materials. In the long-term, operation of new facilities would result in an increase in employment, income, and spending from personnel working at the new facilities, including maintenance, administrative, and professional staff.

4.10.4.1.2 BRAC Implementation and Facilities Projects

Effects would be the same as or similar to those stated in Section 4.10.2.1.2. Under the City Center Alternative, the siting of the BRAC facilities on Fort Belvoir would vary from the Preferred Alternative, but the economic effects from construction expenditures and the increase of Fort Belvoir personnel would be the same. . Table 4.10-15 presents impacts of each of the proposed BRAC action projects on economic and sociological resources.

Table 4.10-15
Effects from proposed BRAC projects on economic and social resources under the City Center Alternative

Project #	BRAC project	Economic Change	Social change
1	NGA Administrative Facility	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
2	WHS Administrative Facility		
3	MDA		
4	Hospital	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on beneficiaries due to availability of new, state-of-the-art hospital

Table 4.10-15
Effects from proposed BRAC projects on economic and social resources under the City Center Alternative *(continued)*

Project #	BRAC project	Economic Change	Social change
5	Dental Clinic	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on beneficiaries from availability of expanded dental clinic
6	NARMC HQ Bldg.	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects due to new facility
7	COE Integration Offices	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
8	Infrastructure	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
9	Emergency Services Center (EPG)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects due to center which would provide rapid response to structural fires and medical emergencies in support of the agencies and activities on EPG
10	Network Operations Center	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
11	USANCA Support Facility		
12	Child Development Center (NGA)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects from additional child day care facility
13	Child Development Center		

Table 4.10-15
Effects from proposed BRAC projects on economic and social resources under the City Center Alternative *(continued)*

Project #	BRAC project	Economic Change	Social change
14	Admin Facility (211, 214, 215, 220)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
15	Access Road/Control Point	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term significant adverse effects due to impact on recreational fields and loss of revenue to MWR
16	AMC Relocatables	No effect	No effect
17	PEO EIS Admin Facility	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
18	Structured Parking, 200 Area	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
19	Modernize Barracks	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects due to new barracks for Soldiers
20	MWR Facility Travel Camp	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on quality of life from new travel camp

4.10.4.2 Sociological Environment

4.10.4.2.1 Land Use Plan Update

Housing. Long-term beneficial effects would be expected for on-post Unaccompanied Personnel Housing. Under the City Center land use plan, a new Troop land use area would be designated on South Post, west of Gunston Road. However, current land uses, with Troop housing in the 2100 Area on the North Post, would continue until such time as the Army could construct and occupy troop facilities in the new area on South Post. An eventual relocation of the Troop area to the South Post would be beneficial to the troops, placing them in close proximity to installation services such as healthcare, shopping, service, and recreation facilities.

Police, Fire, Medical. Long-term minor beneficial effects would be expected on-post. EPG land use would change from Training Ranges to Professional/Institutional. New emergency and medical service facilities could be constructed on EPG in this land area., which would provide improved facilities and services to beneficiaries.

Schools. No effects would be expected.

Family Support, Shops, Services, and Recreation. Long-term minor beneficial and adverse effects would be expected. The land use plan would redesignate acreage on the North Post that is identified as Outdoor Recreation. Some of the acres would change to Professional/Institutional, but most would be incorporated into Community land use. For example, the North Post playing field across from Pence Gate would change from Outdoor Recreation to Community, which could adversely impact recreational use of that field. Long-term beneficial effects from the City Center land use plan would result from the designation of Community land use on Main Post, which could allow for the development of new service, shopping, or recreational facilities, which would provide improved facilities and services to beneficiaries.

4.10.4.2.2 BRAC Implementation and Facilities Projects

Effects on the sociological environment would be the same as or similar to those stated in Section 4.10.2.2.2. Under the City Center Alternative, the siting of the BRAC facilities on Fort Belvoir would vary from the Preferred Alternative; however, the effects on sociological resources from BRAC implementation and the effect on population and demand for housing and public services would be similar. The adverse impact on MWR under the City Center Alternative would not be as severe as under the Preferred or Town Center Alternative because the majority of the proposed BRAC facilities would be sited on EPG and GSA, and would not impact North and South Post facilities, such as the golf courses.

4.10.4.3 Environmental Justice

Effects on environmental justice would be the same as that stated in Section 4.10.2.3.

4.10.4.4 Protection of Children

Effects on protection of children would be the same as that stated in Section 4.10.2.4.

4.10.4.5 BMPs/Mitigation

BMPs or mitigation measures would be the same as that stated in Section 4.10.2.5.

4.10.5 ENVIRONMENTAL CONSEQUENCES OF THE SATELLITE CAMPUSES ALTERNATIVE

4.10.5.1 Economic Development (Employment, Industry, Income, Population)

4.10.5.1.1 Land Use Plan Update

Short- and long-term minor beneficial effects would be expected. The Satellite Campuses land use plan would redesignate acreage on Fort Belvoir as Professional/Institutional, Community, Residential, and Troop, providing the opportunity for development (or redevelopment) of this land. If construction or renovation of facilities on the land occurs, it would generate short-term construction jobs, income, and increased spending in the region from the purchase of construction and other materials. In the long-term, operation of the facilities would result in an increase in employment, income, and spending from personnel working at the new facilities, including maintenance, administrative, and professional staff.

4.10.5.1.2 BRAC Implementation and Facilities Projects

Effects would be the same as or similar to those stated in Section 4.10.2.1.2. Under the Satellite Campuses Alternative, the siting of the BRAC facilities on Fort Belvoir would vary from the Preferred Alternative, but the economic effects from construction expenditures and the increase of Fort Belvoir personnel would be the same. . Table 4.10-16 presents impacts of each of the proposed BRAC action projects on economic and sociological resources.

Table 4.10-16
Effects from proposed BRAC projects on economic and social resources under the Satellite Campuses Alternative

Project #	BRAC project	Economic Change	Social change
1	NGA Administrative Facility	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
2	WHS Administrative Facility		
3	MDA		
4	Hospital	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on beneficiaries due to availability of new, state-of-the-art hospital; long-term significant adverse effects due to loss of part of North Post Golf Course which would be closed to accommodate hospital and NARMC
5	Dental Clinic	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on beneficiaries from availability of expanded dental clinic

Table 4.10-16
Effects from proposed BRAC projects on economic and social resources under the Satellite Campuses Alternative *(continued)*

Project #	BRAC project	Economic Change	Social change
6	NARMC HQ Bldg.	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term significant adverse effects due to loss of part of North Post Golf Course which would be closed to accommodate hospital and NARMC
7	COE Integration Offices	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
8	Infrastructure	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
9	Emergency Services Center (EPG)	No effect	No effect
10	Network Operations Center	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
11	USANCA Support Facility		
12	Child Development Center (NGA)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects from additional child day care facility
13	Child Development Center		
14	Admin Facility (211, 214, 215, 220)	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand

Table 4.10-16
Effects from proposed BRAC projects on economic and social resources under the Satellite Campuses Alternative *(continued)*

Project #	BRAC project	Economic Change	Social change
15	Access Road/Control Point	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term significant adverse effects due to impact on recreational fields and loss of revenue to MWR
16	AMC Relocatables	No effect	No effect
17	PEO EIS Admin Facility	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Short-term minor adverse effects on on-and off-post police, fire, and medical services and shopping and other services due to increased demand; short- and long-term minor adverse effects on off-post schools from increased student enrollments; long-term significant adverse effects on on-post social services and recreational facilities due to a significant increase in demand; short-term minor adverse effects on off-post family and social services due to increased demand
18	Structured Parking, 200 Area	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	No effect
19	Modernize Barracks	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects due to new barracks for Soldiers
20	MWR Facility Travel Camp	Short-term minor beneficial effects due to construction expenditures that would result in beneficial increases in ROI sales volume, income, and employment	Long-term minor beneficial effects on quality of life from new travel camp

4.10.5.2 Sociological Environment

4.10.5.2.1 Land Use Plan Update

Housing. Long-term beneficial effects would be expected for on-post Unaccompanied Personnel Housing. Under the Satellite Campuses land use plan, a new Troop land use area would be designated on South Post, west of Gunston Road. However, current land uses, with Troop housing in the 2100 Area on the North Post, would continue until such time as the Army could construct and occupy troop facilities in the new area on South Post. An eventual relocation of the Troop area to the South Post would be beneficial to the troops, placing them in close proximity to installation services such as healthcare, shopping, service, and recreation facilities.

Police, Fire, Medical. Long-term minor beneficial effects would be expected on-post. The Satellite Campuses Alternative land use plan designates acreage as Professional/Institutional on the North Post. New medical facilities could be constructed on this land area, which would provide improved facilities and service to beneficiaries.

Schools. No effects would be expected.

Family Support, Shops, Services, and Recreation. Long-term minor beneficial and adverse effects would be expected. The land use plan would reduce the number of acres designated as Outdoor Recreation, resulting in long-term adverse effects. Fort Belvoir would lose a significant amount of valuable recreational acreage. Although some of the acreage would be incorporated into Community and Open Space, the proposed land use plan would change at least half of the land use designation of the North Post golf course from Outdoor Recreation to Professional/Institutional. Long-term beneficial effects from the Satellite Campus land use plan could result from the designation of land on the North and South Post as Community, where new or expanded service, shopping, or recreational facilities could be constructed or established, which would provide improved facilities and service to beneficiaries.

4.10.5.2.2 BRAC Implementation and Facilities Projects

Effects on the sociological environment would be the same as or similar to those stated in Section 4.10.2.2.2. Under the Satellite Campuses Alternative, the siting of the BRAC facilities on Fort Belvoir would vary from the Preferred Alternative; however, the effects on sociological resources from BRAC implementation and the effect on population and demand for housing and public services would be similar. The significant adverse impact on MWR facilities and funds (and therefore Soldier's quality of life) also would occur under the Satellite Campus Alternative, with the loss of at least half of the North Post golf course to accommodate the new hospital and NARMC headquarters. The North Post playing field across from Pence Gate would be impacted to accommodate the Access Control Point. Future Master planning actions (non-BRAC) plan for the construction and staffing of new or replacement MWR recreational and service facilities (these actions are addressed under cumulative effects in Section 5.0), but MWR's ability to build these facilities depends on their available NAF, which would be significantly reduced by BRAC actions.

4.10.5.3 Environmental Justice

Effects on environmental justice would be the same as that stated in Section 4.10.2.3.

4.10.5.4 Protection of Children

Effects on protection of children would be the same as that stated in Section 4.10.2.4.

4.10.5.5 BMPs/Mitigation

BMPs or mitigation measures would be the same as that stated in Section 4.10.2.5.

4.10.6 NO ACTION ALTERNATIVE

4.10.6.1 Economic Development (Employment, Industry, Income, Population)

4.10.6.1.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.10.6.1.2 BRAC Implementation and Facilities Projects

No effects would be expected. The changes in population and economic activity that would occur under the proposed action would not be implemented under the No Action Alternative. The housing market and public services (e.g., schools, police, fire, medical, social services) would continue to respond as they have in the past to ROI population changes as needed.

4.10.6.2 Sociological Environment

4.10.6.2.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.10.6.2.2 BRAC Implementation and Facilities Projects

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative. The housing supply and public services (e.g., schools, police, fire, medical, social services) would continue to respond to market demand.

4.10.6.3 Environmental Justice

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative.

4.10.6.4 Protection of Children

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative.

4.10.6.5 BMPs/Mitigation

No BMPs or mitigation measures would be required. The BRAC action would not be implemented under the No Action Alternative.

4.10.7 SUMMARY OF COMPARISON OF ALTERNATIVES

The BRAC action would have minor beneficial economic effects, regardless of the land use alternative selected. The BRAC action, in general, would have the same economic effects under each alternative from construction expenditures and the increase of Fort Belvoir personnel. Estimated construction expenditures would be similar under each alternative, with variations among the alternatives for demolition and infrastructure. The construction and renovation expenditures would result in beneficial increases in ROI business sales volume, income, and

employment. Although the proposed action's expenditures would be quite substantial, Fort Belvoir is in such an economically large and robust region that the magnitude of the expenditures relative to the regional demographic and economic forces would be considered minor. Because construction projects are, by nature, temporary, the economic stimulus from construction of the proposed BRAC and associated facilities would diminish over time as the projects reach completion in 2011.

The social effects of the BRAC action would range from short-term minor adverse to long-term significant adverse and long-term minor beneficial effects, regardless of the land use alternative selected. The siting of the BRAC facilities on Fort Belvoir would vary with each land use alternative; however, the effects on sociological resources from BRAC implementation and the effect on population and demand for housing and public services would be similar. On-post facilities would be inadequate to accommodate the incoming BRAC workforce. Additional police, fire, medical, shopping, and MWR sponsored programs and facilities would be needed. If facilities were not improved, levels of service would decrease. The ability to provide proper service and meet customer demands would degrade because of continued use of inadequate facilities, continued fragmentation of services, and increased demand from the additional population. Long-term significant adverse effects would be expected on MWR sponsored programs, such as Soldier and family support and recreational facilities and activities, because Fort Belvoir's MWR would not have sufficient funds, facilities, or staff to support required MWR programs. Additional Fort Belvoir actions (BRAC and non-BRAC) plan for the construction and staffing of on-post facilities such as a new hospital, new emergency services center, CDCs, pool (water park), relocated/new sports fields, physical fitness centers, and Family Travel Camp area. These new or expanded facilities would be designed to adequately serve the incoming BRAC population, resulting in long-term beneficial effects. However, MWR's ability to build and operate these new recreational facilities depends on their available NAF, which would be significantly reduced by BRAC actions.

From a regional perspective, the social effects of the BRAC action would have short- and long-term minor adverse effects on regional services. The BRAC Commission's recommendations would generate a net increase of 22,000 people in the workforce on Fort Belvoir. Most of these personnel already reside within a one-hour drive to Fort Belvoir. It is probable that some of the affected personnel would change their home residence within the ROI to improve their commute to Fort Belvoir, in particular moving to areas along the Northern Virginia I-95 corridor including Fairfax County, Prince William County, and Stafford County, and the city of Fredericksburg. This would increase the population in these jurisdictions and the demand for services such as police, fire, and medical care; schools; social services; and shopping facilities. In the short-term, services would be expected to decrease as population increased. Expansion of services would be necessary to maintain levels of service. However, the population increases because of the BRAC action would be minor relative to projected regional population growth. In addition, population changes would occur over a number of years. The BRAC action would not be fully implemented until 2011. Over time, services (police, fire, medical, schools, social services) would adapt to the demands of the increased population base, funded by new tax revenues. The number and type of shopping and service businesses and community support morale, welfare, and recreation facilities and services would be expected to increase with demand as they would be market driven.

4.11 AESTHETICS AND VISUAL RESOURCES

Aesthetics and visual resources are the natural and man-made features of a landscape. They include cultural and historic landmarks, landforms of particular beauty or significance, water surfaces, and vegetation. Together these features form the overall impression that a viewer receives of an area or its landscape.

Visual environments are key contributors to people's daily experiences and life styles and can significantly affect moods and feelings of well-being. Major public improvement projects and facilities can have varying degrees and types of effects on the visual environments. The effects can range from very significant to hardly noticeable. Visual environments could be viewed as negative, or they could improve and contribute in a positive way to the appearance and image of communities. Although there is an inherent subjective nature to aesthetic evaluation, this section aims to qualify change by looking at noticability, level of upkeep of structures, and integration into the natural environment.

Visual effects on historic resources are protected under federal law through section 106 of the National Historic Preservation Act of 1966, as amended, and implementing regulations at 36 CFR 800.

4.11.1 AFFECTED ENVIRONMENT

Fort Belvoir consists of two geographically separate areas, the Main Post and the EPG, which are both along the western shore of the Potomac River, approximately 85 miles upstream of the Chesapeake Bay. Main Post is bisected by U.S. Route 1 creating two large areas that are referred to as North Post (north of Route 1) and the South Post (south of Route 1).

Main Post is characterized by a diverse topography, which includes uplands and plateaus, lowlands, and steeply sloped terrain. The uplands and plateaus make up approximately 40 percent of the installation. The predominant lowland areas on Fort Belvoir, approximating 40 percent of Fort Belvoir land, are associated with the floodplains of Accotink Creek, Pohick Creek, and Dogue Creek. Steeply sloped terrain is the primary component of the remaining 20 percent of the land of the Main Post. (U.S. Army, 1989) (for additional information on Topography, Geology and Soils see Section 4.6).

Installation-wide Family Housing is being upgraded under the U.S. Army's Residential Communities Initiative (RCI). Plans include the demolition and replacement of 1,900 homes and the renovation of 170 historically significant homes on Fort Belvoir. The final vision replaces or renovates 2,070 homes on 576 acres of Fort Belvoir developed and operated by a private entity known as Fort Belvoir Residential Communities Limited Liability Company (Clark Pinnacle, 2006). The family housing areas are landscaped to create visual enhancement to entries and provide visual screens between units. Fort Belvoir's troop housing occupies 72 acres (Landgraf, 2000). Landscaping around troop housing areas creates visual enhancement and visual transition to surrounding structures.

Even though Fort Belvoir was used for training purposes starting in 1915, the majority of the original structures were built in response to World Wars I and II. Remnants of these historic landscapes with a variety of cultural/historic structures still remain on-post. Additional development over the decades on the installation reflects various architectural styles that were current for the period in which they were built. Historic sites are further described under Cultural

Resources, section 4.9. For Belvoir and its related properties can be divided into six planning areas: South Post, North Post, Southwest Area, Davison Army Airfield, Engineer Proving Ground (EPG), and General Services Administration (GSA). These areas will serve as a guide for the description of Fort Belvoir.

4.11.1.1 South Post

The South Post is bounded by U.S. Route 1 to the north; the Noman M. Cole, Jr. Pollution Control Plant (formerly the Lower Potomac Pollution Control Plant), the Woodrow Wilson Boy Scout Reservation, and private development to the west; and waterways related to the Potomac River to the south and east. The South Post is broken into two areas for planning purposes: the South Post and the South Post Core Area.

The South Post contains research and development facilities, family housing, community facilities, recreation, administrative/education, supply/storage and maintenance facilities. The South Post peninsula is separated from the Southwest Area by Accotink Bay and Accotink Creek. The peninsula borders Accotink Bay, Dogue Creek, Gunston Cove, and the Potomac River. The central section of South Post contains the Core Area planning district with the highest density of buildings and includes most of the Fort Belvoir historic district. The parade grounds, as the largest open space with mature trees along the edges, serve as the focal point for the historic district. Administrative buildings in the Core Area planning district are separated with landscaping or lawns. The community and administrative area is usually viewed only by personnel and family members stationed at Fort Belvoir, students and other temporary personnel, and federal employees. These are generally people accustomed to the aesthetics of a military installation.

The family housing units surround the core planning district on the east. These vary from single family homes with landscaped entries and visual screens between properties to modern connected row houses with integrated shops and community areas. The Belvoir Ruins Trail is in the vicinity of the Fairfax Mansion Ruins and allows public enjoyment of the cultural resources and numerous trails through open spaces and natural areas. The Dogue Creek Marina is south of the Mount Vernon Road bridge. The marina has 105 wet slips and 300 dry-storage facilities and offers basic marina services except for fueling (King, 1999). All marina facilities are open to active and retired military and their families, and civilian personnel. The South Post golf course—a nine-hole course—tennis courts, and baseball fields are to the north of the core planning district.

The peninsula also contains a third of the 1,360 acre Accotink Bay Wildlife Refuge, which is accessed through the Tompkins Basin area. The Basin Trail, starting in the Tompkins Basin area, connects to approximately 9 miles of wildlife viewing trails through the Accotink Bay Wildlife Refuge. The trail is open to public access for hiking, bird watching, wildlife/nature watching and fishing. Tompkins Basin area is a recreation area bordering Gunston Cove, Accotink Bay, and the Potomac River allowing shoreline fishing and picnicking for public and installation residents. The recreation area has picnic pavilions, archery ranges, and an outdoor recreation facility. Access to ABWR along Pohick Road includes the main entrance and the 0.5-mile Pohick Loop Trail.

The Fairfax County Lower Potomac Planning District connects Fort Belvoir's open space to other sensitive areas in Fairfax County such as floodplains, stream influence zones, and tidal and nontidal wetlands associated with major watercourses, including the Potomac River. Significant

portions of the Mason Neck peninsula immediately south of Fort Belvoir are held in public ownership and are managed for the protection of important wildlife habitats and wetlands, with public recreation as a secondary use. Fort Belvoir's water resources are further described under, Water Resources, Section 4.7.

4.11.1.2 Southwest Area

The Southwest Area borders Accotink Bay, Pohick Bay, and Pohick Creek. The Southwest Area is undeveloped land composed of woodland, wetland, and riparian ecosystems. This area encompasses training areas, most of the 1,360-acre Accotink Bay Wildlife Refuge, and a portion of Fort Belvoir's Forest and Wildlife Corridor. The natural areas designated as the Accotink Bay Wildlife Refuge serve as a buffer for the training areas adjacent to them. Wildlife viewing trails through the Refuge (approximately 9 miles total) are open to the public for hiking, bird watching, wildlife/nature watching, and fishing. The hunting program for white-tailed deer, turkey, and waterfowl uses natural areas found on North and South Post and includes areas designated as training or wildlife refuge. Military personnel and civilian employees associated with Fort Belvoir access training areas through a network of gravel maintenance and access roads for activities including land-navigation training, explosive ordnance disposal, or management of natural resources. There is a gated access point on Poe Road to training areas and the Accotink Bay Wildlife Refuge for maintenance or special projects.

4.11.1.3 North Post

The North Post is bounded by Telegraph Road to the north and northwest; U.S. Route 1 to the south; and Huntley Meadows Park, Woodlawn Plantation, Pole Road Park, and private development to the east. For planning purposes, North Post can be separated into two areas: Lower North Post and Upper North Post. The two areas are divided by Kingman Road, which generally runs northeast to southwest.

Upper North Post is the least developed area and contains large pockets of undeveloped land. The Forest and Wildlife Corridor separates the two largest tenant organizations, HEC and DCEETA, which form distinct communities through fencing, building orientation, parking areas, and landscaping in the Upper North Post area. The Upper North Post contains the 146-acre Jackson Miles Abbott Wetland Refuge (JMAWR) and the majority of the 740-acre Forest and Wildlife Corridor, which connects the forested areas in the north to those in the south. Public access at JMAWR provides a half-mile, handicap-accessible trail for freshwater fishing and wildlife viewing around Mulligan Pond.

The Lower North Post (east of Fairfax County Parkway and south of John J. Kingman Road) is the most developed segment with administrative buildings, fire department, gas station, dining facility and the largest commissary in the continental United States. These areas are landscaped to provide visual screens. The developed areas are usually viewed only by personnel and family members stationed at Fort Belvoir, retirees, students and other temporary personnel, and federal employees who are accustomed to the aesthetics of a military installation. Fort Belvoir maintains a 36-hole golf course on the North Post. The north and south golf courses require 437 acres of vegetation maintained as turf, interspersed with patches of natural vegetation and landscape plantings (Horne, 2001). Fort Belvoir contains 13.3 miles of multiuse trails designed to complement the various roads on the post to accommodate such activities as biking, jogging, and walking (Landgraf, 2000). Improved surface trails parallel many of the roads and developments on the post. (Woolpert, 1993a).

4.11.1.4 Davison Army Airfield

Davison Army Airfield occupies roughly 740 acres. The airfield facility, which takes up about 400 acres is made up of a main runway, hangers, administration buildings, and cleared fields. It is located on the western portion of the Main Post (Landgraf, 2000). Davison Army Airfield is a Class A Army airfield providing support facilities for both fixed- and rotary-wing aircraft. This area contains a portion of Fort Belvoir's Forest and Wildlife Corridor.

4.11.1.5 EPG

The EPG is approximately 1.5 miles northwest of Main Post. It is bounded on the west by Rolling Road, on the east by Backlick Road/I-95, on the south by an industrial park, and on the north by various residential developments. EPG is largely an undeveloped area with gently rolling land ranging from 100- to 300-foot elevations, with the highest elevations in the northwest corner. The outer boundary of EPG and the majority of the west side are characterized by mixed age hardwood forests. The inner east side is characterized by younger pines and brushy areas. There are also several old ranges on the west side that are covered by younger pines and brushy areas. These areas are currently being cleared and grubbed in order to carry out UXO clearance. This process leaves the ranges with the larger pines, but removes all small trees and underbrush. The area is bisected by the narrow, steep-sloped streambed of Accotink Creek and intermittent streams flowing into Accotink Creek.

Within the 807 acres of EPG there are several roads in the northern portions. Roads, including one bridge crossing Accotink Creek, are in poor condition because of lack of maintenance. There are 44 structures at EPG, including 24 buildings and 11 explosives magazines and barricades (Bland, 1999). The majority of the buildings are abandoned and in poor condition because of lack of maintenance and salvage activities. The one building in use is accessed from Backlick Road and is occupied by USANCA. Although there are many pockets of land that have different level of disturbance due to various past uses, the majority of the area has the appearance of natural forest.

4.11.1.6 GSA Parcel

The GSA parcel is a 70.6-acre storage facility that sits three-quarters of a mile northeast of EPG. It is bounded on the west by I-95, by Franconia Springfield Parkway to the north, and by forested and residential areas to the east and south. The area is fully developed and made up entirely of architecturally basic storage facilities and parking lots.

4.11.1.7 Off-Post

Local land uses outside the installation are predominantly residential. Scattered commercial and industrial development, such as the Newington Industrial Park and a number of retail shopping malls, occur along U.S. Route 1, as well as near I-95 (Horne, 2001). There are several local, publicly owned tracts, including Huntley Meadows County Park, Pohick Bay Regional Park, Washington Grist Mill, Mount Vernon Estate and Mount Vernon Parkway, Gunston Hall Plantation, Mason Neck National Wildlife Refuge, and Mason Neck State Park. Many of these tracts occur along the Potomac River, forming a band of riparian habitat along the river and its tributaries. Pohick Church, Woodlawn Plantation, The Alexandria Society of Friends Meeting House and Woodlawn Baptist Church are a few historic resources of Fairfax County found near Fort Belvoir (Fairfax County 2002, 2003).

The view of Main Post seen by the public from U.S. Route 1 varies as one moves from west to east. The viewshed from Route 1 west of Accotink Village is of forested areas. The viewshed around Accotink Village consists of less developed Community and Residential areas. The remaining western portion of the Route 1 viewshed is partially obstructed due to the road sitting lower than surrounding land. The visible areas consist of athletic fields, forested areas, and scattered community areas.

From eastern boundaries along Old Colchester Road, private property, and Pohick Bay Regional Park, and from western boundaries along Pole Road and Mount Vernon Memorial Highway, the public sees a view of Main Post composed of buffer areas consisting of natural scenic views of woods, wetlands and riparian areas.

The view of Main Post the public sees from the northern boundary along Telegraph Road and various residential communities is of woodlands and wetlands.

The view of Main Post the public sees from the southern boundary is of marsh, wetlands, and woodlands, with a few residential or recreational pockets viewed from across the Potomac River, Accotink Bay, Gunston Cove or Dogue Creek from Pohick Bay Regional Park, Mason Neck residential communities, Piscataway Park, and Yacht Haven residential area.

The view of EPG the public sees from all vantage points is of wooded areas, providing a natural scenic view containing mature trees and riparian areas.

4.11.1.8 Fort Belvoir Scenic Integrity

Scenic integrity considers how well a man-made alteration integrates into the original landscape. The less an alteration changes the size, shape, edge effect, and pattern of a natural landscape, the more scenic integrity it possesses. The different grades of scenic integrity are explained in Table 4.11-1.

The proposed land use designations for the Fort Belvoir area include Airfields, Community, Industrial, Professional/Institutional, Residential, Training, and Troop.

Airfields. Airfields are surrounded by large structures in constant use. These include hangers, control towers, and fuel containers that are surrounded by large-scale paving and unforested areas. These areas hold very few of the characteristics of the original landscape and are characterized as having low scenic integrity.

Industrial. The lands designated for Industrial use are characterized by large structures in constant use and surrounded by paved parking and loading areas. These areas greatly dominate the natural features of the land and, thus, fall under the designation of low scenic integrity.

Professional /Institutional. The Professional/Institutional areas of Fort Belvoir vary slightly in their scenic integrity. Some of the older structures are currently in varying states of disrepair and lack aesthetic value. The newer buildings would have more aesthetic value, although it would take time before their landscaping matures enough to better integrate them with the natural landscape. They could be categorized as having moderate to low scenic integrity.

Table 4.11-1
Scenic integrity definitions

High **(Unaltered/Appears Unaltered)** Landscapes where the valued landscape character "is intact" with only minute, if any, deviations. The existing landscape character and sense of place are expressed at the highest possible level.
Moderate **(Slightly to Moderately Altered)** Landscapes where the valued landscape "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed. Landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetative type changes, or architectural styles outside the landscape being viewed. They should appear only as valued character outside the landscape being viewed but compatible or complementary to the character within.
Low **(Heavily Altered)** Landscapes where the valued landscape character "appears heavily altered." Deviations may strongly dominate the valued landscape character. They may not borrow from valued attributes such as size, shape, edge effect, and pattern of natural openings, vegetative type changes, or architectural styles within or outside the landscape being viewed.

Source: USFS, 1995.

Community. The developed portions of the Community areas are characterized by large structures in frequent use that are surrounded by paved parking areas. The developed areas are generally well landscaped to integrate them into the landscape. Community areas also include open areas such as parade grounds and undeveloped areas. Community areas are, therefore, designated as having moderate to high scenic integrity.

Residential. These areas all have structures that begin to dominate the natural landscape. Small pockets of forested areas coupled with integrated landscaping allow these areas to continue to share some of the attributes of the land; therefore, these areas all remain characterized with moderate scenic integrity.

Training. The training lands have very little deviations from the original character of the land. They remain largely forested, and the areas where larger alterations have been made are obscured from public view. Some localized heavy training activities may have altered the natural landscape, however. Therefore, Training is categorized as having moderate to high scenic integrity.

Troop. The Troop areas consist of large structures in constant use. Some of the structures have been present for some time and are in a state of disrepair. The area is landscaped, which moderates the impact on scenic integrity. The areas are categorized as having low to moderate scenic integrity.

Photographs of representative scenic integrity classes for each of the land use categories are shown in Figure 4.11-1.

Airfield Area: Low Scenic Integrity
Davison Army Airfield

Community Area: High Scenic Integrity
North Post

Community Area: Low Scenic Integrity
North Post

Community Area: Moderate Scenic Integrity
North Post

Industrial Area: Low Scenic Integrity
South Post

Industrial Area: Low Scenic Integrity
EPG

Scenic Integrity of Fort Belvoir Land Use Categories

Fort Belvoir, Virginia

Figure 4.11-1

Training Area: High Scenic Integrity
North EPG

Training Area: Low Scenic Integrity
South Post

Troop Area: High Scenic Integrity
South Post Parade Grounds

Troop Area: Low Scenic Integrity
North Post Barracks

Professional/ Institutional Area: High Scenic Integrity South Post

Professional/ Institutional Area: Moderate Scenic Integrity North Post

Scenic Integrity of Fort Belvoir Land Use Categories

Fort Belvoir, Virginia

Figure 4.11-1 (Cont.)

Residential Area: High Scenic Integrity
South Post

Residential Area: Moderate Scenic Integrity
South Post

Scenic Integrity of Fort Belvoir Land Use Categories

Fort Belvoir, Virginia

Figure 4.11-1 (Cont.)

4.11.2 ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

The proposed action would be expected to have short-term minor adverse effects and both minor adverse and beneficial long-term effects. Compared to the existing land use plan, the proposed plan would have several different effects on the Fort Belvoir resources. Most notably, there would be a substantially greater amount of development on EPG and the addition of a medical campus on the South Post golf course under the Preferred Alternative land use plan.

4.11.2.1 Land Use Plan Update

Both the development of EPG and the new medical campus would transform the aesthetic view of their respective areas to that of a professional campus. The medical campus would have a greater effect on the aesthetics of the installation because of its location near the center of Main Post. Although large in their size and extent the buildings would be integrated using the landscaping standards of the installation. Construction would also be expected to produce an aesthetic effect. For each BRAC activity that involves building a new structure, road, or improvement of existing structure, there would be expected to be an adverse short-term effect due to construction. The adverse effect would be larger for a larger structure or cluster of structures. Also, construction on North and South Posts would be expected to have a greater effect because of a larger number of people who would view it regularly. Any construction on EPG would be expected to have a minimal effect because of the low level of current activity.

4.11.2.2 BRAC Implementation and Facilities Projects

4.11.2.2.1 North Post

Under the Preferred Alternative there would be two construction projects on North Post—modernizing the McRee barracks and installing an access control point off of Route 1. All activities would occur south of Kingman Road on Lower North Post where there has already been a large amount of development, thereby reducing the impact of new construction on aesthetics. Each of these changes would only entail expanding or modernizing existing buildings or roads. A detailed look at each activity is listed in Table 4.11-2.

Table 4.11-2
Aesthetic effects from proposed BRAC projects on the North Post under the Preferred Alternative

Project #	BRAC facility	Facility size	Nearby visual characteristics	Aesthetic change
15	Access Control Point	Construct entrance road and security check point	Sited on athletic fields with U.S. Route 1 to the south; athletic fields in all other directions	Minor long-term effect because of small scale and proximity to Route 1
19	Modernize Barracks	Renovate existing Barracks	Sited on existing barracks with Professional/Institutional areas to the north and west, athletic fields to the east, vehicle storage to the south	Minor long-term beneficial effect because of renovations

4.11.2.2.2 South Post

Under the Preferred Alternative, several areas in South Post would undergo change. The most significant visual change would occur on the site of the Fort Belvoir South golf course. This area would be used to construct the new Hospital and NARMC headquarters building. These structures would total about 1 million square feet, which would result in a major aesthetic change. The landscape would change from a golf course with stately oak trees lining the fairways to that of a developed medical campus. While alignment with the natural environment would be an important in planning the new facilities, the landscape would be expected to diminish in visual integrity because of the increased amount of development.

However, the plans call for modern buildings with integrated landscaping. This would create a developed Professional/Institutional area that has a moderate visual integrity. A large portion of the remaining South Post BRAC activities involve new organizations moving into existing buildings. These actions would be expected to have a negligible effect on aesthetic integrity. A detailed look at each activity is listed in Table 4.11-3.

4.11.2.2.3 EPG

Under the Preferred Alternative, EPG would have the largest amount of new facilities, over 4.5 million square feet of building space. The majority of this would be divided between the NGA and WHS buildings. Because of their size, these buildings would dominate the viewshed of the area. A hardwood tree buffer, which should remain around EPG, would obscure most of the view of these buildings; although, the roofs of the buildings would be expected to still be visible from the north, south, and east. Because of the security required for the buildings on the eastern half of EPG, only security-cleared staff, people accustomed to the aesthetics of a military installation, would encounter the altered landscapes within EPG. These buildings would dominate the view from the interior of EPG. AT/FP would be incorporated with integrated landscaping techniques to create an open, campus-like atmosphere. A detailed look at each activity is listed in Table 4.11-4.

4.11.2.2.4 Davison Army Airfield

Under the Preferred Alternative, Davison Army Airfield would not have a discernable change in land use. It would remain in a state of low scenic integrity with its continued airfield land use designation.

4.11.2.2.5 Southwest Area

Under the Preferred Alternative, there would be no discernable change to the Southwest Area. Continued training activities would continue in the areas where they already take place. These would have a minor detrimental visual effect on specific locations because the activities cause continued erosion and trampling of vegetation. This would be a minor effect that would not be expected to change the scenic integrity of the land.

Table 4.11-3
Aesthetic effects from proposed BRAC projects on the South Post under the Preferred Alternative

Project #	BRAC facility	Facility size	Nearby visual characteristics	Aesthetic change
4	Hospital	Construct 868,800 ft^2 building	Sited on Fort Belvoir South golf course with Route 1 to the north, Belvoir Road and forested buffer to the east, Wetland and Community areas to the south, Professional/Institutional to the west	Moderate long-term adverse effect due to large size of structure and high aesthetic integrity of current land
5	Dental Clinic	16,000 ft^2 expansion to existing building		Minor long-term adverse effect due to small size of building
6	NARMC HQ Building	Construct 50,000 ft^2 building		Minor long-term adverse effect due to small size of building
16	Purchase AMC Relocatables	Move into 230,000 ft^2 of buildings	Sited on existing Professional/ Institutional Building with Route 1 to the north, Belvoir Road and forested buffer to the east, Wetland and Community areas to the south, Professional/ Institutional to the west	No change
3	MDA Facility	Move into 107,000 ft^2 building	Sited on existing Professional/ Institutional Building with Professional/Institutional and athletic field to the north, parade grounds to the east, Professional/ Institutional area to the south, residential area to the west	No change
14	Modernize Bldgs. 211, 214, 215, 220	Modernize 133,000 ft^2 building		Minor long-term beneficial effect due to renovations
17	PEO EIS Administrative Facility	Move into 447,400 ft^2 building		No change
10	Network Ops - PEO EIS	Expand building by 15,000 ft^2	Sited on forested area with Professional/Institutional to the north, south, and west, forested area to the east	Minor long-term adverse effect due to small size of building
18	Structured Parking Facility, 200 Area	Construct parking garage	Sited on existing parking lot with historic Professional/Institutional buildings in all directions	Minor long-term adverse effect due to buffer by 200 bldgs.
8	Infrastructure	Widen Gunston Road	Sited on existing roadway that runs north and south between Community, Residential, Professional/Institutional, Troop, and forested areas	Minor long-term adverse effect due to presence of existing road
11	USANCA Replacement	Renovate 20,000 ft^2 building	Surrounded by Professional/ Institutional buildings, including historic buildings to the south	No effect
20	MWR Family Travel Camp	Construct camper trailer loop and small cabins	Sited on forested area with forested area to the north, south, and east; river shore and community area to the west	Minor long-term adverse effect due to addition of small buildings

Table 4.11-4
Aesthetic effects from proposed BRAC projects on EPG under the Preferred Alternative

Project #	BRAC facility	Facility size	Site placement and nearby landscapes	Aesthetic change
1	NGA	Construct 2,419,000 ft^2 building	Sited on forested area with mature hardwoods and young pines, scattered cleared areas, one active Professional/ Institutional building and several abandoned buildings with tree buffer and residential area to the north, I-95 to the east, forested area to the west, forested area and Industrial area to the south	Moderate long-term adverse effect due to large size of building, and minor long-term beneficial effect due to elimination of dilapidated buildings
2	WHS	Construct 2,219,000 ft^2 building		Moderate long-term adverse effect due to large size of building, and minor long-term beneficial effect due to elimination of dilapidated buildings
8	Infrastructure	Add 80 acres of pavement and infrastructure and 25,000 ft^2 of buildings		Minor long-term adverse effect due to small power station and buried lines
9	Emergency Services Center (EPG)	Construct 14,700 ft^2 building		Minor long-term adverse effect due to small size of building
12	Child Development Center–244	Construct 19,590 ft^2 building		Minor long-term adverse effect due to small size of building
13	Child Development Center–303	Construct 24,036 ft^2 building		Minor long-term adverse effect due to small size of building
7	Corps of Engineers Integration Office (Temporary)	Construct 22,500 ft^2 building		Minor long-term adverse effect due to small size of building

4.11.2.3 BMPs/Mitigation

BMPs. Construction activities on Fort Belvoir would adhere to the following state and installation guidelines thus alleviating the need for any mitigation measures. Planning and construction of BRAC facilities would be expected to follow the guidelines set forth in the *Fort Belvoir Installation Design Guide* (Rhodeside and Harwell, 1995). This would allow any new additions to remain consistent with the existing landscape and architectural character of the installation. Building design for larger structures would include varying profiles to blend them into their surroundings. During construction, the Army would retain as many older trees as possible because their presence dramatically enhances visual aesthetics. After completion of construction, the Army would install integrated landscaping in accordance with the *Fort Belvoir Installation Design Guide*. This would lessen the impact of the new buildings. In areas where existing trees cannot be preserved, it would be beneficial to plant stands of trees that would obstruct the view of buildings from high-traffic areas in the long-term.

Mitigation. No specific mitigation measures are identified.

4.11.3 ENVIRONMENTAL CONSEQUENCES OF THE TOWN CENTER ALTERNATIVE

The Town Center Alternative would focus the majority of the BRAC activities to North and South Posts, specifically to the areas bordering the north and south sides of Route 1.

4.11.3.1 Land Use Plan Update

Although both the north and south areas of the installation would receive new structures, the South Post sites would see a larger amount of aesthetic change because of their current high aesthetic value. Short-term adverse effects due to construction would be expected to be similar to that of the Preferred Alternative.

4.11.3.2 BRAC Implementation and Facilities Projects

4.11.3.2.1 North Post

Under the Town Center Alternative land use plan, the North Post would gain a large amount of new buildings. The addition of these structures would not be as dramatic as those on South Post because of the present level of development in the area just north of Route 1. With the addition of the medical campus, MDA building, and the PEO EIS, the area from Route 1 to just north of Abbott Road would become a highly developed Professional/Institutional area. The size of some of the larger buildings would be expected to make them visible from some of the surrounding community areas on North Post, namely the area east of Woodlawn Road. Under this plan, there would be no development on the northern half of North Post, where there is a high level of aesthetic integrity. For the Access Control Point and Modernizing Barracks, the aesthetic change would be the same as the Preferred Alternative. Detailed looks at each unique activity for this alternative are listed in Table 4.11-5.

4.11.3.2.2 South Post

Under the Town Center Alternative, the bulk of the South Post activity would occur on and around the current location of the Fort Belvoir South golf course. The new aesthetic look of the landscape would be dominated by the addition of the NGA and WHS buildings, which would total over 4.5 million square feet. The change from a landscaped golf course with large trees to a large Professional/Institutional campus landscape would be expected to cause a dramatic aesthetic change. The size of these two buildings would affect the viewscape around the upper portion of South Post. For Modernizing Buildings 211, 214, 215, 220, Purchasing AMC Relocatables, infrastructure improvements to Gunston Road, Structured Parking Facility, and Family Travel Camp projects, the aesthetic change would be the same as under the Preferred Alternative. Detailed looks at each unique activity for this alternative are listed in Table 4.11-6.

4.11.3.2.3 EPG

Under the Town Center Alternative EPG would have no change as described under the No Action Alternative.

4.11.3.2.4 Davison Army Airfield

With the Town Center Alternative, Davison Army Airfield would have no discernable change. It would remain in a state of low scenic integrity with its current maintenance schedule.

4.11.3.2.5 Southwest Area

Under the Town Center Alternative, the Southwest Area would have no aesthetic change.

Table 4.11.5
Aesthetic effects from proposed BRAC projects on North Post under the Town Center Alternative

Project #	BRAC facility	Facility size	Site placement and nearby landscapes	Aesthetic change
3	MDA	Construct 107,000 ft^2 building	Sited on forested area with Gunston Road and forested areas to the north and west, Professional/ Institutional buildings to the east, community amphitheatre to the south	Moderate long-term adverse effect due to size of building and proximity to amphitheatre
10	Network Ops – PEO EIS	Expand building by 15,000 ft^2	Sited on existing Professional/ Institutional building and fields with forested areas to the north, Professional/Institutional areas to the east and west, barracks to the south	Minor long-term adverse effect due to small size of expansion
17	PEO EIS Admin Facility	Construct 447,400 ft^2 building	Sited on forested area and landscaped fields with forested area to the north, fields and residential areas to the east, community areas to the south, forested area and Professional/ Institutional to the west	Moderate long-term adverse effect due to larger size of building
8	Infrastructure	Add 80 acres of pavement and infrastructure and 25,000 ft^2 of buildings	Sited on athletic fields with athletic fields to the north, west, and south, Professional/Institutional to the east and southwest	Minor long-term adverse effect due to small power station and buried lines
4	Hospital	Construct 868,800 ft^2 building	Sited on vehicle storage area and landscaped semi-forested area with barracks to the north, Professional/ Institutional areas to the east, tree buffer and Route 1 to the south, vehicle storage to the west	Minor long-term adverse effect due low aesthetic integrity of existing land
5	Dental Clinic	16,000 ft^2 expansion to existing building		Minor long-term adverse effect due low aesthetic integrity of existing land and small size
6	NARMC HQ	Construct 50,000 ft^2 building	Sited on landscaped semi-forested area with athletic fields to the north and east, forested buffer zone and Route 1 to the south, Professional/ Institutional area to the west	Minor long-term adverse effect due to small size of building
7	Corps of Engineers Integration Office	Construct 22,500 ft^2 temporary building	Sited on landscaped semi-forested area with fields to the north and south, Residential area to the East, Professional/Institutional area to the west	Minor long-term adverse effect due to small size of building

Table 4.11.6
Aesthetic effects from proposed BRAC projects on South Post under the Town Center Alternative

Project #	BRAC facility	Facility size	Site placement and nearby landscapes	Aesthetic change
1	NGA	Construct 2,419,000 ft^2 building	Sited on Fort Belvoir South golf course and landscaped forested area with Professional/Institutional area to the north, athletic fields to the northwest, forested areas to the east, Community areas to the south, Troop and Community areas to the west	Major long-term effect due to large size of building and high aesthetic integrity of existing land
2	WHS	Construct 2,219,000 ft^2 building		Major long-term effect due to large size of building and high aesthetic integrity of existing land
12	Child Development Center–244	Construct 19,590 ft^2 building		Minor long-term adverse effect due to size of building
13	Child Development Center–303	Construct 24,036 ft^2 building		Minor long-term adverse effect due to size of building

4.11.3.3 BMPs/Mitigation

BMPs would be similar to those for the Preferred Alternative (Section 4.11.2.3).

4.11.4 ENVIRONMENTAL CONSEQUENCES OF THE CITY CENTER ALTERNATIVE

The City Center Alternative would focus most of the BRAC additions on EPG. This would create a very developed city-like aesthetic for the eastern side of EPG. Fort Belvoir Main Post would remain relatively unchanged.

4.11.4.1 Land Use Plan Update

The high concentration of large buildings on EPG—4,050,490 square feet of building space—would create a dense city area. This would greatly change the aesthetics of the area. The GSA parcel would also be used under this alternative. Although also receiving a large building, its aesthetic integrity would be expected to improve because of its current use as a warehouse area. The remainder of the installation would see very little visual change. Short-term adverse effects from construction would be expected to be similar to that of the Preferred Alternative.

4.11.4.2 BRAC Implementation and Facilities Projects

4.11.4.2.1 North Post

Under the City Center Alternative, North Post would undergo a relatively small amount of change. These changes would be limited to the Access Control Point the Barracks Modernization, and the U.S. Army Corps of Engineers Integration Office. The aesthetic change for these would be the same as under the Preferred Alternative. There would be no unique aesthetic changes for North Post under this alternative.

4.11.4.2.2 South Post

Under the City Center Alternative, there would be expected to be very little aesthetic change to South Post. The majority of the BRAC activities would involve occupying or renovating existing structures. The only new buildings would be the Structured Parking Facility and the buildings associated with the Family Center Camp, which would all be relatively small. For Modernizing Buildings 211, 214, 215, and 220, Purchasing AMC Relocatables, Network Enterprise Comm. Facility (AKO), infrastructure improvements to Gunston Road, Structured Parking Facility, the USANCA building, and Family Travel Camp projects, the aesthetic change would be the same as under the Preferred Alternative. There would be no unique aesthetic changes for South Post under this alternative.

4.11.4.2.3 EPG

Under the City Center Alternative, the vast majority of new structures at Fort Belvoir would be sited on EPG. Ten structures would be placed on the eastern side of EPG. This would drastically change the appearance of the landscape. The new viewscape would be of a dense Professional/ Institutional area. Although, the only people viewing the new structures from within EPG would be those used to the aesthetics of an Army installation; the tree buffer that would be left would not be adequate to conceal these structures from outside residents and motorists. For the NGA Emergency Services Center and the Child Development Center–244, the aesthetic change would be the same as under the Preferred Alternative. Detailed looks at each unique activity for this alternative are listed in Table 4.11-7.

Table 4.11-7
Aesthetic effects from proposed BRAC projects on EPG under the City Center Alternative

Project #	BRAC facility	Facility size	Site placement and nearby landscapes	Aesthetic change
3	MDA	Construct 107,000 ft^2 building	Sited on forested area with mature hardwoods and young pines, scattered cleared areas, one active Professional/institutional building and several abandoned buildings with tree buffer and Residential area to the north, Newly constructed Professional/ Institutional buildings and I-95 to east, Forested area and newly constructed Professional/Institutional buildings to the south, Forested land to the west	Minor long-term adverse effect due to smaller size of building
10	Network Ops–PEO EIS	Construct 15,000 ft^2 building		Minor long-term adverse effect due to small size of building
17	PEO EIS Admin Facility	Construct 447,400 ft^2 building		Moderate long-term adverse effect due to large size of building, and minor long-term beneficial effect due to elimination of dilapidated buildings
6	NARMC HQ Bldg	Construct 50,000 ft^2 building	Sited on forested area with mature hardwoods and young pines, scattered cleared areas, one active Professional/Institutional building and several abandoned buildings with newly constructed Professional/ Institutional buildings to the north and west, I-95 to the east, thin forested buffer and industrial area to the south	Minor long-term adverse effect due to small size of building
4	Hospital	Construct 868,800 ft^2 building		Moderate long-term adverse effect due to large size of building, and minor long-term beneficial effect due to elimination of dilapidated buildings
5	Dental Clinic	16,000 ft^2 expansion to existing building		Minor long-term adverse effect due to small size of building

4.11.4.2.3 GSA Parcel

The City Center Alternative would include development on the GSA Parcel, which lies to the northeast of EPG. This area is used as a storage facility. Development of the WHS complex on the GSA parcel would be expected to increase the visual integrity from that of low Industrial to moderate Professional/Institutional. A detailed look at each activity is listed in Table 4.11-8.

4.11.4.2.4 Davison Army Airfield

With the City Center Alternative, Davison Army Airfield would have no discernable change. It would remain in a state of low scenic integrity with its current maintenance schedule.

4.11.4.2.5 Southwest Area

Under the City Center Alternative, the Southwest Area would have no aesthetic change.

4.11.4.3 BMPs/Mitigation

BMPs would be similar to those for the Preferred Alternative.

Table 4.11-8
Aesthetic effects from proposed BRAC projects on the GSA Parcel under the City Center Alternative

Project #	BRAC facility	Facility size	Site placement and nearby landscapes	Aesthetic change
2	WHS	Construct 2,219,000 ft^2 building	Sited on Industrial area with Springfield Parkway to the north, residential and forested areas to the east and south, I-95 to the west	Minor long-term beneficial effect due to low aesthetic value of existing land
13	Child Dev Center–303	Construct 24,036 ft^2 building		Minor long-term beneficial effect due to low aesthetic value of existing land

4.11.5 ENVIRONMENTAL CONSEQUENCES OF THE SATELLITE CAMPUSES ALTERNATIVE

The Satellite Campuses Alternative would spread out the BRAC activities over Fort Belvoir proper and leave EPG unchanged. The largest concentration of new buildings would be found on North Post on the North Post Golf Course and the area around Route 1.

4.11.5.1 Land Use Plan Update

This alternative would have the greatest effect on North Post. This effect would be expected to be enhanced by the present high aesthetic integrity of the area north of Kingman Road. Under this plan, NGA would be placed on Davison Airfield. This would improve the aesthetic integrity of the airfield by changing it to a Professional/Institutional area. The remaining portion of the installation would be expected to have very little aesthetic change. Short-term adverse effects due to construction would be expected to be similar to that of the Preferred Alternative.

4.11.5.2 BRAC Implementation and Facilities Projects

4.11.5.2.1 North Post

Under the Satellite Campuses Alternative there would be two main development areas on North Post. The first would center around the construction of the WHS and MDA buildings on the already developed area just north of Route 1. The addition of these large buildings, which total more than 2.3 million square feet, would have a moderate adverse impact on the area. The second development area includes the construction of the hospital campus on the location of the Fort Belvoir Golf Club. Although this development would be roughly half the square footage of the WHS and MDA facilities, it would have a greater impact on aesthetic value due to the high-level aesthetic value of the golf course. For the Access Control Point, Modernizing Barracks, and the U.S. Army Corps of Engineers Integration Office, the aesthetic change would be the same as under the Preferred Alternative. For the Infrastructure project, the aesthetic change would be the same as for the Town Center Alternative. Detailed looks at each unique activity for this alternative are listed in Table 4.11-9.

Table 4.11-9
Aesthetic effects from proposed BRAC projects on North Post under the Satellite Campuses Alternative

Project #	BRAC facility	Facility size	Site placement and nearby landscapes	Aesthetic change
6	NARMC HQ Bldg	Construct 50,000 ft^2 building	Sited on Fort Belvoir golf course with Snyder Road and landscaped golf course to the north, Beulah Street and forested area to the east, forested area and Kingman Road to the south, forested area and community area to the west	Minor long-term effect due to small size of building
4	Hospital	Construct 868,800 ft^2 building		Major long-term effect due to large size of building and high aesthetic integrity of existing land
5	Dental Clinic	16,000 ft^2 expansion to existing building		Minor long-term effect due to small size of building
10	Network Ops – PEO EIS	Expand building by 15,000 ft^2	Sited on forested area with Kingman Road and forested area to the north, Commissary/PX to the east, commercial area with scattered forests to the south, Gunston Road forested area and new Professional/ Institutional building to the west	Minor long-term effect due to small size of building
17	PEO EIS Admin Facility	Construct 447,400 ft^2 building		Moderate long-term effect due to smaller size of building
13	Child Dev Center–303	Construct 24,036 ft^2 building	Sited on vehicle storage, athletic fields, and landscaped semi-forested area with barracks and forested area to the north, Professional/ Institutional areas to the east, tree buffer and Route 1 to the south, vehicle storage to the west	Minor long-term beneficial effect due to small size of building and low aesthetic value of existing land
3	MDA	Construct 107,000 ft^2 building		Minor long-term adverse effect due to moderate size of building
2	WHS	Construct 2,219,000 ft^2 building		Moderate long-term adverse effect due to large size of building

4.11.5.2.2 South Post

Under the Satellite Campuses Alternative, there would be expected to be very little aesthetic change to South Post. The majority of the BRAC activities would involve occupying or renovating existing structures. The only new buildings would be a structured parking facility and the buildings associated with the Family Center Camp, which would all be relatively small. For Modernizing Buildings 211, 214, 215, and 220, Purchasing AMC Relocatables, infrastructure improvements to Gunston Road, Structured Parking Facility, and Family Travel Camp projects, the aesthetic change would be the same as under the Preferred Alternative. There would be no unique aesthetic changes for South Post under this alternative.

4.11.5.2.3 EPG

Under the Satellite Campuses Alternative, EPG would have no change as described under the No Action Alternative.

4.11.5.2.4 Davison Army Airfield

The Satellite Campuses Alternative would include new structures on the site of Davison Army Airfield. Although the construction of this large new building would have a significant effect on the viewscape, it would have an overall beneficial effect due to the current low level of aesthetic value of the airfield. A detailed look at each activity is listed in Table 4.11-10.

4.11.5.2.5 Southwest Area

Under the Satellite Campuses alternative, the aesthetic effect on the Southwest Area would be similar to that in the Proposed Action plan.

4.11.5.3 BMPs/Mitigation

BMPs would be similar to those for the Preferred Alternative.

Table 4.11-10
Aesthetic effects from proposed BRAC projects on Davison Army Airfield under the Satellite Campuses Alternative

Project #	BRAC facility	Facility size	Site placement and nearby landscapes	Aesthetic change
1	NGA	Construct 2,419,000 ft^2 building	Sited on Airfield with forested buffer zone to the north and east with Fairfax County Parkway on other side, forested areas community areas and Route 1 to the south, forested area and commercial buildings to the west	Minor short-term adverse effect, minor long-term beneficial effect
12	Child Dev Center–244	Construct 19,590 ft^2 building		Minor long-term beneficial effect

4.11.6 NO ACTION ALTERNATIVE

Under the No Action Alternative, no effects would be expected on the aesthetics of the installation.

4.11.6.1 North Post

Under the No Action Alternative, North Post would have no discernable change in appearance. Under the current maintenance plan, the various land use types would retain their level of visual quality.

4.11.6.2 South Post

Under the No Action Alternative, South Post would have no discernable change in appearance. Under the current maintenance plan, the various land use types would retain their level of visual quality.

4.11.6.3 EPG

Under the No Action Alternative, there would be no change to EPG. USANCA would remain in their facility on the northeast area and the remainder of EPG would remain under the present maintenance plan, where the majority of the buildings and roads would continue to slowly deteriorate, retired ranges would continue to be cleared and grubbed, and the remainder of the forested land would remain uncut. Allowing parts of EPG to be sold or leased on a long-term basis would be explored under this scenario.

4.11.6.4 Davison Army Airfield

Under the No Action Alternative, Davison Army Airfield would have no discernable change. It would remain in a state of low scenic integrity with its current maintenance schedule.

4.11.6.5 Southwest Area

Under the No Action Alternative, the Southwest Area would have no aesthetic change.

4.11.6.6 Mitigation

No mitigation is required for the No Action Alternative.

4.11.7 SUMMARY OF COMPARISON OF ALTERNATIVES

The BRAC actions would be expected to have a minor to moderate impact on the aesthetic and visual resources of Fort Belvoir. There would be some difference in the effects the four alternatives have on aesthetics, with the City Center having the least impact and the other three alternatives having similar slightly larger impacts.

Throughout its history and development, Fort Belvoir has strived to take advantage of the natural topography and vegetation of the area. For this reason, it has been able to preserve a relatively high amount of aesthetic value. Potential effects on the installation's aesthetic value depend on how proposed actions affect those signature areas of the installation having high aesthetic integrity. These areas include the traditional buildings of Fort Belvoir and the landscaping that

takes advantage of natural features and mature hardwoods, which are found primarily on South Post and to a lesser extent on North Post; the undisturbed areas of Fort Belvoir found in the Southwest Area; the wildlife corridors on North Post and western EPG; the golf courses on North and South Post; and the many vistas of the Potomac. The four proposed alternatives differ slightly on how they affect these areas.

The City Center Alternative, which concentrates the majority of its actions on eastern EPG and the GSA site, would have the least aesthetic impact because of the lack of major construction on either North or South Post. The eastern portion of EPG, especially the area inside of Heller Loop, has low aesthetic value because of training and testing activities that have occurred there over the years. This area also contains several abandoned structures that have progressed to an advanced state of dilapidation. Both the City Center Alternative and, to a lesser extent, the Preferred Alternative make use of this area. The Preferred, Town Center, and Satellite Campuses Alternatives all have a greater impact because of having developments on or near aesthetically sensitive areas of Main Post. The Preferred and Town Center Alternatives would have more of an impact as a result of the hospital campus being sited on the South Post golf course. The Town Center Alternative also would situate a large amount of development on North Post above U.S. Route 1. Similarly, the Satellite Campuses Alternative places new structures in this area north of U.S. Route 1. Although it does not impact the South Post golf course, it would site buildings on the North Post golf course. Despite their slight differences, none of the proposed alternatives would have a significant effect on aesthetics and visual resources of the installation.

4.12 UTILITIES

Utilities at Fort Belvoir consist of potable water supply and distribution, sanitary sewage collection, electric power distribution, natural gas distribution, steam supply, communications network, and solid waste collection. Washington Gas owns and operates Fort Belvoir's natural gas system. Electric distribution system at Fort Belvoir will be managed by Dominion Virginia Power under a 50-year contract with Fort Belvoir effective March 2007. By the end of 2008, the Army plans to privatize water distribution, and wastewater collection systems at Fort Belvoir. The existing Fort Belvoir storm water system is described in Section 4.7.

Utility services at the Davison Army Airfield (DAAF) are similar to services available at the Main Post. These include potable water supply and distribution, sanitary sewage collection, electricity, natural gas, steam, communication and solid waste. Utility service providers and service lines are the same for both Fort Belvoir and DAAF. However, due to the proposed location, under one of the considered alternatives, of BRAC tenants with built-in space in excess of 2.4 million square-feet, specific details, when available, of existing utility services such as pipe sizes and potable water storage capacity etc., at DAAF are presented separately in this EIS. Utility services at the Southwest area and Humphrey Engineering Center of Fort Belvoir are not discussed in this EIS.

EPG has minimal on-site utility infrastructure in place. However, it is in close proximity to public utility systems. Utility services available at EPG include potable water supply and distribution, sanitary sewage collection, electricity and solid waste collection. These services are provided by public and private utility companies operating in the area. Though natural gas services are not available at the EPG site, the provider of natural gas in the vicinity of EPG has the ability to provide this service to EPG in the future.

Utility services available at the GSA Franconia Warehouse Complex (GSA Parcel) include potable water supply and distribution, sanitary sewage collection, electricity, natural gas, communications and solid waste collection.

Unless otherwise specified, the primary sources for this section are Fort Belvoir's *Integrated Natural Resources Management Plan* (Horne, 2001), the Solicitation Notice for Utilities Privatization of Electric, Water and Wastewater Systems at Fort Belvoir, (DLA, 2005) and the Fort Belvoir DPW GIS Department.

4.12.1 AFFECTED ENVIRONMENT

4.12.1.1 Potable Water Supply and Distribution

Main Post. Fairfax Water provides potable water to Fort Belvoir as a wholesale customer via two separately metered vaults/pump stations connected to a 30-inch main on Telegraph Road and a 24-inch Fairfax Water line on Pole Road. Water supply to the post is master metered. The Fredrick P. Griffith Water Treatment Plant in Lorton, Virginia supplies water to the post. This plant was opened for operation in May 2006, with production capacity of 120 mgd. The Griffith Plant is one of two supply points that feed the overall Fairfax Water system providing redundancy and reliability to Fort Belvoir from a water supply standpoint.

Current total consumption of potable water at Fort Belvoir ranges from approximately 1.8 to 2.2 mgd (based on Year 2005 and 2006 total annual consumption of 645.81 million gallons and

812.88 million gallons, respectively). The peak demand was recorded as 3.044 mgd (Betts, 2007). Current contracted capacity for potable water with Fairfax Water is 4.4 mgd (Guerra, 2005). The rated (or licensed) capacity of the potable water system as designed and permitted is 4.75 mgd according to storage capacity at Fort Belvoir. When the demand reaches 80 percent of the rated (or licensed) capacity, the corresponding regulating authority, the Virginia Department of Health requires submission of a plan for system upgrade. The contracted capacity covers the Main Post, DCEETA, EPG, and part of HEC. About 1.0 million gallons are held in emergency storage in government-owned tanks.

There are no active potable water wells on the installation, and all abandoned wells have been closed and filled. There are four groundwater wells used for irrigation, three of which are on the North Post golf course, the fourth at the DLA (Bolton, 2002).

Although privatization of the water system is planned by the end of 2008, Fort Belvoir owns, operates, and maintains the entire on-post distribution system. The distribution system provides looped service to the post and includes three pumping stations, three elevated storage tanks, one ground-level storage tank, and a chlorination system. The service lines on the post are made of a variety of materials, including cast iron, ductile iron, and polyvinyl chloride (PVC). An analysis of the system prepared in 1996 showed that more than 70 percent of the potable water system was built in the 1940s and another 7 percent was constructed in the 1950s (USACE, 2002).

Water pressure is aided by a pump station near the Telegraph Road connection and by three elevated water storage tanks. In combination, the three elevated tanks and one ground-level emergency storage tank provide a total of 2.3 million gallons of storage capacity; the tanks and their locations and capacities are listed in Table 4.12-1. The storage tanks are old, and might need to be replaced or supplemented by additional tanks. The valves and piping at the tanks were upgraded in 1994, and the tanks were stripped of lead paint and repainted in 1995 and 1996. The chlorination system (VA DOH Permit Number 6059450) is on Telegraph Road and is operated on an as-needed basis (DLA, 2005). There are no other water treatment facilities on-post.

The government-owned system consists of approximately 525,000 linear feet of distribution piping that includes approximately 81,000 feet of service laterals, 1,100 main line valves, 68 sampling stations, and 641 hydrants. The majority of the distribution system was installed in 1940 and is approaching the end of its design life.

Davison Army Airfield. Potable water for the Davison Army Airfield is supplied from a 24-inch main through Davison Army Airfield. The 24-inch main connects to a 30-inch Fairfax Water main which runs along Telegraph Road.

EPG. Potable water for EPG is purchased by Fort Belvoir from Fairfax Water. Two 24-inch main water supply lines provide potable water to EPG along its perimeter. One supply line is along Backlick Road and another is toward the northwest part of the site along Rolling Road.

GSA Parcel. Fairfax Water provides potable water for the GSA Parcel via a 6-inch main along Loisdale Road. Distribution network pipes of varying sizes provide potable water for the different buildings of the parcel. No storage capacity is available for potable water at the site (Donatone, 2006).

Table 4.12-1
Fort Belvoir potable water storage tanks

Facility no.	Location	Capacity (gallons)	Type	Installed/upgrade
188	16th Street	300,000	Elevated	1918/1996
591	23rd Street	500,000	Elevated	1937/1996
2428	Gorgas Road	500,000	Elevated	1948/1995
2429	Gorgas Road	1,000,000	Ground	1948/1995

4.12.1.2 Sanitary Sewage Collection and Treatment

Main Post. Fort Belvoir owns and maintains the on-post sanitary sewer system, which includes 389,122 feet of service laterals, collection pipes, and mains; 40 sewage pumping/lift stations; 1,173 manholes; and two main pumping stations (Jones, 2005). The two main pumping stations, which were treatment stations until the 1970s, are at Building 97 (southern end of Jadwin Loop) and Building 687 (southern end of Tompkins Basin). In addition, Fairfax County owns and operates two major pumping stations in close proximity to the base and large-diameter force main running generally parallel to Route 1 to the south. Design for replacement of the Dogue Creek force main is underway due to prematurely failing pipes. The alignment of the new pipe runs generally parallel with the existing pipe but does encroach into the parcel south of the Parade Grounds. The government-owned collection system ties to the Fairfax County system at several points along the Dogue Creek trunk line.

The post also owns and operates two ferrous sulfate sewage treatment facilities (USACE, 2003). Like the potable water supply system, Fort Belvoir's sewer system will be privatized in the near future.

Pipes are made of clay, PVC, mixed concrete, cast iron, terra cotta, or asbestos, with PVC pipe and clay predominating. The pipe ranges in size from 24 inches to less than 4 inches, with 8 inches being the most common size. Like the other utility systems at Fort Belvoir, most of the wastewater collection system was built in the 1940s with only replacement and upgrade work being completed since 1997. The upgrade work included relining pipes, upgrading manholes, replacing some pipe (DLA, 2005).

For fiscal years 2001 through 2003, the installation discharged an average of between 1.1 and 1.4 mgd of wastewater to the Fairfax County system. The daily average flow limit specified in the contract with Fairfax County is 3.0 mgd, and the maximum daily peak flow to the Fairfax County system is 6.0 mgd. The Fort Belvoir system ultimately discharges to Fairfax County's Norman M. Cole, Jr. Pollution Control Plant (formerly the Lower Potomac Pollution Control Plant), connecting to the county system through six connection points with separately metered flows. The plant has been upgraded three times in the past 28 years (1978, 1995, and 2004), and now has a maximum daily sewage treatment capacity of 67 mgd (Jones, 2005). The Norman Cole, Jr. Plant receives an average of 45 mgd from all dischargers to the system. This plant discharges its effluent into Pohick Creek, which flows into the Potomac River Permit Number VA0025364).

There is also a 6,300-gallon septic tank at the Golf Course Maintenance Facility on Telegraph Road. This tank does not have a septic field (USACE, 2003).

Davison Army Airfield. Sanitary waste from Davison Army Airfield is collected through an existing 8-inch sanitary sewer and lift station and discharged to the Fairfax County treatment system.

EPG. Sanitary wastewater from EPG is treated by the Norman M. Cole Jr. Pollution Control Plant. There is an existing 54-inch gravity trunk sewer line along Accotink Creek that could provide service to EPG.

GSA Parcel. There is an existing 12-inch gravity trunk sewer line along Loisdale Road behind Building A at the GSA Parcel. Sanitary waste from the site is treated at the Norman M. Cole Jr. Pollution Control Plant (Donatone, 2006).

4.12.1.3 Electricity

Main Post. Dominion Virginia Power (Dominion) provides electrical power to Fort Belvoir from two 34.5-kilovolt (kV) three-phase distribution circuits. Each of these circuits is rated for 62 megavolt amperes (MVA). There are two 84 MVA, 230/34.5 kV transformers at the Fort Belvoir substation near HEC. Transformer #1 feeds circuit 464 and two other circuits, 786 (2,241 customers) and 788 (DCEETA). Transformer #2 feeds circuit 463 and one other circuit, 787 (2,429 customers). Dominion owns the substation, and Fort Belvoir currently owns and maintains all other system components, including electrical lines, on-post substations, transformers, and grounding points. However, electric distribution system at Fort Belvoir will be managed by Dominion Virginia Power under a 50-year contract with Fort Belvoir effective March 2007. The maximum load recorded on the two transformers during the past 3 years was approximately 79 MVA on July 29, 2002 (Smith, 2004). Power is transferred from the substation to a post-owned switching station and distributed to the post at 34.5 kilovolts. Four 34.5-kV distribution circuits emanate from the Humphreys switching station. Power is distributed through approximately 78 miles of overhead lines and 83 miles of underground lines. Several overhead feeder lines serve the various areas of the installation, with some lines being interconnected to form looped feeder areas. Power is stepped down to lower voltages for local use throughout the installation using additional substations. A total of 10 substations are located throughout the installation to transform power to lower voltage. Fort Belvoir also uses one combination substation/switching station and three switching stations. The common utilization voltages are 120/208-volt three-phase, 277/480-volt three-phase, and 120/240-volt single phase. Auxiliary generators are used as backup for critical functions.

The Main Post consumes approximately 157 million kilowatt hours of electricity annually. Average daily consumption is approximately 800,000 kilowatt hours. Meter information from Dominion indicates that the incoming feeders are operating at about 50 percent of capacity. Connected load data indicate that the main 34.5-kV circuits are operating at 50 to 70 percent of capacity (USACE, 2003).

Effective March 2007, as the owner of the electric distribution system, Dominion Virginia Power would be required to substantially upgrade the system by converting all electric distribution system facilities to a uniform 34.5-kV line. Also included in the upgrade would be the demolition of existing substations, burial of overhead lines at some locations and blanket system improvements, consisting of conductor changeouts, tie lines, miscellaneous equipment, and other various items incidental to replacement. Overhead lines would be designed and constructed to eliminate electrocution hazards to the extent possible for owls, hawks, eagles and ospreys (DLA, 2005).

Davison Army Airfield. Dominion provides electricity to the airfield. In addition, a small, separate service line through the Davison Army Airfield provides electricity for the Southwest Area of Fort Belvoir.

EPG. EPG is served by medium voltage (above 1 kV to 99.9 kV) to a location along Backlick Road. The Franconia substation, operated by Dominion less than a mile south of EPG, feeds the distribution main along Backlick Road. High voltage (equal or greater than 100,000 V) electrical service is available along Backlick Road for the eastern side of this site and along Rolling Road for the western side of this site (Fort Belvoir, 2000).

GSA Parcel. Electricity for the GSA Parcel is supplied by Dominion. The electric line runs from Loisdale Road into the complex and is distributed from power pole to power pole and supplied to individual buildings (Donatone, 2006).

4.12.1.4 Natural Gas

Main Post. Washington Gas owns and operates Fort Belvoir's natural gas system. As of 2000, natural gas was distributed to the installation through 25 miles of main lines and 11 miles of service lines, mostly servicing the family-housing areas. Fort Belvoir's natural gas supply system has been upgraded numerous times since 1993, and upgrades would continue over the next few years. Improvements include converting facilities from Number 2 and Number 6 fuel oil to natural gas, replacing old piping, and placing new lines and meters. The total capacity rating for the entire post is approximately 160 million cubic feet (MMcf) per day with two delivery points to Fort Belvoir. Approximately 90 MMcf/day is deliverable along U.S. Route 1 and approximately 70 MMcf/day is deliverable at Woodlawn Road (Smith, 2004).

Davison Army Airfield. The natural gas system at the Davison Army Airfield is owned and operated by Washington Gas as part of the service provided to the Main Post.

EPG. No natural gas services are available on EPG. Washington Gas has transmission lines on Backlick Road along the eastern side adjacent EPG. The closest gas main for the western side EPG is along Rolling Road (Fort Belvoir, 2000). Heating and air conditioning on EPG is provided by self-contained systems adequate to support only the 13,000-square-foot facility occupied by U.S. Army Chemical and Nuclear Agency.

GSA Parcel. Natural gas is provided to the GSA Parcel by Washington Gas from a transmission line along Loisdale Road. One main meter and seven submeters installed by Washington Gas monitors the quantity of gas provided (Donatone, 2006).

4.12.1.5 Steam

Main Post. The existing DeWitt Army Community Hospital, Davison Army Airfield, and the larger buildings on Fort Belvoir use steam to provide heat and hot water. Recently constructed facilities (such as the McNamara headquarters building) and smaller buildings (such as residential units) use individual boilers.

Fort Belvoir has four high-pressure and six low-pressure steam plants. The Viron/Pepco Services Partnership maintains and operates the Building 1422 steam plant under the Military District of Washington Energy Savings Performance Contract. DynCorp maintains and operates the other steam plants and all steam lines. Steam is distributed to the installation through 13 miles of steam

and condensate lines. Most of the piping associated with each central boiler runs underground. Fort Belvoir owns and maintains the entire system (USACE, 2003).

Davison Army Airfield. Davison Army Airfield uses steam to provide heat and hot water. Fort Belvoir owns and maintains the entire steam utility system.

EPG. No steam utility services are provided at the EPG site.

GSA Parcel. No steam utility services are available at the GSA Parcel (Donatone, 2006).

4.12.1.6 Communications

Main Post. Telecommunication and information services on Fort Belvoir consist of a copper and fiber-optic data-distribution network. The network backbone is an asynchronous transfer mode (ATM) and the telephone switch is integrated services digital network (ISDN)-capable. Most of the distribution cable is carried through an underground ductbank. The installation owns the entire system, including copper and fiber-optic cables, utility poles, and computerized switchboard systems associated with inter-post and DoD applications. As of 1997, the main telephone switch handled 18,000 telephone lines and has a capacity of 45,000 telephone lines.

Telephone service at Fort Belvoir is provided by Verizon Communications. The system is a mainframe interconnecting facility owned and operated by Verizon (USACE, 2002). The cable television provider is Comcast Cable (USACE, 2002).

Davison Army Airfield. The communication system at the airfield is owned and operated by Fort Belvoir.

EPG. There is minimal or no telephone and internet infrastructure services provided at present on EPG. However, communication lines are located along Backlick Road for the eastern side of EPG and along Rolling Road for the western side of EPG (Fort Belvoir, 2000).

GSA Parcel. Communication services are provided Verizon for the GSA Parcel (Donatone, 2006).

4.12.1.7 Solid Waste

Main Post. Fort Belvoir generates about 6,694 tons of municipal solid waste (MSW) annually that are disposed of off-post by a contract hauler Brooks, M.J. Personal communication, February 2007). Approximately 2,719 tons of the total municipal solid waste is recycled (Brooks, M.J. Personal communication, February 2007). Household and office building trash is disposed of off-post by a contract hauler to the I-95 Energy/Resource Recovery Facility managed by Covanta Fairfax, Inc., owned and operated by Covanta Energy. Fairfax County disposes of the ash generated from the facility in an adjacent landfill complex. A letter of agreement between the Division of Solid Waste Disposal and Resource Recovery of Fairfax County and Fort Belvoir has a cap of 100 tons per day of MSW (Meoli, 2007). Disposal capacity of the Resource Recovery Facility is 3,000 tons per day with an air permit limit of 1.095 million tons per year (Meoli, 2007). The County expects the Resource Recovery Facility to have sufficient capacity to handle disposal needs through 2025 (Fairfax County, 2005). Items such as tires and fluorescent lighting go to the Defense Reutilization and Marketing Office for recycling. Scrap metal is recycled through the Qualified Recycling Program. Woody waste, grass clippings left on-site as mulch,

and leaves are composted at the post's compost site. Approximately 3,000 tons of yard waste was composted on the post in Fiscal Year 2006 (Brooks, M.J. Personal communication, February 2007).

Other bulky waste, such as appliances and furniture, as well as construction and demolition debris, is disposed of at Hilltop Landfill in Fairfax County. This landfill has been estimated to have 9 years of capacity remaining, on the basis of expected county construction/demolition debris (CDD) rates (Fairfax County, 2005).

The installation has a mandatory installation-wide recycling program that collects white paper, colored paper, newspaper, aluminum cans, tin/steel cans, scrap metal, cardboard, glass bottles, plastic containers, used oil, and toner cartridges at the Building 1089 Recycling Facility. Fort Belvoir also has a 10-year Integrated Solid Waste Management Plan, last updated in 1999. In general, the planning goal is to reduce solid waste management costs and environmental effects by reducing the quantity of materials that must be disposed of by incineration or landfilling. Fort Belvoir has met its recycling goals for solid wastes and now recycles more than 50 percent of its solid waste (USACE, 2003). During period June 2006 to January 2007, Fort Belvoir disposed approximately an average of 450 tons of MSW per month (Meoli, 2007).

Davison Army Airfield. Solid waste generated from the Davison Army Airfield is collected and disposed of through the solid waste disposal system at the Main Post.

EPG. Nonhazardous municipal solid waste collected EPG is hauled for disposal through the existing solid waste disposal system at Fort Belvoir.

GSA Parcel. Solid waste is collected from the GSA Parcel by Urban Services and disposed of at the Prince William County landfill site in Virginia. The warehouse complex also has a recycle program and recycled waste is collected by Recycle America (Donatone, 2006).

4.12.2 ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

Under the proposed BRAC action, there would be a net increase of 22,000 personnel at Fort Belvoir and connected sites. Demand on all utility systems would increase as a result of the BRAC action. This would require additional buildings with new and efficient utility systems for providing the required level of utility services. In the long-term, Fort Belvoir would minimize demand increases on the systems by installing water-conserving devices such as low-flow showerheads, faucets, and toilets in new facilities. In addition, all vertical building construction projects, with the exception of major hospitals (USACE Medical Facilities Mandatory Center of Expertise, 2006) starting with FY 2008 are required to achieve the SILVER level of Leadership in Energy and Environmental Design (LEED) of the U.S. Green Building Council (Deputy Assistant Secretary of the Army. 2006. *Sustainable Design and Development Policy Update—SpiRiT to LEED Transition*. Memorandum dated January 5).

This rating system is based on sustainable design and development concepts and assesses the degree to which the design of a building successfully incorporates consideration of matters such as sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality. Major hospital buildings must be LEED certifiable at a minimum with the goal of achieving LEED Silver (USACE Medical Facilities Mandatory Center of Expertise, 2006). Using the LEED rating system improves the environmental and economic performance of

facilities by using established and advanced industry principles, practices, materials, and standards.

Installing fixtures and heating systems in compliance with the Energy Policy Act of 2005 (Public Law 109-58—August 2005) with specified goals for increased use of renewable energy sources, advanced utility metering and procurement of energy efficient equipment and building systems in all applicable contracts would have beneficial effects by reducing the per capita consumption of natural gas and other sources of energy.

In addition, upgrades and new utility lines would be confined to the 121 outgrants at Fort Belvoir, as much as possible and would avoid the EQC on EPG with the exception of utility crossings required to cross Accotink Creek, in which case utility crossings would occur at road bridge crossings. Appropriate wetland and subaqueous stream bed permits would also be obtained as required for utility corridors.

4.12.2.1 Potable Water Supply and Distribution

4.12.2.1.1 Land Use Plan Update

Long-term minor adverse and beneficial effects and minor short-term adverse effects would be expected as a result of implementing the Preferred Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Preferred Alternative land use plan. The proposed changes in the acreage of land would result in constructing additional buildings or renovating existing buildings. Hence, the potable water consumption would increase from additional workers locating to these new and renovated buildings. Substantial additions and upgrades for the potable water infrastructure would occur at the Main Post and EPG to provide adequate supply of potable water. In addition to upgrades to existing water supply lines at the Main Post, new distribution and storage capacity for potable water might be necessary to accommodate specific needs of users such as hospital and other related services. New supply and distribution lines for potable water and storage capacity to ensure reliable service would be necessary at EPG under the Preferred Alternative land use plan.

In the long-term, because new buildings would use efficient water conserving devices, the proposed development would reduce the per capita demand for potable water. However, minor long-term adverse effects would occur due to the increase in overall total demand on potable water infrastructure from additional personnel occupying the newly constructed or renovated buildings. Minor short-term adverse effects also would be expected. Implementing the Preferred Alternative would result in short-term disconnections and reconnections of existing potable water utility systems during the construction phase.

4.12.2.1.2 BRAC Implementation and Facilities Projects

Under the Preferred Alternative, there would be a net increase of 22,000 personnel distributed between EPG and the South and North Posts. In addition, 146 personnel involved from five discretionary moves proposed by the Army would be located at Fort Belvoir. Existing utility systems on EPG are sized to support a few hundred personnel. Similarly, existing utility systems near the proposed construction sites at the South Post under the Preferred Alternative are at or near their design capacity.

Many of the personnel proposed to move to various office locations at EPG and the South Post already live and work in the surrounding areas. As such, their demand on utilities would be limited to use of services during office hours and not based on residential levels of demand.

Of the net increase of 22,000 personnel at various locations on Fort Belvoir from the BRAC action, approximately 18,000 personnel would be assigned to the agencies proposed to be located at EPG. Miscellaneous building space amounting to approximately 6.2 million square feet would be added at various locations of the above sites, including more than 4.7 million square feet of additional building space constructed on EPG.

Using a per capita water consumption of 75 gpd, the proposed increase in personnel under the Preferred Alternative would increase the demand for potable water by 1.34 mgd at EPG. The demand for potable water at the South Post would increase by 0.39 mgd, estimated for approximately 140 hospital beds at 600 gallons per bed per day, and water use by hospital employees and visitors to the hospital. A substantial increase in outpatient visits to the hospital could increase the demand for potable water. The above estimated total increase in potable water demand of 1.73 mgd, together with the current average demand of 1.8 to 2.2 mgd would result in an overall demand of 3.53 to 3.93 mgd. The water storage requirements for fire fighting and water needs during construction phase would also be considered during the design stages.

The anticipated future average demand is between 74 and 83 percent of the current rated capacity of 4.75 mgd the post has with Fairfax Water. If the demand for potable water reaches 80 percent of rated capacity, as required by the regulating authority, Fort Belvoir must submit a plan for upgrading the system and negotiate for additional contracted capacity with Fairfax Water for potable water.

Fairfax Water's existing 24-inch mains along Backlick Road on the east side and along Rolling Road on the west side could be linked with a new water line and be tapped at various locations to provide potable water for the various proposed office buildings at EPG. In addition, storage tanks with sufficient capacity would be necessary to ensure reliability of supply and for emergency use. An 8-inch main provides potable water to existing buildings at EPG. In view of the age of the existing distribution system and to meet the demand of additional workers moving to EPG, new distribution lines would be necessary. Under the Preferred Alternative, most of the additional buildings and workers proposed to be located at the Main Post would be in the South Post. Existing off-post potable water infrastructure in the vicinity of the South Post is adequate to handle the increased demand for potable water. However, upgrades to the existing distribution network and construction of a dedicated storage tank for the exclusive use of the proposed hospital would be necessary to ensure reliability of service.

4.12.2.2 Sanitary Sewage Collection and Treatment

4.12.2.2.1 Land Use Plan Update

Long-term minor adverse and beneficial effects and minor short-term adverse effects would be expected as a result of implementing the Preferred Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Preferred Alternative land use plan. The proposed changes in the acreage of land would result in constructing additional buildings or renovating existing buildings. Wastewater generation would increase from additional office workers at new and renovated offices, administrative and residential buildings, hospital and related medical services.

Substantial additions and upgrades would occur on the Main Post and EPG to provide adequate level of sanitary sewer services. In addition to upgrades to existing sanitary sewer lines, new collection and conveyance systems would be necessary to provide adequate level of services because of an increased numbers of users under the Preferred Alternative land use plan. Substantial investments for a new collection and conveyance system would be necessary at EPG under the Preferred Alternative land use plan.

In the long-term, because new buildings would use efficient water conserving devices, the proposed development would reduce the *per capita discharge* of sanitary wastewater. However, minor long-term adverse effects would occur due to the additional demand on sanitary wastewater infrastructure. Minor short-term adverse effects also would be expected. Implementing the Preferred Alternative would result in short-term disconnections and reconnections of existing sanitary sewer utility systems during the construction phase.

4.12.2.2.2 BRAC Implementation and Facilities Projects

Under the Preferred Alternative, the demand for sanitary sewer services would increase by 1.07 mgd at EPG and by 0.31 mgd at the South Post. This increase is based on a per capita discharge of 60 gallons per day and 480 gallons of sanitary sewer per hospital bed per day for approximately 140 beds. A substantial increase in outpatient visits to the hospital could increase the quantity of sanitary waste. The additional estimated wastewater flow of 1.38 mgd would bring the total discharge from the Main Post and EPG between 2.48 to 2.78 mgd from its current range of 1.1 to 1.4 mgd. Though this estimate is below the 3.0 mgd average flow limit and 6.0 mgd maximum daily peak flow limit the post has with the Fairfax County, if flows increase above the contracted amount, it would be necessary for Fort Belvoir to negotiate a new contract with the Fairfax County for discharge of additional volume of wastewater to the county sewer system.

The existing 54-inch gravity trunk main along Accotink Creek could be tapped to discharge sanitary waste from various buildings proposed at EPG. New collections system pipes, interceptors and appurtenances would be required to convey the sanitary waste to the existing trunk main along Accotink Creek. The existing on- and off-post sanitary sewer collection infrastructure in the vicinity of the South Post could handle the additional flow of 0.31 mgd with appropriate upgrades to the existing collection system.

4.12.2.3 Electricity

4.12.2.3.1 Land Use Plan Update

Long-term minor adverse and beneficial effects would be expected as a result of implementing the Preferred Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Preferred Alternative land use plan. The proposed changes in the acreage of land would result in constructing additional buildings or renovating existing buildings. Substantial additions and upgrades would occur on the Main Post and EPG to provide adequate level of electricity at these two locations. In addition to upgrades to existing distribution lines at Fort Belvoir, new supply grid and distribution system would be necessary at EPG under the Preferred Alternative land use plan. These additions and upgrades would be designed and built to use energy-efficient devices, thus reducing the consumption of electricity.

4.12.2.3.2 BRAC Implementation and Facilities Projects

Dominion, which supplies electricity to Fort Belvoir and would own the on-post distribution network from March 2007, would be required to make substantial upgrades to the electrical transmission and distribution systems to provide power to the BRAC tenants proposed to move to EPG. These upgrades could potentially take several years to plan and construct due to right-of-way acquisition and State Corporation Commission permitting requirements.

In addition to normal demands, new mission-critical users such as NGA require separate feeds from independent substations as well as buried primary service in lieu of overhead lines because of Unified Facilities Criteria (UFC) security and reliability standards. These requirements would add to the cost and complexity of the necessary improvements.

The BRAC demands at EPG would require improvements to Dominion's Franconia substation. This substation is fed from multiple circuits allowing for a high degree of reliability. Because of physical constraints, the maximum size for a new substation transformer is 75 MVA. The BRAC demands, as reported, could exceed 100 MVA, requiring two transformer/switch sets. The Franconia substation has sufficient physical room within the existing plant to accommodate the required upgrades.

Power would be fed from the Franconia substation to a proposed substation on EPG. Approximately 4 acres must be set aside for this electrical substation near the perimeter of EPG for accessibility by Dominion.

In addition, new electrical distribution systems must be constructed at EPG to provide electricity for the BRAC tenants. The North and South Posts have sufficient capacity to provide electricity for the additional 1.49 million square feet of administrative and hospital building space under the Preferred Alternative. New and upgrades to the existing electric network and associated equipment would be required to provide adequate and reliable electricity to BRAC tenants moving to the Main Post.

4.12.2.4 Natural Gas

4.12.2.4.1 Land Use Plan Update

Long-term minor adverse and beneficial effects would be expected as a result of implementing the Preferred Alternative land use plan. The acreage of land designated as Professional/ Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Preferred Alternative land use plan. The proposed changes in the acreage of land would result in constructing additional buildings or renovating existing buildings. Substantial additions and upgrades would occur on the Main Post and EPG to provide adequate supply of natural gas. In addition to upgrades to existing distribution lines at Fort Belvoir, a new supply grid and distribution system would be necessary at EPG under the Preferred Alternative land use plan.

4.12.2.4.2 BRAC Implementation and Facilities Projects

Using an estimate of 2.5 MMcf of natural gas per 100,000 square feet of office space, the 4.7 million square feet of building space proposed at EPG would require a total of 118 MMcf of natural gas to provide for heating purposes. Also, the additional building space, including the hospital at the South Post would require 38 MMcf of natural gas. The total increase for natural gas of 156 MMcf from the construction of additional building space at EPG and the South Post is

near the current combined total purchase capacity of 160 MMcf the installation has with Washington Gas.

Washington Gas has sufficient capacity to provide the additional quantity of natural gas from existing distribution network near EPG and the Main Post to meet the additional demand. Fort Belvoir must negotiate a new supply contract with Washington Gas to have sufficient capacity to meet the demand for natural gas from existing personnel at Fort Belvoir and incoming BRAC tenants.

A new distribution network would be required at EPG, and additions and upgrades for the existing distribution system at the South Post would be required under the Preferred Alternative.

4.12.2.5 Steam

4.12.2.5.1 Land Use Plan Update

No effects would be expected. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Preferred Alternative land use plan. The proposed changes in the acreage of land would result in constructing additional buildings or renovating existing buildings. The existing steam distribution system is limited to the Main Post and the Davison Army Airfield, and it does not extend to EPG. Moreover, it is not feasible to extend the steam distribution to EPG.

4.12.2.5.2 BRAC Implementation and Facilities Projects

BRAC tenants at EPG could opt to have individual centralized utility plants to provide emergency power, steam and cooling water to meet the specific needs of equipment and other accessories. Because of the proposed location of the different BRAC tenants at EPG, it might not be feasible to have one centralized steam plant to serve all facilities.

Existing steam facilities at Fort Belvoir would need substantial upgrades to meet the demand of the BRAC tenants moving to the South Post. Additional demand for steam could also be met by installing units that use natural gas.

4.12.2.6 Communications

4.12.2.6.1 Land Use Plan Update

No effects would be expected as a result of implementing the Preferred Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Preferred Alternative land use plan. The proposed changes in the acreage of land would result in constructing additional buildings or renovating existing buildings. Substantial additions and upgrades would occur on the Main Post and EPG to provide adequate level of communication services. In addition to upgrades to existing communication system at Fort Belvoir, a new network would be necessary at EPG under the Preferred Alternative land use plan.

In the long-term, the new and upgraded communication systems at the Main Post and EPG would use current and most efficient communication equipment, thus providing a secure and reliable level of service for the various BRAC tenants.

4.12.2.6.2 BRAC Implementation and Facilities Projects

A new telecommunication network would be required at EPG to satisfy the various agency-specific needs for different levels of communication systems. In addition to providing agency-specific telecommunication systems, improvements would be necessary to the existing minimal communication infrastructure currently available at EPG to meet the demand of general users moving to the EPG site. Existing communication services on the South Post would need upgrades to provide adequate and reliable communication services for the BRAC tenants moving to the South Post. The use of updated equipment would have long-term beneficial effects by consuming less resources and space.

4.12.2.7 Solid Waste

4.12.2.7.1 Land Use Plan Update

Long-term minor adverse effects would be expected as a result of implementing the Preferred Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Preferred Alternative land use plan. The proposed changes in the acreage of land would result in constructing additional buildings or renovating existing buildings. Additional solid waste would be generated on the Main Post and EPG from office workers moving to the proposed locations. In addition, construction of new buildings and demolition/renovation of some of the existing buildings would also generate construction and demolition debris (CDD) at both locations.

4.12.2.7.2 BRAC Implementation and Facilities Projects

Municipal solid waste (MSW) generated under the Preferred Alternative would not be substantial in terms of overall monthly or yearly quantity or regional landfill capacity. Most of the municipal solid waste expected to be generated at Fort Belvoir under the Preferred Alternative is generated at other Army facilities in the region. As such, the regional impact on the landfill capacity, because of the MSW generation at EPG and the Main Post, would be minimal due to the relocating of personnel. However, Fort Belvoir would need to negotiate with the current contract hauler to dispose of the additional solid waste generated to designated landfill sites.

Using EPA's national average of 1 lb/day/employee and 5-day week, for a total of 22,000 additional office workers under the BRAC action, an additional 2,328 tons of solid waste would be generated per year at EPG and 532 tons per year on the Main Post under the Preferred Alternative. Close to 50 percent of this solid waste generated would be recycled under the mandatory recycling program in effect at Fort Belvoir, unless prohibited due to security considerations for some BRAC tenants. The installation would continue its practice of composting woody wastes and leaves. At present Fort Belvoir disposes approximately an average of 450 tons of MSW per month, well below its permitted disposal capacity of 100 tons per day.

In addition to the quantity of solid waste generated from BRAC tenants, Table 4.12-2 presents an estimate of the CDD that would be generated at Fort Belvoir by construction activities under the Preferred Alternative.

Table 4.12-2
Estimates of construction and demolition debris generated at Fort Belvoir under the Preferred and Other Alternatives

Construction activity type	Area (ft^2)	CDD factor (lb/ft^2)	Estimated waste (lb)	Estimated waste (tons)
Construction	6,190,531	4.4	27, 238,336	13,619
Renovation	320,000	20	6,400,000	3,200
Gross total	**6,510,531**		**33,638,336**	**16,819**
Amount Recycled (50%)			16,819,168	8,410
Net total CDD generated			**16,819,168**	**8,410**

Per requirements stipulated in memorandum ACSIM, DAIM-ZA, 06 Feb 06, SAB, a minimum of 50 percent of the estimated 16,819 tons of CDD would be diverted from Army-owned, noninstallation-operated landfill sites. As a result of this sustainable management of waste in military construction, renovation, and demolition activities, approximately 8,410 tons of CDD would be disposed of in various landfill sites in the area. The overall quantity of 8,410 tons of CDD equates to a yearly average (on the basis of 4 years of construction activity) of 2,103 tons, or a monthly average of approximately 175 tons. Area landfill lifespans would be reduced from their current estimates because of solid waste generated under the Preferred Alternative, but capacities are sufficient to handle the short-term waste that would be generated from construction/renovation and the long-term operational waste from the increased population at Fort Belvoir.

Solid waste other than typical municipal solid waste generated from hospital buildings and other specialized agencies, including waste such as asbestos generated from demolition of existing structures are described in Section 4.13. In addition, some BRAC tenants may dispose of their solid waste separately off-post due to security considerations.

4.12.2.8 BMPs/Mitigation

4.12.2.8.1 Potable Water Supply and Distribution

As a BMP, training for staff and contractors on water conservation measures in domestic water use and water use for construction activities would be provided.

4.12.2.8.2 Sanitary Sewage Collection and Treatment

No BMPs or mitigation measures would be required.

4.12.2.8.3 Electricity

No BMPs or mitigation measures would be required.

4.12.2.8.4 Natural Gas

No BMPs or mitigation measures would be required.

4.12.2.8.5 Steam

No BMPs or mitigation measures would be required.

4.12.2.8.6 Communications

No BMPs or mitigation measures would be required.

4.12.2.8.7 Solid Waste

As a BMP, required training would be provided for in-house staff on materials eligible for recycling municipal solid waste generated by BRAC tenants and methods for achieving the goals set by Fort Belvoir. An adequate number of containers would be provided in all appropriate locations for collection of recycled municipal solid waste. In addition, Army recycling requirements would be incorporated for CDD into all contracts awarded to outside contractors.

4.12.3 ENVIRONMENTAL CONSEQUENCES OF THE TOWN CENTER ALTERNATIVE

4.12.3.1 Potable Water Supply and Distribution

4.12.3.1.1 Land Use Plan Update

Long-term minor adverse and beneficial effects and minor short-term adverse effects would be expected as a result of implementing the Town Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Town Center Alternative land use plan. The potable water consumption would increase from requirements of additional workers locating to this area. Substantial additions and upgrades for the potable water infrastructure would occur at Fort Belvoir to provide adequate supply of potable water. In addition to upgrades to existing water supply lines, new distribution and storage capacity for potable water may be necessary to accommodate agency-specific needs of users such as hospital and other related services.

In the long-term, these additions and upgrades would use efficient water conserving devices, thus reducing the *per capita consumption* of potable water and eliminating waste. However, minor long-term adverse effects would occur due to the increase in the *overall total demand* on potable water infrastructure from additional personnel occupying the newly constructed or renovated buildings. Minor short-term adverse effects also would be expected. Implementing the Town Center Alternative would result in short-term disconnections and reconnections of existing potable water utility systems during the construction phase.

4.12.3.1.2 BRAC Implementation and Facilities Projects

Under the Town Center Alternative, there would be a net increase of 22,000 personnel distributed between the North and South Posts. Most of the personnel proposed to move to various office locations at the Main Post already live and work in the surrounding areas. As such, their demand on utilities would be limited to use of services during office hours and not based on residential levels of demand.

Using per capita water consumption rates as described earlier under the Preferred Alternative, under the Town Center Alternative there would be an increase of 1.73 mgd in the Main Post demand for potable water. The estimated total increase in potable water demand of 1.73 mgd together with the current average demand of 1.8 to 2.2 mgd would result in an overall demand of

3.53 to 3.93 mgd. The anticipated average demand is between 74 and 83 percent of the current rated capacity of 4.75 mgd the installation has with Fairfax Water. As required by the regulating authority, Fort Belvoir must submit a plan for upgrading the system and negotiate for additional contracted capacity with Fairfax Water for potable water.

Under the Town Center Alternative, most of the additional buildings and workers would be in the South Post. Existing off-post potable water infrastructure in the vicinity of the South Post is adequate to handle the increased demand for potable water. However, upgrades to the existing distribution network and construction of a dedicated storage tank for the exclusive use of the proposed hospital would be necessary to ensure reliability of service.

4.12.3.2 Sanitary Sewage Collection and Treatment

4.12.3.2.1 Land Use Plan Update

Long-term minor adverse and beneficial effects and minor short-term adverse effects would be expected as a result of implementing the Town Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Town Center Alternative land use plan. Wastewater generation would increase from additional office workers and new office, hospital, administrative and residential buildings. Substantial additions and upgrades would be required at the Main Post to provide adequate level of sanitary sewer services. In addition to upgrades to existing sanitary sewer lines, new collection and conveyance systems would be necessary to provide adequate level of services resulting from increased numbers of users and building locations under the Town Center Alternative land use plan.

In the long-term, because new buildings would use efficient, water-conserving devices, the proposed development would reduce the *per capita discharge* of sanitary wastewater. However, minor long-term adverse effects would occur due to the additional demand on sanitary wastewater infrastructure. Minor short-term adverse effects also would be expected. Implementing the Town Center Alternative would result in short-term disconnections and reconnections of existing sanitary sewer utility systems during the construction phase.

4.12.3.2.2 BRAC Implementation and Facilities Projects

Under the Town Center Alternative, the demand for sanitary sewer services would increase by 1.38 mgd at the Main Post, including discharges from the hospital. This increase is based on various sewer demands presented earlier under the Preferred Alternative. The additional wastewater flow of 1.38 mgd would bring the total discharge from the Main Post between 2.48 to 2.78 mgd. Though this estimate is below the 3.0 mgd average flow limit and 6.0 mgd maximum daily peak flow limit the Post has with the Fairfax County, if flows increase above the contracted amount, it would be necessary for Fort Belvoir to negotiate a new contract with the Fairfax County for discharge of additional volume of wastewater to the County sewer system.

The existing off-post sanitary sewer collection system in the vicinity of the South Post could handle the additional flow of 1.38 mgd with appropriate upgrades to the existing sanitary infrastructure, collection and conveyance system, including any required pump stations and force mains.

4.12.3.3 Electricity

4.12.3.3.1 Land Use Plan Update

Long-term minor adverse and beneficial effects would be expected as a result of implementing the Town Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Town Center Alternative land use plan. Substantial additions and upgrades would occur at Fort Belvoir to provide adequate level of electricity. These additions and upgrades would be designed and built to use energy-efficient devices, thus reducing the consumption of electricity.

4.12.3.3.2 BRAC Implementation and Facilities Projects

Long-term beneficial effects would result from energy efficient electric power distribution system, as substantial upgrades to the system would be expected to occur. On the other hand, long-term minor adverse effects would occur from increases in demand for electric power due to the BRAC action.

There would be an additional 6.2 million square-feet of administrative office space. Most of the employees are likely already working Fairfax County, so the countywide impacts are probably somewhat lower than given here. The BRAC demands, as reported, may exceed 100 MVA. Additional installation capacity for electric supply would be required.

4.12.3.4 Natural Gas

4.12.3.4.1 Land Use Plan Update

Long-term minor adverse and beneficial effects would be expected as a result of implementing the Town Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Town Center Alternative land use plan. Substantial additions and upgrades would occur at Fort Belvoir to provide adequate supply of natural gas. These additions and upgrades would use energy-efficient devices, thus reducing the per capita consumption of natural gas.

4.12.3.4.2 BRAC Implementation and Facilities Projects

Using an estimate of 2.5 MMcf of natural gas per 100,000 square feet of office space, the Main Post would require a total of approximately 156 MMcf of natural gas to provide for heating purposes. The above total increase for natural gas of 156 MMcf from the construction of additional building space at the Main Post is near the current combined total purchase capacity of 160 MMcf Fort Belvoir has with Washington Gas.

Washington Gas has sufficient capacity to provide the additional quantity of natural gas from existing distribution network near Fort Belvoir to meet the additional demand. Fort Belvoir should negotiate a new supply amount with Washington Gas to have sufficient capacity to meet the demand for natural gas from existing personnel and incoming BRAC tenants.

Upgrades and additions for the existing distribution system at the Main Post are required to meet the demand for natural gas from the BRAC workforce.

4.12.3.5 Steam

4.12.3.5.1 Land Use Plan Update

No effects would be expected. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Town Center Alternative land use plan.

4.12.3.5.2 BRAC Implementation and Facilities Projects

Some of the BRAC tenants at Main Post could opt to have individual centralized utility plants to provide emergency power, steam and cooling water to meet the specific needs of equipment and other accessories. Because of the close proximity of the proposed location for the different BRAC tenants at the South Post, it could be cost effective to have one centralized plant to serve all facilities. Existing steam facilities at Fort Belvoir would need substantial upgrades to meet the demand of the BRAC tenants moving to the South Post. Additional demand for steam might also be met by installing units that use natural gas.

4.12.3.6 Communications

4.12.3.6.1 Land Use Plan Update

No effects would be expected as a result of implementing the Town Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Town Center Alternative land use plan. Substantial additions and upgrades would occur at Fort Belvoir to provide adequate level of communication services.

4.12.3.6.2 BRAC Implementation and Facilities Projects

Substantial upgrades would be necessary for existing telecommunication network at the Fort Belvoir to satisfy the various agency-specific needs to provide different levels of communication systems.

4.12.3.7 Solid Waste

4.12.3.7.1 Land Use Plan Update

Long-term minor adverse effects would be expected as a result of implementing the Town Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Town Center Alternative land use plan. Additional solid waste would be generated at Fort Belvoir from office workers moving to the proposed locations. In addition, construction of new buildings and demolition/renovation of existing buildings would also generate additional solid waste.

4.12.3.7.2 BRAC Implementation and Facilities Projects

Solid waste generated under the Town Center Alternative would not be substantial in terms of overall monthly or yearly quantity or regional landfill capacity. Most of the solid waste expected to be generated at Fort Belvoir under the Town Center Alternative is generated at other Army facilities in the region. As such, the impact on the landfill capacity, from the solid waste generation at Fort Belvoir, would be minimal as a result of the BRAC action. However, Fort

Belvoir should negotiate with the current contract hauler to dispose of the additional solid waste generated to designated landfill sites.

Using EPA's national average of 1 lb/day/employee and 5-day week, an additional 2,860 tons of solid waste would be generated per year at Fort Belvoir from 22,000 additional workers under the Town Center Alternative. Close to 50 percent of this solid waste generated would be recycled under the mandatory recycling program in effect at Fort Belvoir.

In addition to the quantity of solid waste generated from BRAC tenants, Table 4.12-2 presents an estimate of the CDD that would be generated at Fort Belvoir by construction activities undertaken under the Town Center Alternative.

Quantities of yearly and monthly CDD generated as a result of the Town Center Alternative are same as of the CDD generated under the Preferred Alternative and presented in section 4.12.2.7.2.

4.12.3.8 BMPs/Mitigation

BMPs would be same as those stated in Section 4.12.2.8.

4.12.4 ENVIRONMENTAL CONSEQUENCES OF THE CITY CENTER ALTERNATIVE

4.12.4.1 Potable Water Supply and Distribution

4.12.4.1.1 Land Use Plan Update

Long-term minor adverse and beneficial effects and minor short-term adverse effects would be expected as a result of implementing the City Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at EPG, Main Post, and GSA Parcel under the City Center Alternative land use plan. The potable water consumption would increase from requirements of additional workers locating to these areas. Substantial additions and upgrades for the potable water infrastructure would occur at EPG and the GSA Parcel to provide adequate level of potable water. In addition to upgrades to existing water supply lines, new distribution and storage capacity for potable water might be necessary to accommodate agency-specific needs of users such as hospital and other related services.

In the long-term, these additions and upgrades would use efficient water conserving devices, thus reducing the *per capita consumption* of potable water and eliminating waste. However, minor long-term adverse effects would occur due to the increase in *overall total demand* on potable water infrastructure from additional personnel occupying the newly constructed or renovated buildings. Minor short-term adverse effects also would be expected. Implementing the City Center Alternative would result in short-term disconnections and reconnections of existing potable water utility systems during the construction phase.

4.12.4.1.2 BRAC Implementation and Facilities Projects

Under the City Center Alternative, there would be a net increase of 22,000 personnel distributed between EPG, the GSA Parcel, and the South and North Posts. Most of the personnel proposed to move to various office locations already live and work in the surrounding areas. As such, their

demand on utilities would be limited to use of services during office hours and not based on residential levels of demand.

Of the net increase of 22,000 personnel, approximately 12,000 personnel would be assigned to the various agencies proposed to be located at EPG and approximately 9,300 personnel would be assigned to the GSA Parcel. Miscellaneous building space amounting to approximately 6.2 million square feet would be added at various locations of the three sites, with approximately 4 million square feet of additional building space constructed at EPG and more than 2.2 million square feet of constructed at the GSA Parcel.

Using a per capita water consumption of 75 gallons per day, the proposed increase in personnel under the City Center Alternative would increase the demand for potable water by 0.99 mgd at EPG, including visitors to the hospital. The demand for potable water at the GSA Parcel would increase by 0.7 mgd. The total increase of 1.73 mgd, including an increase of 0.04 mgd in potable water demand at the Main Post, together with the current average demand of 1.8 to 2.2 mgd would result in an overall demand of 3.73 to 3.93 mgd. The anticipated average demand is between 74 and 83 percent of the current rated capacity of 4.75 mgd the installation has with Fairfax Water. As required by the regulating authority, Fort Belvoir must submit a plan for upgrading the system and negotiate for additional contracted capacity with Fairfax Water for potable water. The water storage requirements for fire fighting and water needs during construction phase should also be considered during the design stages.

Existing Fairfax Water's 24-inch mains along Backlick Road on the east side and along Rolling Road on the west side could be linked with a new water line and be tapped at various locations to provide potable water for the various office buildings proposed to be located at EPG. In addition, storage tanks with sufficient capacity might need to be built to ensure reliability of supply and for emergency use. An 8-inch main provides potable water to existing buildings at EPG. No storage facilities are available for storage of potable water at the EPG site. In view of the age of the existing distribution system and to meet the demand of additional workers moving to EPG, new distribution lines and storage capacity would be necessary.

Existing potable water supply lines at the GSA Parcel could be tapped to provide water supply for new BRAC tenants moving to the site. Significant investments to construct new potable water distribution and storage systems would be necessary at the GSA warehouse site.

4.12.4.2 Sanitary Sewage Collection and Treatment

4.12.4.2.1 Land Use Plan Update

Long-term minor adverse and beneficial effects and minor short-term adverse effects would be expected as a result of implementing the City Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at EPG, the Main Post, and the GSA Parcel under the City Center Alternative land use plan. Wastewater generation would increase from additional office workers and new office, administrative, and residential buildings. Substantial additions and upgrades would occur at EPG to provide adequate level of sanitary sewer services. In addition to upgrades to existing sanitary sewer lines, new collection and conveyance systems would be necessary to provide adequate level of services because of increased numbers of users under the City Center Alternative land use plan. Substantial investments for a new collection and conveyance system would be necessary at EPG under the City Center Alternative land use plan.

In the long-term, because new buildings would use efficient, water-conserving devices, the proposed development would reduce the *per capita discharge* of sanitary wastewater. However, minor long-term adverse effects would occur due to the additional demand on sanitary wastewater infrastructure. Minor short-term adverse effects also would be expected. Implementing the City Center Alternative would result in short-term disconnections and reconnections of existing sanitary sewer utility systems during the construction phase.

4.12.4.2.2 BRAC Implementation and Facilities Projects

Under the City Center Alternative, the demand for sanitary sewer services would increase by 0.79 mgd at EPG, by 0.56 mgd at the GSA Parcel, and by 0.03 mgd at the Main Post. This increase is based on a per capita discharge of 60 gallons per day. The additional wastewater flow of 1.38 mgd would bring the total discharge from the Main Post, EPG, and the GSA Parcel between 2.48 to 2.78 mgd. Though this estimate is below the 3.0 mgd average flow limit and 6.0 mgd maximum daily peak flow limit the Post has with the Fairfax County, if flows increase above the contracted amount, it would be necessary for Fort Belvoir to negotiate a new contract with the Fairfax County for discharge of additional volume of wastewater to the county sewer system.

The existing 54-inch gravity trunk main along Accotink Creek could be tapped to discharge sanitary waste from various buildings proposed at EPG. New collections system pipes, interceptors and appurtenances would be required to convey the sanitary waste to the existing trunk main along Accotink Creek.

The existing 12-inch sanitary sewer line at the GSA Parcel has sufficient capacity to carry the additional sanitary waste flow generated at the site as a result of implementing the BRAC action. New collections system pipes, interceptors and appurtenances would be required to convey the sanitary waste to the existing trunk main.

4.12.4.3 Electricity

4.12.4.3.1 Land Use Plan Update

Long-term minor adverse and beneficial effects would be expected as a result of implementing the City Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at EPG, the Main Post, and the GSA Parcel under the City Center Alternative land use plan. Substantial additions and upgrades would occur at EPG to provide adequate level of electricity. In addition to upgrades to existing distribution lines, new supply grid and distribution system would be necessary at EPG under the City Center Alternative land use plan. These additions and upgrades would be designed and built to use energy-efficient devices, thus reducing the consumption of electricity.

4.12.4.3.2 BRAC Implementation and Facilities Projects

Dominion, the electricity supplier, would need to make substantial upgrades to the electrical transmission and distribution systems to provide power to the BRAC tenants moving to EPG and the GSA Parcel. These upgrades could potentially take several years to plan and construct due to right-of-way acquisition and State Corporation Commission permitting requirements.

In addition to normal demands, new mission-critical users such as NGA require separate feeds from independent substations as well as buried primary service in lieu of overhead lines because

of UFC security and reliability standards. These requirements would add to the cost and complexity of the necessary improvements.

The BRAC demands would require improvements to Dominion's Franconia substation. This substation is fed from multiple circuits allowing for a high degree of reliability. Because of physical constraints, the maximum size for a new substation transformer is 75 MVA. The BRAC demands, as reported, may exceed 100 MVA, requiring two transformer/switch sets. The Franconia substation has sufficient physical room within the existing plant to accommodate the required upgrades.

Power would be fed from the Franconia substation to a proposed substation on EPG. Approximately 4 acres must be set aside for this station near the perimeter of EPG for accessibility by Dominion.

In addition, new electrical distribution systems would be constructed at EPG and the GSA Parcel to provide electricity for the BRAC tenants.

4.12.4.4 Natural Gas

4.12.4.4.1 Land Use Plan Update

Long-term minor adverse and beneficial effects would be expected as a result of implementing the City Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at EPG, the Main Post, and the GSA Parcel under the City Center Alternative land use plan. Substantial additions and upgrades would occur at EPG and the GSA Parcel to provide adequate supply of natural gas at these locations. In addition to upgrades to existing distribution lines, new supply grid and distribution system would be necessary at EPG and the GSA Parcel under the City Center Alternative land use plan. These additions and upgrades would use energy-efficient devices, thus reducing the per capita consumption of natural gas.

4.12.4.4.2 BRAC Implementation and Facilities Projects

Using an estimate of 2.5 MMcf of natural gas per 100,000 square feet of office space, EPG would require a total of 99 MMcf of natural gas to provide for heating purposes. In addition, the GSA Parcel would require 57 MMcf of natural gas. The total increase for natural gas of 156 MMcf due to the construction of additional building space at EPG, the Main Post, and the GSA Parcel is near the current combined total purchase capacity of 160 MMcf that Fort Belvoir has with Washington Gas.

Washington Gas has sufficient capacity to provide the additional quantity of natural gas from existing distribution network near EPG and the GSA Parcel to meet the additional demand. The installation would be required to negotiate a new supply amount with Washington Gas to have sufficient capacity to meet the demand for natural gas from existing personnel at Fort Belvoir and incoming BRAC tenants.

In addition, a new distribution network would be required at EPG and the GSA Parcel to supply natural gas for the individual buildings.

4.12.4.5 Steam

4.12.4.5.1 Land Use Plan Update

No effects would be expected. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at EPG and the GSA Parcel under the City Center Alternative land use plan. Note that there is no steam distribution system at EPG and the GSA Parcel, and extending steam distribution lines from the Main Post to these locations would not be feasible.

4.12.4.5.2 BRAC Implementation and Facilities Projects

BRAC tenants at EPG and the GSA Parcel could opt to have individual centralized utility plants to provide emergency power, steam, and cooling water to meet the specific needs of equipment and other accessories. Because of the proposed location of the different BRAC tenants at EPG and the GSA Parcel, it would not be feasible to have one centralized plant to serve all facilities.

4.12.4.6 Communications

4.12.4.6.1 Land Use Plan Update

No effects would be expected as a result of implementing the City Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at EPG, the Main Post, and the GSA Parcel under the City Center Alternative land use plan. Substantial additions and upgrades would occur at EPG and the GSA Parcel to provide adequate level of communication services at these locations. New networks would be necessary at the EPG and the GSA Parcel under the City Center Alternative land use plan.

4.12.4.6.2 BRAC Implementation and Facilities Projects

A new telecommunication network would be required at EPG and the GSA Parcel to satisfy the various agency-specific needs for different levels of communication systems. In addition to providing agency-specific telecommunication systems, improvements would be necessary to the existing minimal communication infrastructure available at EPG and the nominal communication infrastructure available at the GSA Parcel to meet the demand of general users to be located at these locations.

4.12.4.7 Solid Waste

4.12.4.7.1 Land Use Plan Update

Long-term minor adverse effects would be expected as a result of implementing the City Center Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at EPG, the Main Post, and the GSA Parcel as a resulting of implementing the City Center Alternative land use plan. Additional solid waste would be generated from office workers moving to the proposed locations. In addition, construction of new buildings and demolition/renovation of the existing buildings would generate additional solid waste at both locations.

4.12.4.7.2 BRAC Implementation and Facilities Projects

Solid waste generated under the City Center Alternative would not be substantial in terms of overall monthly or yearly quantity or regional landfill capacity. Most of the solid waste generated at EPG, the Main Post, and the GSA Parcel under the City Center Alternative is generated at other Army facilities in the region. As such, the regional impact on the landfill capacity because of the solid waste generation at EPG and the GSA Parcel would be minimal as a result of relocating personnel. However, Fort Belvoir should negotiate with the current contract hauler to dispose the additional solid waste generated to designated landfill sites.

Using EPA's national average of one lb/day/employee and 5-day work week, an additional 1,570 tons of solid waste would be generated per year at EPG, 1,210 tons per year at the GSA Parcel, and 80 tons per year on the Main Post under the City Center Alternative. Close to 50 percent of this solid waste generated would be recycled under the existing mandatory recycling program in effect at Fort Belvoir.

In addition to the above quantity of solid waste generated from BRAC tenants, Table 4.12-2 presents an estimate of the CDD that would be generated at EPG and the GSA Parcel by construction activities under the City Center Alternative.

Quantities of yearly and monthly CDD generated as a result of the City Center Alternative are same as of the CDD generated under the Preferred Alternative and presented in section 4.12.2.7.2.

4.12.4.8 BMPs/Mitigation

BMPs would be the same as those stated in Section 4.12.2.8.

4.12.5 ENVIRONMENTAL CONSEQUENCES OF THE SATELLITE CAMPUSES ALTERNATIVE

4.12.5.1 Potable Water Supply and Distribution

4.12.5.1.1 Land Use Plan Update

Long-term minor adverse and beneficial effects and minor short-term adverse effects would be expected as a result of implementing the Satellite Campuses Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Satellite Campuses Alternative land use plan. The potable water consumption would increase from requirements of additional workers moving to these areas. Substantial additions and upgrades would occur for the potable water supply infrastructure at the Main Post and Davison Army Airfield to provide adequate level of potable water. In addition to upgrades to existing water supply lines, new distribution and storage capacity for potable water might be necessary to accommodate specific needs of users such as hospital and other related services. New supply and distribution lines for potable water and storage capacity to ensure reliable service would be necessary at the Davison Army Airfield under the Satellite Campuses Alternative land use plan.

In the long-term, these additions and upgrades would use efficient water conserving devices, thus reducing the *per capita consumption* of potable water and eliminating waste. However, minor long-term adverse effects would occur due to the increase in *overall total demand* on potable

water infrastructure from additional personnel occupying the newly constructed or renovated buildings. Minor short-term adverse effects also would be expected. Implementing the Satellite Campuses Alternative would result in short-term disconnections and reconnections of existing potable water utility systems during the construction phase.

4.12.5.1.2 BRAC Implementation and Facilities Projects

Using potable water consumption rates described earlier, the proposed increase in personnel under the Satellite Campuses Alternative would increase the demand for potable water by 0.64 mgd at the Davison Army Airfield and by 1.09 mgd at the Main Post. The total increase in potable water demand of 1.73 mgd together with the current average demand of 1.8 to 2.2 mgd would result in an overall demand of 3.73 to 3.93 mgd. The anticipated average demand is between 74 and 83 percent of the current rated capacity of 4.75 mgd the installation has with Fairfax Water. As required by the regulating authority, Fort Belvoir must submit a plan for upgrading the system and negotiate for additional contracted capacity with Fairfax Water for potable water.

Existing potable water infrastructure at the North Post is adequate to handle the increased demand for potable water. However, upgrades to the existing distribution network and construction of a dedicated storage tank for the exclusive use of the proposed hospital might be necessary to ensure reliability of service.

Existing 24-inch potable water supply lines in the vicinity of Davison Army Airfield could be tapped for providing potable water for the new NGA administration and CDC buildings proposed to be constructed at the Army Airfield as part of the BRAC action. In addition, upgrades to the existing distribution network would provide adequate and reliable supply of potable water for the BRAC tenants moving to the airfield location.

4.12.5.2 Sanitary Sewage Collection and Treatment

4.12.5.2.1 Land Use Plan Update

Long-term minor adverse and beneficial effects and minor short-term adverse effects would be expected as a result of implementing the Satellite Campuses Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Satellite Campuses Alternative land use plan. Wastewater generation would increase from additional office workers and new office, hospital, administrative and residential buildings. Substantial additions and upgrades would occur at the North and South Posts and Davison Army Airfield to provide adequate level of sanitary sewer services. In addition to upgrades to existing sanitary sewer lines, new collection and conveyance systems might be necessary to provide adequate level of services from an increased numbers of users as a result of the proposed land use plan. Substantial investments for a new collection and conveyance system would be necessary at the Davison Army Airfield under the Satellite Campuses Alternative land use plan.

In the long-term, because new buildings would use efficient water conserving devices, the proposed development would reduce the *per capita discharge* of sanitary wastewater. However, minor long-term adverse effects would occur due to the additional demand on sanitary wastewater infrastructure. Minor short-term adverse effects also would be expected. Implementing the Satellite Campuses Alternative would result in short-term disconnections and reconnections of existing sanitary sewer utility systems during the construction phase.

4.12.5.2.2 BRAC Implementation and Facilities Projects

Under the Satellite Campuses Alternative, the demand for sanitary sewer services would increase by 0.51 mgd at the Davison Army Airfield and by 0.87 mgd at the Main Post. This increase is based on a per capita discharge of 60 gallons per day. The above additional wastewater flow of 1.38 mgd would bring the total discharge from the Main Post between 2.48 to 2.78 mgd. Though this estimate is below the 3.0 mgd average flow limit and 6.0 mgd maximum daily peak flow limit Fort Belvoir has with Fairfax County, if flows increase above the contracted amount, it would be necessary for Fort Belvoir to negotiate a new contract with the county for discharge of additional volume of wastewater to the County sewer system.

The existing sanitary sewer collection system in the Main Post could handle the additional flow of 0.87 mgd with appropriate upgrades to the existing sanitary infrastructure, collection and conveyance system, including any pump stations and force mains.

Sanitary waste from the new NGA administration and CDC buildings proposed to be constructed at the Davison Army Airfield as part of the BRAC action can be discharged via the existing 8-inch sanitary sewer line and associated lift station in the vicinity of Davison Army Airfield. Capacity and maintenance upgrades would be necessary for the existing sewer network in the area.

4.12.5.3 Electricity

4.12.5.3.1 Land Use Plan Update

Long-term minor adverse and beneficial effects would be expected as a result of implementing the Satellite Campuses Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Satellite Campuses Alternative land use plan. Substantial additions and upgrades would occur at the North and South Posts and Davison Army Airfield to provide adequate level of electricity at these locations. In addition to upgrades to existing distribution lines on the Main Post, a new supply grid and distribution system would be necessary at the Davison Army Airfield under the Satellite Campuses Alternative land use plan. These additions and upgrades would use energy-efficient devices, thus reducing the per capita consumption of electricity.

4.12.5.3.2 BRAC Implementation and Facilities Projects

There would be an additional 6.2 million square-feet of administrative office space at the Main Post and Davison Army Airfield under the Satellite Campuses Alternative. Most of these employees already work in Fairfax County, so the countywide impacts are probably somewhat lower than given here. The BRAC demands, as reported, might exceed 100 MVA; therefore, additional on-post capacity would be required.

Electricity supply for the new NGA administration and CDC buildings proposed to be constructed at Davison Army Airfield as part of the BRAC action could be provided from the existing electric grid in the vicinity. However, significant investments would be necessary to provide the required level of electricity for NGA tenants.

4.12.5.4 Natural Gas

4.12.5.4.1 Land Use Plan Update

Long-term minor adverse and beneficial effects would be expected as a result of implementing the Satellite Campuses Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Satellite Campuses Alternative land use plan. Substantial additions and upgrades would be required at the North and South Posts and Davison Army Airfield to provide adequate supply of natural gas at these locations. In addition to upgrades to existing distribution lines at Fort Belvoir, a new supply grid and distribution system would be necessary at the Davison Army Airfield under the Satellite Campuses Alternative land use plan. These additions and upgrades would use energy-efficient devices, thus reducing the per capita consumption of natural gas.

4.12.5.4.2 BRAC Implementation and Facilities Projects

Using an estimate of 2.5 MMcf of natural gas per 100,000 square feet of office space, the Main Post and Davison Army Airfield require approximately 96 MMcf and60 MMcf of natural gas to provide for heating purposes. The above total increase for natural gas of approximately 156 MMcf due to the construction of additional building space at the South Post is near the current combined total purchase capacity of 160 MMcf the installation has with Washington Gas.

Washington Gas has sufficient capacity to provide the additional quantity of natural gas from existing distribution network near Fort Belvoir to meet the additional demand. Fort Belvoir should negotiate a new supply amount with Washington Gas to have sufficient capacity to meet the demand for natural gas from existing personnel and incoming BRAC tenants.

Upgrades and additions for the existing distribution system at the North Post and Davison Army Airfield are required to meet the needs of the workforce. Washington Gas has enough capacity to supply the required volume of natural gas.

4.12.5.5 Steam

4.12.5.5.1 Land Use Plan Update

No effects would be expected. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at the North and South Posts and Davison Army Airfield under the Satellite Campuses Alternative land use plan.

4.12.5.5.2 BRAC Implementation and Facilities Projects

BRAC tenants at Davison Army Airfield could opt to have individual centralized utility plants to provide emergency power, steam and cooling water to meet the specific needs of equipment and other accessories. Existing steam facilities at Fort Belvoir and Davison Army Airfield would need substantial upgrades to meet the demand of the BRAC tenants. Demand for steam under the Satellite Campuses Alternative could also be met by installing units that use natural gas.

4.12.5.6 Communications

4.12.5.6.1 Land Use Plan Update

No effects would be expected as a result of implementing the Satellite Campuses Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Satellite Campuses Alternative land use plan. Substantial additions and upgrades would be required at the North and South Posts and Davison Army Airfield to provide adequate level of communication services at these locations. In addition to upgrades to existing communication system at Fort Belvoir, a new network would be necessary at the Davison Army Airfield under the Satellite Campuses Alternative land use plan.

4.12.5.6.2 BRAC Implementation and Facilities Projects

Substantial upgrades would be necessary for existing telecommunication network at the North and South Posts and Davison Army Airfield to satisfy the various agency-specific needs to provide different levels of communication systems.

Required communication network for the new NGA administration and CDC buildings proposed to be constructed at the Davison Army Airfield as part of the BRAC action could be provided from the existing off-post communication network in the vicinity of Davison Army Airfield.

4.12.5.7 Solid Waste

4.12.5.7.1 Land Use Plan Update

Long-term minor adverse effects would be expected as a result of implementing the Satellite Campuses Alternative land use plan. The acreage of land designated as Professional/Institutional, Residential, Community, Industrial and Training would increase at Fort Belvoir under the Satellite Campuses Alternative land use plan. Additional solid waste would be generated at the North and South Posts and at Davison Army Airfield from office workers moving to the proposed locations. In addition, construction of new buildings and demolition/renovation of existing buildings would also generate additional solid waste at both locations.

4.12.5.7.2 BRAC Implementation and Facilities Projects

Solid waste generated under the Satellite Campuses Alternative would not be substantial in terms of overall monthly or yearly quantity or regional landfill capacity. Most of the solid waste generated at Fort Belvoir under the Satellite Campuses Alternative is generated at other Army facilities in the region. As such, the effects on the landfill capacity from the solid waste generation at Fort Belvoir would be minimal from the relocation of personnel. However, Fort Belvoir should negotiate with the current contract hauler to dispose of the additional solid waste to designated landfill sites.

Using EPA's national average of 1 lb/day/employee and 5-day week, an additional 1,749 tons of solid waste would be generated per year at the Main Post and 1,111 tons per year at Davison Army Airfield under the Satellite Campuses Alternative. Close to 50 percent of this solid waste generated would be recycled under the existing mandatory recycling program in effect at Fort Belvoir.

In addition to the quantity of solid waste generated from BRAC tenants, Table 4.12-2 presents an estimate of the CDD that would be generated at Fort Belvoir by construction activities under the Satellite Campuses Alternative.

Quantities of yearly and monthly CDD generated as a result of the Satellite Campuses Alternative are same as of the CDD generated under the Preferred Alternative and presented in section 4.12.2.7.2.

4.12.5.8 BMPs/Mitigation

BMPs would be same as those stated in Section 4.12.2.8.

4.12.6 ENVIRONMENTAL CONSEQUENCES OF THE NO ACTION ALTERNATIVE

4.12.6.1 Potable Water Supply and Distribution

4.12.6.1.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.12.6.1.2 BRAC Implementation and Facilities Projects

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative. No changes in population and subsequent increase in demand for potable water supply would occur under the No Action Alternative.

4.12.6.2 Sanitary Sewage Collection and Treatment

4.12.6.2.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.12.6.2.2 BRAC Implementation and Facilities Projects

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative. No changes in population and subsequent increase in demand for sanitary sewer services would occur under the No Action Alternative.

4.12.6.3 Electricity

4.12.6.3.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.12.6.3.2 BRAC Implementation and Facilities Projects

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative. No changes in population and subsequent increase in demand for electricity would occur under the No Action Alternative.

4.12.6.4 Natural Gas

4.12.6.4.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.12.6.4.2 BRAC Implementation and Facilities Projects

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative. No changes in population and subsequent increase in demand for natural gas would occur under the No Action Alternative.

4.12.6.5 Steam

4.12.6.5.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.12.6.5.2 BRAC Implementation and Facilities Projects

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative. No changes in population and subsequent increase in demand for steam would occur under the No Action Alternative.

4.12.6.6 Communications

4.12.6.6.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.12.6.6.2 BRAC Implementation and Facilities Projects

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative. No changes in population and subsequent increase in demand for communication services would occur under the No Action Alternative.

4.12.6.7 Solid Waste

4.12.6.7.1 Land Use Plan Update

No effects would be expected. A land use plan update would not be implemented under the No Action Alternative.

4.12.6.7.2 BRAC Implementation and Facilities Projects

No effects would be expected. The BRAC action would not be implemented under the No Action Alternative. No changes in population and subsequent increase in demand for disposal of solid waste would occur under the No Action Alternative.

4.12.6.8 BMPs/Mitigation

No BMPs or mitigation measures would be required. The BRAC action would not be implemented under the No Action Alternative.

4.12.7 SUMMARY OF COMPARISON OF ALTERNATIVES

Different alternatives for implementing the BRAC action would have varying effects on existing utility systems, extent of upgrades, additions required to utility infrastructure, associated cost investment to implement the additions and time frame required to plan and implement them. In addition, the alternatives grade differently with respect to availability of additional capacity, on- and off-site improvements required, redundancy available for ensuring reliability of service and provision of centralized service.

Under the Preferred Alternative, most of the development would be centralized around EPG where existing utility services on EPG are close to nonexistent. However, the site is in close proximity to most utility systems. The BRAC action would require expansion to the publicly owned infrastructure as well as to some of the utility owned infrastructure.

For potable water and sanitary sewer, existing on-site utilities on EPG are currently largely inadequate to support the level of proposed development. New infrastructure would be needed on EPG for all on-site utility systems. However, the proposed BRAC facilities at EPG would require little if any improvements to off-site facilities, except for electricity and natural gas. Providing the required level of electricity at EPG would require substantial improvements to the existing off-site infrastructure. In addition, extending natural gas to EPG would require off-site improvements to existing infrastructure.

Consideration should also be given to the capacity constraints of the local utility network. Fort Belvoir purchases treatment capacity for potable water and sanitary sewer services from public utilities and currently is using only a portion of purchased capacity. However, the BRAC action demands would most likely consume all the purchased treatment capacity for both systems. There is adequate local capacity to provide natural gas for the proposed development at EPG, but some on- and off-post infrastructure improvements would be required. Providing electricity to meet the needs of BRAC tenants moving to EPG would require substantial on- and off-site upgrades, time and investment.

Redundancy is a fundamental principal in the design of all utility systems. UFC criteria recommend certain reliability and redundancy strategies designed to minimize outages from all systems; strategies include multiple feeds, looped water systems, and quick disconnects at buildings. Mission-critical activities such as NGA could have power fed from independent Dominion transmission circuits with automatic switching in addition to standby generators to support life-support and critical-data functions. It will be imperative to identify and quantify the redundancy requirements of each tenant as soon as possible because these requirements would have substantial cost effects to the utility infrastructure. Redundancy ratings for the different alternatives are comparable with one another for most utility services.

The City Center and Satellite Campuses Alternatives would be ranked the lowest in terms of providing centralized service. The centralized service provision ratings for the Preferred Alternative and the Town Center Alternative are comparable because most facilities would be concentrated on either EPG or the South Post, respectively, under these two alternatives.

Municipal solid waste and construction and demolition debris collection and disposal are comparable for all the alternatives. The sites are in close proximity to one another. As such, their impact on available landfill capacity also would be similar for all considered alternatives.

4.13 HAZARDOUS SUBSTANCES AND HAZARDOUS MATERIALS

Military operations performed at Fort Belvoir historically require the storage and use of hazardous substances and hazardous materials to successfully accomplish missions. This requirement has been in place for some time as the storage and use of hazardous substances and hazardous materials at Fort Belvoir predated today's environmental legislation, which were largely introduced in the 1970s and 1980s. (e.g., Resource Conservation and Recovery Act of 1976 [RCRA] and Comprehensive Environmental Response, Compensation and Liability Act of 1980 [CERCLA]). The adoption of these environmental statutes resulted in a complex network of federal and state requirements for the generation, use, treatment, storage and disposal of hazardous substances and hazardous materials. As a federal installation, Fort Belvoir must comply with all applicable federal, state and local laws and regulations for generation, use, treatment, storage and disposal of hazardous substances and hazardous materials. Fort Belvoir has a RCRA Part B permit (VA7213720082) issued by VDEQ for the accumulation, storage, and disposal of hazardous waste.

Fort Belvoir manages hazardous substances and hazardous materials in compliance with programs regulated by EPA and VDEQ. For successful environmental compliance, there are myriad regulatory requirements including federal, Commonwealth of Virginia, and Fairfax County regulations that must be addressed. Fort Belvoir must also comply with applicable federal, state, and local regulations implementing federal statutory requirements, including Army regulations. Executive Orders apply to Fort Belvoir as well. Fort Belvoir ENRD is tasked with maintaining Fort Belvoir's compliance with all appropriate and applicable regulations and orders for the storage and use of hazardous substances and hazardous materials. For the purpose of this analysis, the terms hazardous substances and hazardous materials include those substances defined as hazardous by CERCLA, RCRA, and the Toxic Substances Control Act (TSCA). In general, they include substances that, because of their quantity, concentration, or physical, chemical, or toxic characteristics, might present substantial danger to public health or welfare or to the environment when released into the environment.

The hazardous substances and hazardous materials evaluated in this EIS include the following:

- Petroleum Constituents
- Hazardous waste
- Solid Waste
- Asbestos-containing materials (ACMs)
- Lead-based paint (LBP)
- Polychlorinated biphenyls (PCBs)
- Pesticides
- Regulated medical waste
- Ordnance areas
- Radioactive material
- Radon

Fort Belvoir ENRD has an active environmental program that maintains compliance specific to each of these hazardous substances and hazardous materials. A summary of the regulatory requirements and the specifics of each program are discussed herein. Figure 4.13-1 illustrates the

locations of the various sites associated with hazardous substances and hazardous materials at Fort Belvoir and EPG.

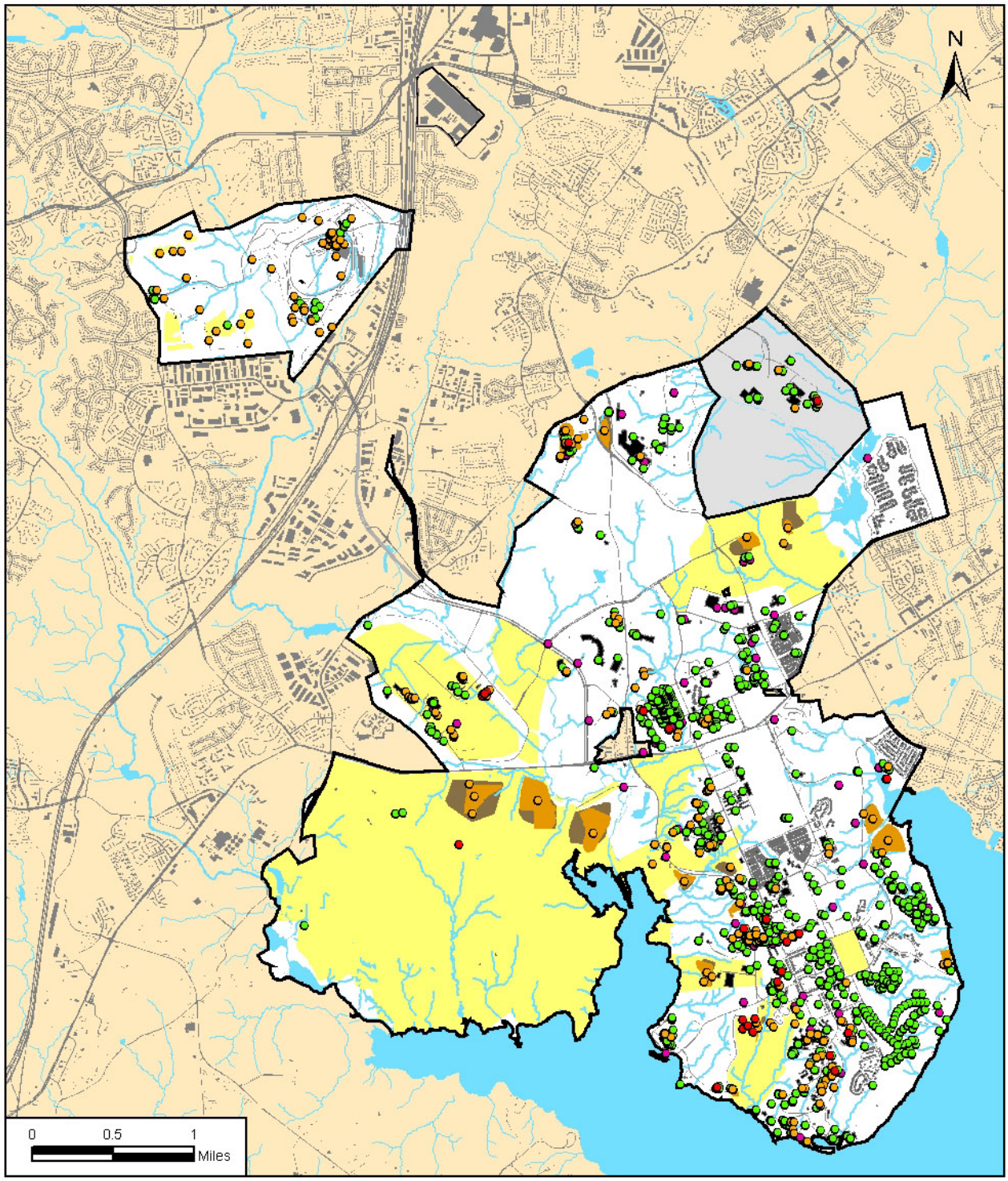
4.13.1 AFFECTED ENVIRONMENT

4.13.1.1 Petroleum Constituents

Nearly a thousand petroleum storage areas (PSAs) formerly existed or still exist at Fort Belvoir. PSAs include ASTs (aboveground storage tanks) and USTs (underground storage tanks) that store petroleum. PSAs range in size from a 275-gallon AST to a 50,000-gallon UST. For more than two decades, Fort Belvoir ENRD's Petroleum Management Program (PMP) has been addressing PSAs and petroleum release sites (PRSs). This program manages all aspects of PSAs and PRSs, including scheduling operation and maintenance, compliance monitoring, tank closure and removal, environmental investigations, remediation system design, management, and reporting. At the federal level, storage of petroleum is regulated by RCRA Subtitle I; however, VDEQ has been given enforcement authorization by the EPA. Fort Belvoir is managing its PSAs and PRS under the VDEQ Petroleum Program. The major regulations and orders applicable and relevant to petroleum are summarized in Table 4.13-1.

Table 4.13-1
Petroleum regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	RCRA Subtitle I
	Clean Water Act
Commonwealth of Virginia Regulations	9 VAC 25-580-10 et seq. Underground Storage Tanks; Technical Standards and Corrective Action Requirements
	9 VAC 25-91-10, et seq. Facility and Aboveground Storage Tanks (AST) Regulations
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
	EO#12856 Federal Compliance with Right to Know Laws and Pollution Prevention Requirements
Army Regulations	AR 200-1 Environmental Protection and Enhancement



LEGEND

- Installation Property
- HWMU
- PSA
- PRS
- Former or Operational Training Range
- Former Landfill
- SWMU

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Hazardous Substances and Hazardous Materials

Fort Belvoir, Virginia

Figure 4.13-1

Main Post. Fort Belvoir has 117 active USTs, of which 28 are regulated by VDEQ. In addition, there are 162 active ASTs, of which nine are regulated by VDEQ (Fort Belvoir, 2006d). The locations of these PSAs are illustrated in Figure 4.13-1. These tanks contain substances such as heating oil, diesel fuel, motor gasoline, type 8 jet propellant, lubricants, and used oils. To comply with UST regulatory deadlines, Fort Belvoir completed a program of tightness-testing, removal, replacement, and upgrading for the regulated USTs on-post. All UST replacements have double walls and state-of-the-art leak-detection systems to comply with UST regulations under RCRA Subtitle I. Nevertheless, both these new, replacement USTs and existing, unregulated USTs have the potential to release their contents into the soil, groundwater, surface water, and air. Additionally, there are 57 active heating oil tanks in residential housing areas. Any petroleum effected soils and groundwater would need to be properly addressed during the redevelopment of the Main Post.

EPG. There are a total of 22 PSAs within the EPG property. The locations of these PSAs are illustrated in Figure 4.13-1. Of the 22 PSAs, 8 are ASTs and 14 are USTs. Many of the tanks associated with these PSAs have been removed, and where releases confirmed, initial abatement measures were performed. Site characterizations were also performed at the release sites and in all cases a letter of no further action from VDEQ has been received. However, the natural attenuation remedy approved was based on the land use at the time. Now the land use would change because of the proposed development; the regulatory community has requested additional investigations to provide current site condition data.

GSA Parcel. Record searches have indicated that approximately 10 regulated ASTs and USTs are within the GSA Parcel, and approximately 15 AST/USTs formerly existed on the site, for a total of 25 PSAs. It is likely that residual petroleum contamination exists at these sites. The petroleum-impacted soils and groundwater would need to be properly addressed during any redevelopment of the GSA Parcel.

4.13.1.2 Hazardous Waste

Through a RCRA permit, EPA and, in the case of Fort Belvoir, VDEQ, regulate the proper management of wastes. Fort Belvoir has had an active RCRA Program in place for more than 20 years. The RCRA/Waste Management Program at Fort Belvoir is responsible for the storage, use, characterization, manifesting, remediation and proper disposal of all hazardous waste generated at the installation. The major regulations and orders applicable and relevant to hazardous waste are summarized in Table 4.13-2.

Fort Belvoir entered into a Federal Facilities Compliance Agreement (FFCA) in 1992 with EPA that identified 27 Solid Waste Management Units (SWMUs) sites as unpermitted Hazardous Waste Management Units (HWMUs). Fort Belvoir received funding and initiated corrective action at these HWMUs. Closure plans were developed, the sites were investigated, remediated, and closure reports were prepared. VDEQ has issued letters of concurrence with the no further action determination for all 27 HWMU sites. Twenty six of these sites were closed using health-based risk assessments. One of these HWMUs, the Open Burning/Open Detonation (OB/OD) Pit at site T6A on the Southwest Area, required a land use restriction as part of the closure that limited future development near the site to commercial/industrial land use only. In addition, two permitted hazardous waste sites, Building 2991 and Building 1124 on the Main Post, were closed in 2001 and 2006, respectively. Soil disturbance is restricted at these sites to avoid exposure to constituents of concern.

Table 4.13-2
Hazardous waste regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	RCRA Subtitle I
	CERCLA/SARA
	Clean Water Act
Commonwealth of Virginia Regulations	9 VAC 20-60-10 et alia : Virginia Hazardous Waste Management Regulations
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
	EO#12856 Federal Compliance with Right to Know Laws and Pollution Prevention Requirements
Army Regulations	AR 200-1 Environmental Protection and Enhancement

Main Post. Fort Belvoir has a RCRA Part B permit (VA7213720082) issued by VDEQ for the storage of hazardous waste. Fort Belvoir stores hazardous waste at Building 1490. Fort Belvoir also operates four temporary (less than 90 days) hazardous waste accumulation sites at Buildings 1414, 1495, and 367 on South Post and Building 2826 (DCEETA) on North Post. There are also 20+ satellite accumulation areas on the Main Post.

In addition, Fort Belvoir used to stored hazardous waste (waste fuel) in a 12,000-gallon UST at Building 1124. This unit was closed in accordance with the VDEQ approved *Building 1124 Closure Plan*, dated April 2002. In 2006 VDEQ approved the *Building 1124 Closure Report,* dated April 27 2005.

EPG. EPG was a RCRA permitted facility under EPA ID# VA1210000906. However, this permit had been issued for the HWMU at Building 5095. A closure report for Building 5095 was submitted to VDEQ in December 2000 and was approved in June 2001. Current hazardous waste generation at EPG is incidental and EPG is considered a Conditionally Exempt Small Quantity Generator. The extensive environmental investigation ongoing at EPG should reveal if hazardous waste sites exist and must be addressed before redevelopment. In September 2005, EPA Region III issued a Unilateral Administrative Order under section 3013 that requires Fort Belvoir to investigate sites at EPG. These activities are monitoring testing, analysis and reporting of hazardous waste releases to EPA Region III.

GSA Parcel. Six RCRA sites were identified at the GSA Parcel including one RCRA large quantity generator at GSA 6810 Loisdale Road Building A. This RCRA large quantity generator, permit number VA4470039336, has 12 violations with no volitions resolved. Permitted wastes include corrosive wastewater from electroplating operations, chlorinated, and nonchlorinated solvents. Violations appear to be of an administrative nature. It is possible that hazardous waste contamination exists at this site. If identified, the hazardous waste impacted soils and groundwater would need to be properly addressed during any redevelopment of the GSA Parcel.

4.13.1.3 Solid Waste

Fort Belvoir has conducted numerous studies that have identified 248 SWMUs on the installation including both the Main Post and EPG. The locations of these SWMUs are shown in Figure 4.13-1.

However, these studies were sporadically funded, and investigations and corrective action measures were intermittently conducted. The SWMUs that were investigated, remediated, and closed were about 50 sites in areas intended for proposed redevelopment. Fort Belvoir now manages an active SWMU Program to manage the sites, perform remediation, corrective action, and close the sites. Fort Belvoir's SWMU Program is managed with EPA as the lead agency and VDEQ as a contributing agency. The major regulations and orders applicable and relevant to solid waste are summarized in Table 4.13-3.

Table 4.13-4 provides a summary of the number of SWMUs by category. These categories are largely based on studies conducted in the late 1980s. Action plans for each SWMU were prepared in the 1990s. An inspection of all SWMUs was conducted in 2005.

Main Post. There are 204 SWMUs on the Main Post, which are at various stages of investigation and closure. The most recent RCRA Part B permit, issued in 2004, included the investigation and corrective actions for these SWMUs. The distribution of SWMU sites is as follows:

- North Post: 36 sites
- South Post: 148 sites
- Davison Army Airfield: 20 sites
- HEC: 6 sites

Fort Belvoir performed a visual site inspection (VSI) for each of the Main Post SWMUs in 2005 and prepared a Summary VSI report for each SWMU, which included recommendations of what action must be undertaken to achieve closure of the SWMU. The recommendations were determined on the basis of VSIs and review of available data.

EPG. There are 44 SWMUs on EPG that are in various stages of investigation and closure. In accordance with the requirements of EPA Administrative Order 3013, dated September 2005, Fort Belvoir prepared a summary of current conditions and categorized the 44 SWMUs into four

Table 4.13-3
Solid waste regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	RCRA Part B Permit (Main Post)
	RCRA Subpart D
	Unilateral Administrative Order issued by EPA Region III under Section 3013 of RCRA (EPG)
	CERCLA/SARA
	Clean Water Act
Commonwealth of Virginia Regulations	9 VAC 20-80-10 et seq.: Virginia Solid Waste Management Regulations
	9 VAC 20-60-264 Subpart H
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
	EO#12856 Federal Compliance with Right to Know Laws and Pollution Prevention Requirements
Army Regulations	AR 200-1 Environmental Protection and Enhancement

Table 4.13-4
SWMU categories

SWMU category	Description	# of SWMUs
A	Landfill or surface impoundment	29
B	Building storage unit	23
C	Wash rack	12
D	Oil/Water separator	11
E	Waste POL storage area	14
F	Aboveground waste POL tank	9
G	Underground waste POL tank	14
H	Spent battery storage area	5
I	Battery acid neutralization unit	5
J	Incinerator	6
K	Fire control training area unit	5
L	Miscellaneous unit	47
M	Engineer Proving Ground area unit	44
N	Units identified by CH2M Hill in 1992	24
Total		**248**

categories. These categories are: No Further Action (NFA), Administrative Closure (AC), Confirmatory Sampling (CS) to confirm absence or presence of contamination, and Site Investigations (SI) including soil and groundwater sampling. Of the 44 SWMUs, 9 are considered to require NFA, 12 would undergo AC, 7 would require CS and closure actions, and 16 require a SI. EPA reviewed this summary report and offered comments on the categorization of the SWMUs. EPA agreed with the categorization, with most of their comments addressing the SWMUs eligible for enrollment into the Military Munitions Response Program (MMRP). In 2006 Fort Belvoir prepared investigation plans at all sites requiring additional investigation. The investigations are underway with the first phase of the investigations to be completed in 2007. Depending on the results of the first phase, additional investigations and remediation could be required.

GSA Parcel. The record search of environmental databases did not indicate that any solid waste issues exist at the GSA Parcel.

4.13.1.4 Asbestos-Containing Materials (ACMs)

In response to the dangers posed by materials containing asbestos, federal laws were passed in the 1980s. The Asbestos Hazard Emergency Reauthorization Act of 1987 was among the first, and it addressed the asbestos in public schools. It set forth qualifications for inspection and analysis, analytical requirements, and acceptable response actions.

Two categories are used to describe ACM–Friable ACM and Non-friable ACM. Friable is defined as any material containing more than 1 percent asbestos (as determined by polarized light microscopy) that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Non-friable ACM is material that contains more than 1 percent asbestos that when dry cannot be pulverized into powder by hand pressure.

EPA and Occupational Safety and Health Administration (OSHA) regulate the remediation of asbestos-containing materials. Emissions of asbestos fiber into the ambient air are regulated by EPA in accordance with Section 112 of the Clean Air Act (CAA) of 1970, which established the National Emissions Standards for Hazardous Air Pollutants (NESHAPs). These clean air standards, along with TSCA regulations concerning asbestos abatement in the demolition or rehabilitation of buildings with ACM. The major regulations and orders applicable and relevant to ACM are summarized in Table 4.13-5.

Main Post. Fort Belvoir maintains an active asbestos program. The Asbestos Program Manager (APM) is responsible for all elements of the asbestos program including asbestos surveys and sampling, operation and maintenance, permitting, asbestos abatement design and oversight, and restoration. The installation has asbestos data on nearly all facilities on-post. When renovation projects are scheduled on-post, the APM must evaluate them for potential effects to asbestos. Supplemental asbestos surveys are performed to gather sufficient data to prepare the abatement design. The APM provides oversight during the abatement to ensure compliance with all applicable regulations and that air samples meet the acceptance criteria. Through this process, Fort Belvoir mitigates the potential for asbestos release while abating the installation one project at a time. The APM also is responsible for the overall compliance of the asbestos response actions enacted on the installation including training, operation and maintenance and public notice requirements.

EPG. An asbestos survey performed in support of the Right-of-Way (ROW) for the Fairfax County Parkway identified asbestos in eight of the nine buildings included in the survey. ACMs identified at EPG included vinyl floor tiles, caulking, glazing, acoustical tile, and roofing, among others. These ACMs would likely also be encountered in buildings on the rest of EPG. An asbestos survey would be required before demolition or renovation of these structures.

GSA Parcel. On the basis of the estimated construction date of the GSA Parcel, ACMs are likely present in the warehouse and could also be discovered in the other structures on the site. An asbestos survey would be required before demolition or renovation of these structures.

Table 4.13-5
ACM laws and regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	40 CFR Part 763 AHERA
	Toxic Substances Control Act of 1976
	40 CFR Part 61 Subpart M NESHAP
	29 CFR 1910 Occupational Safety and Health Administration (OSHA)
	29 CFR 1926.1101
Commonwealth of Virginia Regulations	9 VAC 20-80-10 et seq.: Virginia Solid Waste Management Regulations
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
Army Regulations	AR 200-1 Environmental Protection and Enhancement

4.13.1.5 Lead-Based Paint (LBP)

For centuries, lead and lead containing compounds were added to paints in the form of pigments. Epidemiological studies have indicated that exposure to lead could cause learning and cognitive

developmental deficiencies. To address the lead issue, Congress passed Title X Residential Lead-Based Paint Hazard Reduction Act of 1992, which set forth the qualifications for paint inspection, risk assessment, analytical requirements, and acceptable response actions. OSHA also regulates the exposure of workers to lead during construction and renovations. The major regulations and orders applicable and relevant to LBP are summarized in Table 4.13-6.

Similar to the asbestos program, Fort Belvoir maintains an active lead program. The Lead Program Manager (LPM) is responsible for all elements of the lead program including paint inspections and sampling, risk assessments, operation and maintenance, permitting, lead abatement design and oversight, and restoration. However, no installation-wide survey has been conducted at Fort Belvoir to determine the presence of LBP. When renovation projects are scheduled on-post, the LPM must evaluate them for potential effects to LBP.

Main Post. LBP sampling, analysis, and risk assessment was completed in 1997 for 11 homogeneous areas of existing on-post housing, including pre-1978 housing within Belvoir, Gerber, Dogue Creek, Rossell, Jadwin, Fairfax, Colyer, George Washington, River, and Woodlawn Villages, as well as the T-400 (Park and part of Jadwin Villages) and 100 (part of Gerber Village) areas. During the assessment, wipe samples were taken from interior windowsills, window troughs, and noncarpeted floors, and areas where children specifically were most likely to come in contact with dust (i.e., entryways, kitchens, bathrooms, children's bedrooms, and play areas). Paint chips were also collected from interior and exterior building components with visibly deteriorated paint. Composite soil samples were collected from bare exposed soil areas (i.e., children's play areas and building foundations or drip lines). The sample lead concentrations were then compared to Department of Housing and Urban Development (HUD) action levels for dust wipe samples (USACE, 2003).

As a result of the sampling and risk assessment, the Army implemented interim control measures in the Dogue Creek and George Washington villages to prevent human exposure where lead was detected above the EPA preliminary remediation goals for soil. Flowerbeds were built around the houses, extending 2 feet from the foundations of the houses. These flowerbeds were then filled in with dirt and mulch (USACE, 2003). In accordance with Army LBP abatement guidelines, the LBP found on interior walls exceeding HUD levels in Gerber and Dogue Creek homes were encapsulated by drywall or skim of plaster (if the building is eligible for historic preservation). No LBP was identified in Woodlawn Village housing. LBP abatement wastes, including chips and other LBP debris, were turned in to the Hazardous Waste Department for manifesting and off-site disposal as RCRA hazardous wastes (USACE, 2003).

Table 4.13-6
LBP regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	Title X Residential Lead-Based Paint Hazard Reduction Act of 1992
	29 CFR 1910 Occupational Safety and Health Administration (OSHA)
	29 CFR 1926.62
Commonwealth of Virginia Regulations	9 VAC 20-60-10: Virginia Hazardous Waste Management Regulations
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
Army Regulations	AR 200-1 Environmental Protection and Enhancement

EPG. A lead-based paint inspection performed in support of the ROW for the Fairfax County Parkway identified LBP in six of the nine buildings included in the survey. LBP painted components identified at EPG included doorframes, doors, window frames, and exterior wood components, among others. These LBP components would likely also be encountered on the rest of EPG. A lead paint inspection would be required before demolition or renovation of these structures.

GSA Parcel. On the basis of the estimated construction date of the GSA Parcel, lead paint is likely present in the warehouse and might also be discovered in the other structures located on the parcel. A lead paint inspection would be required before demolition or renovation of these structures.

4.13.1.6 PCBs

Because of their resilience to heat and electricity poly chlorinated biphenyls (PCBs) were added to electrical equipment dielectric fluid to stabilize transformers, capacitors and other electrical equipment. Unfortunately PCB's resilience also makes them persistent in the environment where they bio-accumulate in organisms, and become concentrated in the food chain. Increasing concern about the long-term effect of these persistent carcinogenic and mutagenic chemicals on human health and the environment resulted in the ban of their manufacture, sale, and distribution under Toxic Substance Control Act (TSCA) of 1976. The major regulations and orders applicable and relevant to PCBs are summarized in Table 4.13-7.

Main Post. The Army considers the garrison to be PCB-compliant with TSCA requirements. At this time, active, PCB-containing transformers (transformers containing fluids with 50 parts per million [ppm] or greater PCBs) are present at Buildings 1413 and 1157. The U.S. Army's policy is to take all transformers that are being taken offline for repair or replacement to Building 1495, where they are sampled for PCB content. Because of the size, complexity, and age of the electrical infrastructure at Fort Belvoir, the possibility of encountering PCB-containing electrical equipment still exists (USACE, 2003).

Within the Supply, Storage, & Maintenance area (700 Area) of South Post lie two areas contaminated with PCBs. One is the old Defense Reutilization and Marketing Office (DRMO) on South Post. This site had 1.7 million pounds of PCB-contaminated soil removed and the area capped with clean soil and vegetated with grass and trees. The second contaminated area is the old coal yard south of Warren Avenue on South Post. Before excavation, information regarding the known distribution and status of contaminated sites needs to be reviewed so that improvements could be safely implemented (Fort Belvoir, 2005b).

Table 4.13-7
PCB regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	TSCA of 1976
Commonwealth of Virginia Regulations	9 VAC 20-60-10: Virginia Hazardous Waste Management Regulations
	9 VAC20-80-113
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
Army Regulations	AR 200-1 Environmental Protection and Enhancement

EPG. Twenty potential PCB-containing pole and pad mounted transformers were removed in support of the ROW for the Fairfax County Parkway. None of the transformers sampled and analyzed contained PCBs greater than 50 parts per million. During an environmental investigation at EPG performed in 1990 (USATHAMA, 1990), 55 transformers were sampled analyzed for PCB content. 51 of the 55 transformers had PCB concentrations below detection limits. Of the 12 transformers where PCBs were detected, only 3 exceeded 50 parts per million PCB containing threshold. Because of the size, complexity, and age of the electrical infrastructure at EPG, the possibility of encountering PCB-containing electrical equipment still exists. All transformers would likely require additional sampling to determine PCB content before decommissioning and disposal which is accordance with Fort Belvoir's Program.

GSA Parcel. On the basis of the estimated construction date of the GSA Parcel, PCB-containing electrical equipment is likely present in the warehouse and could also be discovered in the other structures on the site. All electrical equipment including transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.

4.13.1.7 Pesticides

Pesticides have been used at Fort Belvoir since its inception, particularly on the golf courses. Fort Belvoir has employed a pesticide management program for years. Fort Belvoir recently updated its Integrated Pesticide Management Plan (IPMP) in November 2006. The storage and application of all pesticides at Fort Belvoir are performed in accordance both the U.S. Army's Integrated Pest Management (IPM) techniques and IPMP for Fort Belvoir. IPM is intended to reduce the use of pesticides and is in accordance with the Army's Pollution Prevention Program. Through a combination of cultural and biological controls and new IPM techniques specified in the IPMP, chemical pesticide usage dropped by 60 percent between 1996 and 1999. Pesticide reductions are mandated by Department of Defense Instruction 4150.7 on all DoD properties. The major regulations and orders applicable and relevant to pesticides are summarized in Table 4.13-8.

Main Post. Pesticides are stored in industrial areas on South Post and the north post golf courses and are either DoD certified or certified by the Commonwealth of Virginia as "Commercial Applicators." Approximately 60 percent of the pesticides applied on Fort Belvoir are on the North Post golf course; another 20 percent are applied on the South Post golf course. The types of pesticides used on the golf courses include fungicides and herbicides. Preventive spraying is not authorized in housing units, and interior pest control is performed by FBRC Property Manager contracted pest control company.

Table 4.13-8
Pesticide laws and regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	Federal Insecticide, Fungicide, and Rodenticide Act of 1976
	TSCA of 1976
Commonwealth of Virginia Regulations	9 VAC 20-80-10 et seq.: Virginia Solid Waste Management Regulations
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
Army Regulations	AR 200-1 Environmental Protection and Enhancement
	AR 200-5 Army Pest Management Program
	DOD Instruction 4150.7 DOD Pest Management Program

EPG. Historical use of pesticides is not well documented at EPG. SWMU investigations performed at M-42 and M-43 identified low-level DDT and its breakdown products. This indicated that, to some degree, pesticides were used at EPG in the past. The extensive environmental investigation at EPG should reveal if significant pesticides issues exist at EPG. If identified, pesticides might need to be addressed before redevelopment of the parcel.

GSA Parcel. There is little to no public information on the use of pesticides on the GSA Parcel. However, on the basis of the age of the warehouse, it is likely that pesticides were used or are used on the parcel. Any information regarding pesticides on the property should be obtained and evaluated. If necessary, soil and groundwater sampling could indicate if there are significant issues with pesticides on the GSA Parcel. If identified, pesticides might need to be addressed before redevelopment of the parcel.

4.13.1.8 Regulated medical waste

Regulated medical waste includes but is not limited to blood-soaked bandages, syringes, and organs. The main generator of medical biohazardous waste is Dewitt Army Hospital. Some of the regulated medical waste is treated at the hospital with a steam autoclave. The remainder of the waste is treated by a contractor and disposed of at an appropriate facility. Small quantities of medical biohazardous waste are also generated from the DCEETA and other nursing stations. The major regulations and orders applicable and relevant to medicinal and biohazardous waste are summarized in Table 4.13-9.

Main Post. Medically generated waste is managed in accordance with RCRA and Virginia Regulated Medical Waste Management Regulations regarding biomedical, solid, and hazardous wastes. The Logan Dental Clinic and Dewitt Hospital generate small quantities of regulated medical wastes that are disposed of off-site through private waste transporters (Fort Belvoir, 2006e). Historically, however, it is likely that all forms of waste, including biohazardous and hazardous wastes, might have been placed in the former landfills on South Post when the installation was operating its own landfills. These SWMUs are being monitored, investigated, and remediated under the installation's RCRA corrective action program.

EPG. The review of the numerous historical documents for EPG did not indicate that any regulated medical waste issues exist at EPG. The extensive environmental investigation at EPG should reveal if a significant medical and biohazardous waste or silver recovery/recycling issues exist at EPG. If identified, these issues might need to be addressed before redevelopment of the parcel.

GSA Parcel. The record search of environmental databases did not indicate that any medical/biohazardous waste issues exist at the GSA Parcel.

Table 4.13-9
Regulated medical waste regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	49 CFR, Sections 172 and 173 Medical Waste Transportation
Commonwealth of Virginia Regulations	9 VAC 20-120 Virginia Regulated Medical Waste Management Regulations
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
Army Regulations	AR 200-1 Environmental Protection and Enhancement

4.13.1.9 Ordnance Areas

The MMRP was established by under the Defense Environmental Restoration Program (DERP) to address defense sites with munitions and explosives of concern (MEC) (which include unexploded ordnance [UXO] and discarded military munitions [DMM]) and munitions constituents (MC). The Army's inventory of closed, transferring, and transferred (CTT) military ranges and sites have identified sites eligible for action under the MMRP. A report presenting the results of the MMRP Historical Records Review (HRR) has been conducted at Fort Belvoir. The DoD is establishing policy and guidance for munitions response actions under the MMRP. Key program drivers developed to date conclude that munitions response actions would be conducted under the process outlined in the National Contingency Plan (40 CFR Part 300) as authorized by CERCLA. The MMRP Historical Record Review (HRR) indicates that ranges have existed on the Main Post of Fort Belvoir. Sixteen ranges were identified in the 2002 Phase 3 Range Inventory performed at Fort Belvoir (Malcolm Pirnie, 2006). Twelve additional ranges were identified at the Main Post during the HHR preparation. Figure 4.13-1 illustrates the locations of ranges on the installation.

Since its inception as Camp Humphries, Fort Belvoir has designated areas for weapons training. A consequence of this training is that many of these former training ranges now contain UXO. In addition to UXO, the MMRP would also address any associated contamination under CERCLA. To meet the requirements in this arena, the MMRP is centrally funded and managed by the Army Environmental Center. This program would have DoD as the lead authority with regulatory input from the VDEQ Federal Facilities Division. Former training ranges containing Ordnance and Explosives (OE), UXO areas, and MEC are both on EPG and the Main Post. Investigation, clearance, and closure of these former training ranges would be addressed in the MMRP. Because the MMRP is in its infancy (within the last 2 years), cleanup thresholds are still being developed.

Main Post. U. S. Army Environmental Center contracted EA Engineering, Science, and Technology, Inc to prepare a Phase I Qualitative Assessment Report under the Operational Range Assessment Program for the operational ranges located at the Main Post of Fort Belvoir. The Phase I report indicates there are 15 ranges designated as operational on the Main Post of Fort Belvoir (EA, 2006). Nine ranges are located in the Southwest area and comprise some 1,290 acres. Four ranges at the Davison Army Airfield encompass 310 acres. The 24 acre Parade Grounds are located in the central portion of the Main Post next to Post Headquarters. Two maneuver and training areas, encompassing 248 acres, are located in the southwestern peninsula of the Main Post just West of CMRL complex (EA, 2006). Two continuous ranges located on the north post are former ranges that are being addressed under the MMRP (EA, 2006). The locations of these operational and former training ranges are illustrated in Figure 4.13-1.

However, because Fort Belvoir has been a military facility for more than 90 years and through two world wars, as well as more recent conflicts, the potential for the presence of ordnance anywhere on the installation cannot be ruled out. So, for instance, in 1990, cannon balls dating to the War of 1812 were discovered in Fairfax Village, and within the last year, a World War I- or World War II-era hand grenade was discovered in Dogue Creek Village and a World War II-era bazooka in one of the housing areas. Given the installation's history and the prominence of the surrounding area in the early wars fought on this country's soil, the risk of uncovering ordnance elsewhere in the main cantonment areas is possible (USACE, 2003).

Historical training areas have been located in the area of the FBRC properties and may well have included the use of small arms such as pistols, standard rifles, and machine guns. A 1918 document reported that there were seven rifle/machine gun type ranges on-post that were either in operation, under construction, or planned, although the locations of these ranges were not specified (USACE, 2003).

World War II training records indicate that the majority of the training at Fort Belvoir during this period would not have involved the use of live ammunition. Available data indicate that live ammunition from small arms and grenade training was used within the current wildlife preserve around Accotink Bay, or on designated ranges west of the Fort Belvoir Residential Community Project 1 (USACE, 2003). Grenade training from about 1940 to 1959 was restricted to a range referred to as Grenade Court, west of Pohick Road and Tulley Gate at the northern edge of Accotink Bay within the current wildlife preserve. The Grenade Court range potentially contains live grenades (USACE, 2003).

No heavy artillery, ordnance, or explosives are thought to have been used at Fort Belvoir on the developed areas of the Main Post or in the vicinity of the Fort Belvoir Residential Communities properties, except for the general area of Woodlawn, Lewis Heights, and Gerber villages. The Woodlawn Village property was formerly used by the Bureau of Standards as a Radio Laboratory Area, circa 1950, and as a demolition and maneuver training site, as shown on the 1918 Forestry Map. Bulk explosives and blasting caps might have been used there. Nevertheless, during the construction of Woodlawn Village in the 1970s, no types of explosives were reported to have been encountered. The area north of Lewis Heights village, T-16, was historically and is still considered an active training range, at which blank ammunition, simulators, and pyrotechnics were all in use. A 1918 Forestry Map shows an Ordnance School where Buildings 714 and 718 are located–between Buildings 707 and 708, as indicated on the 1918 Post Map. The school supplied ammunition to the troops stationed at Camp AA Humphreys. Bullets have been discovered in Gerber Village that date back to the World War I era and are thought to be remnants from the Ordnance School. Also shown on the 1918 Forestry Map is the School of Mines, which was between the existing Post Headquarters and Jadwin Village (USACE, 2003).

Portions of the George Washington, Rossell Loop, Fairfax, Park, and Jadwin Loop villages were or were thought to have been used in World War I-era trench training. The trenches were primarily on the eastern side of the post because the meteorological conditions near the water favored the formation of fog and provided the right conditions for holding other training gases, which tend to sink, within the confines of the trenches, thus creating ideal conditions for trench training (USACE, 2003).

EPG. There are 10 former training ranges at EPG that are at various stages of OE clearance and removal. EPG is composed of approximately 820 acres and is bisected by Accotink Creek, creating areas on each side of the creek known as EPG East and EPG West. EPG West is approximately 389 acres with nine ranges and EPG East is 431 acres with one 18-acre range (Eebee Field). Given its historical use and concentration of ranges, all of EPG West is being considered a range. The ROW for the proposed Fairfax County Parkway is composed of approximately 170 acres and extends through the southern portions of both sections of EPG. Most of the clearance action taken to date has occurred within the ROW. In support of the Fairfax County Parkway ROW property transfer, the Army undertook OE clearance and removal actions. About 20 acres (15 percent) of the ROW parcel encompasses former training ranges. OE removal actions have taken place at three ranges (Ranges 3, 4, and 5C) and portions of two others (Ranges 1 and 2).

The ranges on EPG fall into four categories of OE clearance and removal status: Category I OE is cleared and removed; Category II OE is partially cleared and removed; Category III represents surveys performed but OE not cleared or removed; and Category IV means no significant OE clearance actions have been undertaken. These categories and the ranges within each category are detailed below.

Category I OE Cleared and Removed. Category 1 ranges have been cleared of all OE. The USACE has certified the ranges are cleared in accordance with approved explosive safety submissions. Fourteen acres of ranges within the ROW have been cleared and designated as Category I OE.

Category II OE Partially Cleared and Removed. Category II ranges have been partially cleared of OE, and the USACE has certified grids within the ranges where OE clearance and removal actions have been completed. Ranges 1 and 2, which partially overlap the ROW on EPG West, fall in this category; about half of their 14 acres have been cleared.

Category III Surveys Performed but OE Not Cleared and Removed. Category III ranges have had some preparations for OE clearance and removal performed, but OE clearance and removal has not been performed. Because the geophysical surveys have been completed for these ranges, the anomalies located on these ranges could be quantified. Using this data, scopes of work and cost estimates to complete the remaining OE clearance on these ranges could be developed. Numerous anomalies that appear to be burial pits have been identified on these ranges during the geophysical surveys. These burial pits would likely require investigations to determine if the burial pits have impacted the environment (such as soil and groundwater contamination). Ranges 5, 5A, and 5B, which consist of 9 acres in the northern portion of EPG West, fall in this category.

Category IV No Significant OE Clearance Actions Undertaken. OE clearance actions have not been undertaken, and few investigations have been performed on ranges in this category. Without geophysical surveys of these ranges, it is difficult to estimate the number of anomalies. However, on the basis of the knowledge of other ranges on EPG, a per-acre cost estimate could be developed and extrapolated to these ranges in this category. Range 1A (7 acres) on EPG West and the abandoned airfield (Eebee Field) in the northern portion of EPG East fall in this category.

Areas Outside Training Ranges on EPG West. The recently prepared MMRP HRR has indicated that the entire western portion of EPG should be considered has having potential OE (Malcolm Pirnie, 2006). This area encompasses approximately 389 acres. To address this issue during OE clearance for the ROW, a magnetometer-assisted surface clearance (MASC) was performed for the entire area within the ROW outside the training ranges. OE was discovered on land outside the former training ranges. For these reasons, a MASC of the areas outside the training ranges on EPG West would likely be required. Performing MASC activities is the first step in clearance activities. Additional activities that would be performed at additional costs are vegetation clearing, extensive surveys, and geophysical activities.

GSA Parcel. The environmental database search performed did not indicate ordnance areas are at the GSA Parcel. On the basis of the historical use of the property as a warehouse, it is not likely that ordnance was used on the parcel in the past.

4.13.1.10 Radioactive Materials

Main Post. An inventory list is maintained for radioactive material on Fort Belvoir and is updated semiannually. DeWitt Army Hospital and other on-post medical facilities, such as the Logan Dental Clinic, produce low-level radioactive wastes. It is assumed that historically all forms of post waste, including low-level radioactive wastes, might have been placed in the former landfills on South Post, which were identified as SWMU which are currently under RCRA Corrective Action. Two SWMUs on South Post are identified by the Army as former radioactive waste storage facilities, which are related to a former decommissioned nuclear reactor plant, built for research and development purposes within the radiation testing area along Gunston Cove on the southern tip of South Post. One is northwest of Fairfax Village in an administrative area; the other is southeast of the Visitor's Center on the other side of Pohick Road near the northern tip of Accotink Bay (USACE, 2003).

EPG. In the 1990 Phase I/II Environmental Baseline Survey (EBS), this site was described as being along the eastern boundary of the EPG where four detectors with radioactive components were unearthed in 1987. Although there might still be additional detectors buried in this location, the radioactivity levels are expected to be below a threshold where an environmental hazard could be present. According to the 1990 Phase I/II EBS, "the detectors were judged to be environmentally harmless" and, therefore, no further action is recommended unless additional detectors are found. An environmental investigation is being performed at SWMU M-44 in accordance with the EPA–approved plan.

GSA Parcel. There is no public information regarding radioactive material at the GSA Parcel. On the basis of the history of the site use as a warehouse, the use of radioactive material is unlikely, nevertheless any environmental records regarding the property should be evaluated to determine if radioactive material was used and stored at the property. If identified, a radiological survey would be required to determine the nature and extent.

4.13.1.11 Radon

Radon gas is a naturally occurring, colorless, odorless, radioactive gas produced by the decay of naturally radioactive material (e.g., potassium, uranium) found in underlying bedrock. Atmospheric radon is diluted to insignificant levels, but when concentrated in enclosed areas, radon could pose human health risks. The major regulations and orders applicable and relevant to radon are summarized in Table 4.13-10.

Main Post. According to the EPA Map of Radon Zones, the rocks and soils found in southeastern Fairfax County, where Fort Belvoir is, have the highest radon potential. Radon testing is performed for residential buildings, as required by EPA, the state, and the Army. Radon testing for existing Fort Belvoir residential buildings was completed in 1991. Only three residential buildings–Building 140 in Gerber Village, Building 174 adjacent to Gerber Village, and Building 810F in Colyer Village–exhibited any elevated radon levels (above 4.0 pCi/L). No testing has been done for new or renovated buildings since 1992 (USACE, 2003).

EPG. According to the EPA Map of Radon Zones, the rocks and soils found in southeastern Fairfax County, where EPG is, have the highest radon potential. Radon testing has not been performed at EPG.

GSA Parcel. According to the EPA Map of Radon Zones, the rocks and soils found in southeastern Fairfax County, where the GSA Parcel is, have the highest radon potential. Radon testing on the GSA Parcel data has not been identified.

Table 4.13-10
Radon laws regulations and orders applicable to Fort Belvoir

Agency	Regulation or order
Federal Regulations	Clean Air Act of 1970
	EPA Map of Radon Zones document (EPA-402-R-93-071)
Commonwealth of Virginia Regulations	Radiation Control Act *Code of Virginia* Section 32.1-227
Executive Orders	EO#12088 Federal Compliance with Pollution Control Standards
Army Regulations	AR 200-1 Environmental Protection and Enhancement

4.13.2 ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE

4.13.2.1 Land Use Plan Update

The amount of administrative space included in the Preferred Alternative land use plan is twice the amount of administrative space included in the 1993 land use plan. This increase in administrative space would result in minor adverse effects as the various tenant agencies that occupy the new administrative space would also need to comply with all hazardous waste regulations. The tenants in the additional administrative spaces could also generate hazardous and toxic waste, which may also be considered a minor adverse effect.

4.13.2.2 BRAC Implementation and Facilities Projects

The major hazardous substances and hazardous material waste issues potentially affecting the Preferred Alternative are about 130 acres of former training ranges on EPG (EPG West and Eebee Field) and 30 SWMUs, several HWMUs, and PSAs. The specific consequences of Preferred Alternative with respect to each hazardous and toxic waste issues and required site preparations before development are further discussed Table 4.13-11.

Petroleum. Long-term minor adverse effects would result from an increase in storage capacity requirements for petroleum. Any construction of new storage facilities to handle storage requirements from BRAC actions would be done in accordance with applicable laws regarding construction materials, leak protection, monitoring, and spill containment.

EPG. 22 PSAs are located within the development areas of the Preferred Alternative. Of the 22 PSAs, 8 are ASTs and 14 are USTs. In addition, 10 PRSs are located within the development areas of the Preferred Alternative at EPG.

VDEQ issued letters of concurrence with the no further action determination for these PRSs at Fort Belvoir. These sites are subject to land use restrictions. Should these restrictions change an additional site investigation may be necessary along with appropriate regulatory coordination. In addition, residual petroleum contamination likely exists in the area. To address this issue, construction programs that call for disturbing areas around this PRS should require the appropriate federal OSHA construction worker protection. Disturbing previously unidentified

Table 4.13-11
Hazardous Substances and Hazardous Materials resources affected by the Preferred Alternative

Resource	Pre-development activities
Petroleum	The 22 PSAs at EPG could be aggressively addressed as part of the site preparations. A closure process involving administrative and decontamination process would be required. Confirmation samples collected beneath USTs and potentially some ASTs would likely be required to demonstrate no release has occurred. It could be expected that some USTs would have a release previously undiscovered. Site investigations at each release are approximately $40,000 each and require a month to complete. Mitigation measures could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.
Hazardous Substances and Hazardous Materials	Investigation work plans would require regulatory approval. Site investigations could be performed concurrently with site preparation activities. Additional investigation could be performed to determine if and where residual affected soils exist.
Solid waste	Investigation work plans would require EPA and VDEQ approval. Site investigations could be performed concurrently with OE clearance and site preparation activities.
Asbestos	Before initiating renovation activities, the potential for environmental effects of special hazards such as ACM would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves ACM would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62; EPA, state, federal, and Army regulations. Measures to control airborne asbestos would be implemented. All construction debris that contains ACM would be disposed of at licensed disposal facilities in accordance with applicable laws.
Lead based paint	Before initiating renovation activities, the potential for environmental effects of special hazards such as LBP would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves LBP would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62; EPA and HUD standards; and state, federal, and Army regulations. Measures to control airborne lead dust would be implemented. All construction debris that contains LBP would be disposed of at licensed disposal facilities in accordance with applicable laws.
PCBs	Because of the size, complexity, and age of the electrical infrastructure at EPG, the possibility of encountering PCB-containing electrical equipment still exists. All transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.
Pesticides	Proposed development in the South Post golf course would occur in areas of known historical pesticide application. A pesticide survey of the South Post golf course would likely be required. From the results of the pesticides survey, the waste generated during development could be properly managed if they are effected by significant levels of pesticides
Regulated Medical Waste	No immediate site preparation activities required. However, the relocation/expansion of the Dewitt Hospital would likely result in an significant increase in the amount of regulated medical waste generated at Fort Belvoir as proposed in the development of the Preferred Alternative.
Ordnance areas	Army approval of Explosive Safety Submission (ESS) would be required. Extensive OE clearance and removal actions would be required on the 230 acres of historical training ranges. All ranges areas would require site investigations
Radioactive material	The investigation of SWMU M-44 would be required before development of the Preferred Alternative.
Radon	No immediate site preparation activities would be required. However, the expansion of tenants at Fort Belvoir has a potential to increase the amount of people exposed to radon at Fort Belvoir.

petroleum contamination would also require proper handling and disposal of contaminants as required by federal, state, local, and Army regulations.

Site Preparation Activities: Preparing the site of the development of the Preferred Alternative could be accomplished by employing a Health and Safety Program including qualified industrial hygienists and a Health and Safety Plan (HSP). Additional investigation could identify if residual

impacted soils exists and where there are located so that plans to excavate and remove the impacted soils could be developed. The HSP specifies worker training requirements, personnel protective equipment, air monitoring requirements along with health and safety protocols appropriate to the project. The industrial hygienists would oversee the activities to ensure compliance with the HSP. Most large construction firms are experienced in this area. The cost estimates for a Health and Safety Program to adequately address this issue are not considered significant as the specifications of the construction project itself would likely require a HSP. This requirement could be incorporated into the construction program without adding significant costs.

Hazardous Substances and Hazardous Materials. Long-term minor adverse effects would result from an increase in the use of hazardous materials. Additional potentially hazardous materials that could be found on-post during BRAC-related construction and operational activities include paints, thinners, asphalt, and fuel and motor oils for vehicles and equipment. An increase in the volume of these wastes generated and the amount of storage required would be anticipated.

Short-term negligible adverse effects could result from an increase in spills associated with the use of hazardous materials. Established controls such as spill containment, emergency response and clean-up procedures would limit the impact of spills.

No effects would be expected from hazardous waste disposal. The installation is a large-quantity generator of hazardous wastes and has established procedures for managing and disposing of hazardous wastes. A permitted hazardous waste storage facility is located on the Main Post. The current hazardous waste disposal procedures would continue with implementation of the Preferred Alternative. All hazardous wastes would be managed in accordance with the installation's Hazardous Waste Storage Permit and RCRA requirements.

EPG. Four HWMUs are located within the development areas of the Preferred Alternative. VDEQ has issued letters of concurrence with the no further action determination for all HWMU sites at Fort Belvoir. Disturbance of these sites could result in a complete exposure pathway to human health and the environment and a reassessment of the site would be required with appropriate regulatory coordination.

*Site Preparation Activities***:** Disturbance of HWMU sites could be mitigated by further characterizing the impacted area through sample and analysis and employing a Health and Safety Program including qualified industrial hygienists and an HSP. Additional investigation could identify if residual impacted soils exists and where there are located so that plans to excavate and remove the impacted soils could be developed. The HSP specifies worker training requirements, personnel protective equipment, air monitoring requirements along with health and safety protocols appropriate to the project. The industrial hygienists would oversee the activities to ensure compliance with the HSP. The cost estimates for this mitigation are not considered significant as the specifications of the construction project itself would likely require a HSP for the general construction so addressing this constraint could be incorporated into the construction program without adding significant costs.

Solid Waste. No effects would be expected from solid waste disposal. The installation has established procedures for managing and disposing of solid wastes. The current solid waste disposal procedures would continue with implementation of the Preferred Alternative. There would be preceding cumulative impact with positive effects before development in that the SWMU located within the proposed development area of the Preferred Alternative would need to be investigated and remediated before development.

Thirty SWMUs are located within the development areas of the Preferred Alternative. Table 4.13-12 summarizes the current status of these SWMUs.

Table 4.13-12
Status of SWMUs within Preferred Alternative footprints

Recommendation	Number of SWMUs
No Further Action	4
Administrative Closure	8
Confirmation Sampling	7
Site Investigation	11

Source: Tetra Tech, 2005a.

Site Preparation Activities: Fort Belvoir has remediation and corrective action plans for these SWMUs. Mitigation ranges from administrative closure to confirmation sampling. These action plans should be implemented. However, for those sites requiring confirmation sampling, subsequent cleanup requirements could only be determined following analysis of the samples to determine if additional corrective action is required.

Asbestos. Long-term minor beneficial effects would be expected related to ACM present in existing buildings if such buildings were demolished or renovated to accommodate incoming BRAC activities. ACM would be handled in a manner consistent with applicable rules and regulations including NESHAPS regulations, and thus no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

The proposed development of the Preferred Alternative would result in the demolition of over 40 existing buildings. This would result in an estimated 50,000 tons of construction debris. If 1 percent of this debris is ACM then 500 tons of ACM debris could be anticipated. The potential for effects of special hazards such as ACM would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves ACM would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62; EPA, state, federal, and Army regulations. Measures to control airborne asbestos would be implemented. All construction debris that contains ACM would be disposed of at licensed disposal facilities in accordance with applicable laws.

Site Preparation Activities: Before demolition, asbestos would need to be identified and removed or abated from all the structures located within the Preferred Alternative. Initial asbestos surveys and supplemental asbestos surveys would be required performed to gather sufficient data to prepare the abatement design. Once the asbestos abatement design is completed appropriate permits and notification is required. Depending on the type of asbestos differing abatement techniques would be employed. After the asbestos is abated and air samples indicate the clearance is acceptable the demolition of the structure could undertaken.

Lead Based Paint. Long-term minor beneficial effects would be expected related to LBP present in existing buildings if such buildings were demolished or renovated to accommodate incoming BRAC activities. LBP would be handled in a manner consistent with applicable rules and

regulations, and thus no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

The proposed development of the Preferred Alternative would result in the demolition of over 40 existing buildings. This would result in an estimated 50,000 tons of construction debris. The potential for effects of special hazards such as LBP would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves LBP would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62; EPA, state, HUD, federal, and Army regulations. Measures to control airborne lead dust would be implemented.

Site Preparation Activities: Lead paint surveys and supplemental lead paint surveys would be required to gather sufficient data to determine if LBP is present in the buildings to be demolished. A waste stream for the demolition of each facility could be estimated into the various components, concrete, roofing, windows, doors, framing etc. Representative samples of these components could be collected and analyzed to determine if the waste stream of components exceed the regulatory limit for lead. If the waste stream samples do not exceed the regulatory limit for lead then the waste could be managed as construction debris. If the waste stream samples exceed the regulatory limit for lead then the abatement or removal and special disposal of components containing lead based paints should be evaluated. All construction debris that contains lead above the regulatory limit would be disposed of at licensed disposal facilities in accordance with applicable laws.

PCBs. No effects would be expected. There would be preceding beneficial cumulative effects before development in that the electrical equipment located within the proposed development area of the Preferred Alternative would first need to be investigated, sampled, and managed.

Numerous pole and pad mounted transformers are located within the Preferred Alternative. Over the years, Fort Belvoir has sampled, tested, and removed, many of the PCB containing electrical components. However, due to the size, complexity, and age of the electrical infrastructure at EPG, the possibility of encountering PCB-containing electrical equipment still exists. All transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.

Site Preparation Activities: A survey of the electrical equipment that is likely to be removed as part of the development of the Preferred Alternative would be required. All electrical equipment should be sampled and tested to determine if the electrical equipment needs to be managed as PCB containing wastes.

Pesticides. No effects from pesticides would be expected at the Preferred Alternative. Pesticides would continue to be used in accordance with the Fort Belvoir IPMP.

Regulated medical waste. Long-term minor adverse effect would be expected as the relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of regulated medical waste generated at Fort Belvoir as proposed in the development of the Preferred Alternative. This increase in hospital space would result in minor adverse effects as the various hospital tenant agencies that occupy the new space would also need to comply with all regulated medical waste regulations.

Ordnance. No adverse effects or environmental effects would be expected from ordnance. There would be preceding beneficial cumulative effects before development in that the ordnance located

within the proposed development area of the Preferred Alternative would first need to be cleared and removed.

The MMRP HRR (Malcolm Pirnie, 2006) indicates former ranges have existed in the vicinity of the Preferred Alternative. About 130 acres of former training ranges are located within the development areas of the Preferred Alternative with the potential for OE to be encountered on the remainder of the EPG Property.

Site Preparation Activities: If the 30-acre abandoned airfield (Eebee Field) located on EPG East to the northwest of Heller Loop and EPG West were cleared of OE, this could free up a considerable amount of developable land.

Radioactive Material. Long-term minor adverse effects would be anticipated as DeWitt Army Hospital and other on-post medical facilities, such as the Logan Dental Clinic, produce low-level radioactive wastes. The relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of radioactive material generated at Fort Belvoir as proposed in the development of the Preferred Alternative. This increase in hospital space would result in minor adverse effects, as the various hospital tenant agencies that occupy the new administrative space would also need to comply with all radioactive material regulations. In addition, the tenants in the additional hospital space may also generate radioactive material, which may also be considered a minor adverse effect.

Radon. Long-term minor indirect adverse effect would be expected. The expansion of administrative space at Fort Belvoir increases the amount of people potentially exposed to radon at Fort Belvoir. No immediate site preparation activities required.

4.13.2.3 BMPs/Mitigation

BMPs. Environmental and health risks are controlled by implementing existing programs, policies, regulations, and standard operating procedures (SOPs). Measures to reduce the risk of harm to humans and the environment from hazardous substances and hazardous materials would be included in these requirements.

Mitigation. No specific mitigation measures are identified.

4.13.3 ENVIRONMENTAL CONSEQUENCES OF THE TOWN CENTER ALTERNATIVE

4.13.3.1 Land Use Plan Update

Effects would be similar to those discussed in Section 4.13.2.1.

4.13.3.2 BRAC Implementation and Facilities Projects

The major hazardous and toxic waste issues potentially affecting Town Center Alternative are about 90 acres of former ranges, SWMUs, HWMUs, and the several hundred PSAs. The specific consequences of Town Center Alternative with respect to each hazardous and toxic waste issues and required site preparations before development are presented in Table 4.13-13.

Petroleum. Long-term minor adverse effects would result from an increase in storage capacity requirements for petroleum. Any construction of new storage facilities to handle storage

requirements from BRAC actions would be done in accordance with applicable laws regarding construction materials, leak protection, monitoring, and spill containment.

Table 4.13-13
Hazardous Substances and Hazardous Materials resources affected by the Town Center Alternative

Resource	Pre-development activities
Petroleum	The 191 PSAs within a proposed building envelope could be aggressively addressed as part of the site preparations. A closure process involving administrative and decontamination process would be required. Confirmation samples collected beneath USTs and potentially some AST would likely be required to demonstrate no release has occurred. It could be expected that some USTs would have a release previously undiscovered. Site investigations at each release are approximately $40,000 each and require a month to complete. Mitigation measures could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.
Hazardous Substances and Hazardous Materials	Investigation work plans would require regulatory approval. Site investigations could be performed concurrently with site preparation activities. Additional investigation could be performed to determine if and where residual impacted soils exist.
Solid Waste	Investigation work plans would require EPA and VDEQ approval. Site investigations could be performed concurrently with site preparation activities.
Asbestos	Before initiating renovation activities, the potential for environmental effects of special hazards such as ACM would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves ACM would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62; EPA, state, federal, and Army regulations. Measures to control airborne asbestos would be implemented. All construction debris that contains ACM would be disposed of at licensed disposal facilities in accordance with applicable laws.
Lead Based Paint	Before initiating renovation activities, the potential for environmental effects of special hazards such as LBP would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves LBP would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62; EPA and HUD standards; and state, federal, and Army regulations. Measures to control airborne lead dust would be implemented. All construction debris that contains LBP would be disposed of at licensed disposal facilities in accordance with applicable laws.
PCBs	Due to the size, complexity, and age of the electrical infrastructure at Fort Belvoir, the possibility of encountering PCB-containing electrical equipment still exists. All transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.
Pesticides	Proposed development in the South Post Golf Course would occur in areas of known historical pesticide application. A pesticide survey of the South Post Golf Course would likely be required. Based on the results of the pesticides survey, the waste generated during development could be properly managed is they are impacted by significant levels of pesticides
Regulated Medical Waste	No immediate site preparation activities required. However, the relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of regulated medical waste generated at Fort Belvoir as proposed in the development of the Town Center Alternative.
Ordnance Areas	Army approval of Explosive Safety Submission (ESS) required. Only the Gas Area is anticipated to require OE clearance and removal. All ranges areas would require site investigations
Radioactive Material	No immediate site preparation activities required. However, the expansion of tenants at Fort Belvoir has a potential to increase the amount of radiological material generated at Fort Belvoir.
Radon	No immediate site preparation activities required. However, the expansion of tenants at Fort Belvoir has a potential to increase the amount of people exposed to radon at Fort Belvoir.

There are 191 PSAs within the development areas of the Town Center Alternative. Preparing the PSAs for construction is a straightforward decommissioning process. Many of the open PSAs are unregulated, so a costly formal closure process could be avoided. On average, one in three USTs

at Fort Belvoir has had a release, so it could be expected that some USTs would have a release previously undiscovered. This preparation activity could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.

In addition, there are 21 PRSs within the development areas of the Town Center Alternative. VDEQ has issued letters of concurrence with a no further action determination for most of these PRSs. However, acceptance was based on not disturbing the areas. If disturbance of these sites could not be avoided, additional investigations could be required by VDEQ. In addition, residual petroleum-impacted soils likely exist in the sites. To address this issue, construction programs that call for disturbing areas around these PRSs should require the appropriate federal OSHA construction worker protection. Disturbing previously unidentified petroleum contamination would also require proper handling and disposal of contaminants as required by federal, state, local, and Army regulations.

Site Preparation Activities: Preparing the site of the development of the Town Center Alternative could be accomplished by employing a Health and Safety Program including qualified industrial hygienists and an HSP. Additional investigation could identify if residual impacted soils exist and where they are located so that plans to excavate and remove the impacted soils could be developed. The HSP specifies worker training requirements, personnel protective equipment, air monitoring requirements along with health and safety protocols appropriate to the project. The industrial hygienists would oversee the activities to ensure compliance with the HSP. Most large construction firms are experienced in this area. The cost estimates for a HSP to adequately address this issue are not considered significant as the specifications of the construction project itself would likely require an HSP. This requirement could be incorporated into the construction program without adding significant costs.

Hazardous Substances and Hazardous Materials. Long-term minor adverse effects could result from an increase in the generation of hazardous substances and hazardous materials. Additional potentially hazardous materials that could be found on-post during BRAC-related construction and operational activities include paints, thinners, fluorescent lamps, batteries, and fuel and motor oils for vehicles and equipment. An increase in the volume of these wastes generated and the amount of storage required would be anticipated.

Short-term minor adverse effects would result from an increase in spills associated with the use of hazardous materials. Established controls such as spill containment, emergency response and cleanup procedures would limit the effects of spills.

No effects would be expected from hazardous waste disposal. The installation is a large-quantity generator of hazardous wastes and has established procedures for managing and disposing of hazardous wastes. The current hazardous waste disposal procedures would continue with implementation of the Town Center Alternative. All hazardous wastes would be managed in accordance with the installation's *Hazardous Waste Management Plan* and RCRA requirements.

Two HWMUs are within the development areas of the Town Center Alternative. The HWMUs are associated with Vehicle Maintenance Facility in Buildings 1949 and 1950, in the southwesternmost development area on the North Post. VDEQ has issued letters of concurrence with the no further action determination for all HWMU sites at Fort Belvoir. However, disturbance of these sites could result in a complete exposure pathway to human health and the

environment. In these cases, it is likely VDEQ would require reopening the site to protect human health and the environment.

Site Preparation Activities: Disturbance of HWMU sites could be mitigated by further characterizing the effected area through sample and analysis and employing a Health and Safety Program including qualified industrial hygienists and an HSP. Additional investigation could identify if residual effected soils exist and where they are so that plans to excavate and remove the affected soils could be developed. The HSP specifies worker training requirements, personnel protective equipment, air monitoring requirements along with health and safety protocols appropriate to the project. The industrial hygienists would oversee the activities to ensure compliance with the HSP. The cost estimates for this mitigation are not considered significant as the specifications of the construction project itself would likely require an HSP for the general construction so addressing this constraint could be incorporated into the construction program without adding significant costs. Disturbing previously unidentified contamination would also require properly handling and disposal as required by federal, state, local, and Army regulations.

Solid Waste. No effects would be expected from solid waste disposal. The installation has established procedures for managing and disposing of solid wastes. The current solid waste disposal procedures would continue with implementation of the Town Center Alternative.

There would be beneficial effects before development in that the SWMUs within the proposed development area of the Town Center Alternative would need to be investigated and remediated before development. There are 19 SWMUs within the development areas of the Town Center option. Table 4.13-14 summarizes the status of these SWMUs.

Site Preparation Activities: Fort Belvoir has corrective action plans for these SWMUs. Mitigation ranges from administrative closure to confirmation sampling. These action plans should be implemented. However, for those sites requiring confirmation sampling, subsequent cleanup requirements could only be determined following analysis of the samples to determine if additional corrective action is required.

Table 4.13-14
Status of SWMUs within Town Center Alternative footprints

Recommendation	Number of SWMUs
No Further Action	2
Administrative Closure	6
Confirmation Sampling	11
Site Investigation	0

Source: Tetra Tech, 2005a.

Asbestos. Long-term minor beneficial effects would be expected related to ACM present in existing buildings if such buildings were demolished or renovated to accommodate incoming BRAC activities. ACM would be handled in a manner consistent with applicable rules and regulations, and thus, no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

The proposed development of the Town Center Alternative would result in the demolition of more than 75 existing buildings. This would result in an estimated 500,000 tons of construction debris. If 1 percent of this debris is ACM, 5,000 tons of ACM debris could be anticipated. The

potential for effects of special hazards such as ACM would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves ACM would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA, state, federal, and Army regulations. Measures to control airborne asbestos would be implemented. All construction debris that contains ACM would be disposed of at licensed disposal facilities in accordance with applicable laws.

Site Preparation Activities: Before demolition, asbestos would need to be identified and removed or abated from all the structures within the Town Center Alternative. Initial asbestos surveys and supplemental asbestos surveys would be performed to gather sufficient data to prepare the abatement design. Once the asbestos abatement design is completed, appropriate permits and notification would be required. Depending on the type of asbestos, differing abatement techniques would be employed. After the asbestos is abated and air samples indicate the clearance is acceptable, the demolition of the structure could be undertaken.

Lead Based Paint. Long-term minor beneficial effects would be expected related to LBP present in existing buildings if such buildings were demolished or renovated to accommodate incoming BRAC activities. LBP would be handled in a manner consistent with applicable rules and regulations, and thus no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

The proposed development of the Town Center Alternative would result in the demolition of more than 75 existing buildings. This would result in an estimated 500,000 tons of construction debris. The potential for effects of special hazards such as LBP would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves LBP would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA, state, HUD, federal, and Army regulations. Measures to control airborne lead dust would be implemented.

Site Preparation Activities: Lead paint surveys and supplemental lead paint surveys would be required to gather sufficient data to determine if LBP is present in the buildings to be demolished. A waste stream for the demolition of each facility could be estimated for the various components, concrete, roofing, windows, doors, framing, and so on. Representative samples of these components could be collected and analyzed to determine if the waste stream of components exceed the regulatory limit for lead. If the waste stream samples do not exceed the regulatory limit for lead, the waste could be managed as construction debris. If the waste stream samples exceed the regulatory limit for lead, the abatement or removal and special disposal of components containing LBP should be evaluated. All construction debris that contains lead above the regulatory limit would be disposed of at licensed disposal facilities in accordance with applicable laws.

PCBs. No effects would be expected. There would be preceding beneficial cumulative effects before development in that the electrical equipment within the proposed development area of the Town Center Alternative would first need to be investigated, sampled, and managed.

Numerous pole- and pad-mounted transformers are within the Town Center Alternative. Over the years, Fort Belvoir has sampled, tested, and removed many of the PCB-containing electrical components. However, because of the size, complexity, and age of the electrical infrastructure at Fort Belvoir, the possibility of encountering PCB-containing electrical equipment still exists. All

transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.

Site Preparation Activities: A survey of the electrical equipment that is likely to be removed as part of the development of the Town Center Alternative would be required. All electrical equipment should be sampled and tested to determine if the electrical equipment needs to be managed as PCB-containing wastes.

Pesticides. No effects from pesticides would be expected at the Town Center Alternative. Pesticides would continue to be used in accordance with the Fort Belvoir IPMP.

Proposed development for the Town Center Alternative in the South Post golf course area would occur in areas of known historical pesticide application. There would be preceding beneficial cumulative effects before development in that the golf course within the proposed development area of the Town Center Alternative would first need to be investigated, sampled, and managed.

Site Preparation Activities: A pesticide survey of the South Post golf course would likely be required. Based on the results of the pesticides survey, the waste generated during development could be properly managed if they are affected by significant levels of pesticides.

Regulated medical waste. Long-term minor adverse effect would be expected as the relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of medical and biological waste generated at Fort Belvoir. This increase in hospital space would result in minor adverse effects, as the various hospital tenant agencies that occupy the new space would also need to comply with all medical and biohazardous waste regulations.

Ordnance. No adverse effects would be expected from ordnance. There would be preceding beneficial cumulative effects before development in that the ordnance within the proposed development area of the Town Center Alternative would first need to be cleared and removed.

The MMRP HRR (Malcolm Pirnie, 2006) indicates that former ranges have existed in the vicinity of the Town Center Alternative. On the North Post, former ranges of potential concern to the development areas include the T-15 Range, and *Gas Area* in the vicinity of existing Kingman Road and Woodlawn Road. About 68 acres of T-15 are within the northeastern corner of the development area on the North Post southwest of the Kingman Road and Woodlawn Road intersection. The T-15 Range was used for small-arms training until 2002. The Gas Area overlaps the T-15 Range at the southwest quadrant of the same intersection and consists of 17 acres within the development area. The Gas Area was used for gas training in the 1940s.

On the South Post, the former Gunston Road 1,000-inch Rifle Range overlaps 0.1 acres of the southwestern end of the South Post proposed development area along the east side of Gunston Road, and a former firing area associated with this range is adjacent to the development area to the south on the west side of Gunston Road. About 1.7 acres of the fan for this firing area overlap the southwest corner of the development area. In addition, an active range is adjacent to this development area to the west and overlaps 2.0 acres of the northeast corner of the South Post development area, west of Gunston Road.

Site Preparation Activities: These ranges are along the boundaries of the proposed building envelop of this alternative and should be avoided if possible. To date, no significant OE removal actions have been performed in any of these areas. The Gas Area would likely require intrusive

activities to clear the area of UXO. The T-15 Range and Gunston Road 1,000-inch Rifle Range, and the other operational range would likely not require UXO removal and clearance. A site investigation under MMRP including soil and groundwater sampling could be anticipated at these ranges. On the basis of results of the site investigation, additional corrective action(s) could also be required. OE clearance and removal actions may be performed in the range areas concurrent to site preparation activities, provided that the OE standoff distances are respected.

Radioactive Material. Long-term minor adverse effects would be expected because DeWitt Army Hospital and other on-post medical facilities, such as the Logan Dental Clinic, produce low-level radioactive wastes. The relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of radioactive material generated at Fort Belvoir as proposed in the development of the Town Center Alternative. This increase in hospital space would result in minor adverse effects, as the various hospital tenant agencies that occupy the new administrative space would also need to comply with all radioactive material regulations. In addition, the tenants in the additional hospital space might also generate radioactive material, which could also be considered a minor adverse effect.

Radon. Long-term minor adverse effects would be expected. The expansion of administrative space at Fort Belvoir increases the amount of people potentially exposed to radon at Fort Belvoir. No immediate site preparation activities would be required.

4.13.3.3 BMPs/Mitigation

BMPs would be same as those stated in Section 4.13.2.3.

4.13.4 ENVIRONMENTAL CONSEQUENCES OF THE CITY CENTER ALTERNATIVE

4.13.4.1 Land Use Plan Update

Effects would be similar to those discussed in Section 4.13.2.1.

4.13.4.2 BRAC Implementation and Facilities Projects

The major hazardous and toxic waste issues potentially affecting the City Center Alternative are about 130 acres of former training ranges on EPG (EPG West and Eebee Field) and 30 SWMUs, several HWMUs, and PSAs. The specific consequences of City Center Alternative with respect to each hazardous and toxic waste issues and required site preparations before development are further discussed Table 4.13-15.

Petroleum. Long-term minor adverse effects would result from an increase in storage capacity requirements for petroleum. Any construction of new storage facilities to handle storage requirements from BRAC actions would be done in accordance with applicable laws regarding construction materials, leak protection, monitoring, and spill containment.

EPG. 22 PSAs are within the development areas of the City Center Alternative. Of the 22 PSAs, 8 are ASTs and 14 are USTs. In addition, 10 PRSs are within the development areas of the City Center Alternative at EPG.

VDEQ issued letters of concurrence with the no further action determination for these PRSs at Fort Belvoir. However, acceptances were based on not disturbing the area. If disturbance of this

site could not be avoided, an additional investigation could be required by VDEQ. In addition, residual petroleum contamination likely exists in the area. To address this issue, construction programs that call for disturbing areas around this PRS should require the appropriate federal

Table 4.13-15
Hazardous Substances and Hazardous Materials Resources affected by the City Center Alternative

Resource	Pre Development Activities
Petroleum	The 22 PSAs at Fort Belvoir along with the 25 PSAs at the GSA Parcel could be aggressively addressed as part of the site preparations. A closure process involving administrative and decontamination process would be required. Confirmation samples collected beneath USTs and potentially some AST would likely be required to demonstrate no release has occurred. It could be expected that some USTs would have a release previously undiscovered. Site investigations at each release would be approximately $40,000 each and require a month to complete. Mitigation measures could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.
Hazardous Substances and Hazardous Materials	Investigation work plans would require regulatory approval. Site investigations could be performed concurrently with site preparation activities. Additional investigation could be performed to determine if and where residual impacted soils exist.
Solid waste	Investigation work plans would require EPA and VDEQ approval. Site investigations could be performed concurrently with OE clearance and site preparation activities.
Asbestos	Before initiating renovation activities, the potential for environmental effects of special hazards such as ACM would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves ACM would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA, state, federal, and Army regulations. Measures to control airborne asbestos would be implemented. All construction debris that contains ACM would be disposed of at licensed disposal facilities in accordance with applicable laws.
Lead based paint	Before initiating renovation activities, the potential for environmental effects of special hazards such as LBP would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves LBP would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62; EPA and HUD standards; and state, federal, and Army regulations. Measures to control airborne lead dust would be implemented. All construction debris that contains LBP would be disposed of at licensed disposal facilities in accordance with applicable laws.
PCBs	Because of the size, complexity, and age of the electrical infrastructure at EPG, the possibility of encountering PCB-containing electrical equipment still exists. All transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.
Pesticides	No effects would be anticipated. Ongoing investigations at EPG should identify any significant pesticide issues.
Regulated Medical Waste	No immediate site preparation activities required. However, the relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of regulated medical biological waste generated at Fort Belvoir as proposed in the development of the City Center Alternative.
Ordnance areas	Army approval of Explosive Safety Submission (ESS) would be required. Extensive OE clearance and removal actions would be required on the 230 acres of historical training ranges. All ranges areas would require site investigations
Radioactive material	The investigation of SWMU M-44 would be required before development of the City Center Alternative
Radon	No immediate site preparation activities would be required. However, the expansion of tenants at Fort Belvoir has a potential to increase the amount of people exposed to radon at Fort Belvoir.

OSHA construction worker protection. Disturbing previously unidentified petroleum contamination would also require proper handling and disposal of contaminants as required by federal, state, local, and Army regulations.

GSA Parcel. Approximately 10 regulated and 15 former UST and ASTs are within the GSA Parcel, and approximately 15 AST/UST formerly existed on the site, for a total of 25 PSAs. Five leaking underground storage tanks resulting in PRSs have been identified on the GSA Parcel and are listed in Table 4.13-16. The PRSs have been closed and are not anticipated to be an issue.

Site Preparation Activities: Preparing the site of the development of the City Center Alternative could be accomplished by employing a Health and Safety Program including qualified industrial hygienists and an HSP. Additional investigation could identify if residual-impacted soils exist and where they are so that plans to excavate and remove the affected soils could be developed. The HSP specifies worker training requirements, personnel protective equipment, air monitoring requirements, along with health and safety protocols appropriate to the project. The industrial hygienists would oversee the activities to ensure compliance with the HSP. Most large construction firms are experienced in this area. The cost estimates for a Health and Safety

Program to adequately address this issue are not considered significant because the specifications of the construction project itself would likely require an HSP. This requirement could be incorporated into the construction program without adding significant costs.

Table 4.13-16
GSA parcel petroleum release sites

Owner	Property	Pollution complaint no.	Status
Hydro Conduit Corp.	6800 Loisdale Road	19921218	Closed
Hydro Conduit Corp.	6800 Loisdale Road	19922022	Closed
Hydro Conduit Corp.	6800 Loisdale Road	19901716	Closed
Hydro Conduit Corp.	6800 Loisdale Road	19921836	Closed
GSA Building 4	6801 Loisdale Road	19954283	Closed

Hazardous Substances and Hazardous Materials. Long-term minor adverse effects would result from an increase in the generation of hazardous substances and hazardous materials. Additional potentially hazardous materials that could be found on-post during BRAC-related construction and operational activities include paints, thinners, fluorescent lamps, batteries, and fuel and motor oils for vehicles and equipment. An increase in the volume of these wastes generated and the amount of storage required would be anticipated.

Short-term negligible adverse effects could result from an increase in spills associated with the use of hazardous materials. Established controls such as spill containment, emergency response and clean-up procedures would limit the impact of spills.

No effects would be expected from hazardous waste disposal. The installation is a large-quantity generator and permitted storage facility of hazardous wastes and has established procedures for managing and disposing of hazardous wastes. The current hazardous waste disposal procedures would continue with implementation of the City Center Alternative. All hazardous wastes would be managed in accordance with the installation's Hazardous Waste Management Program and RCRA requirements.

EPG. Four HWMUs are within the development areas of the City Center Alternative. VDEQ has issued letters of concurrence with the no further action determination for all HWMU sites at Fort

Belvoir. However, disturbance of these sites could result in a complete exposure pathway to human health and the environment. In these cases, it is likely that VDEQ would require reopening the site to protect human health and the environment.

GSA Parcel. Six RCRA permits were identified at the GSA Parcel including a RCRA large quantity generator at GSA 6810 Loisdale Road Building A. This RCRA large-quantity generator, EPA Identification number VA4470039336, has 12 violations with no violations resolved. Generated wastes include corrosive wastewater from electroplating operations, chlorinated, and nonchlorinated solvents. Violations appear to be of an administrative nature.

Site Preparation Activities: Disturbance of HWMU sites could be mitigated by further characterizing the affected area through sample and analysis and employing a Health and Safety Program including qualified industrial hygienists and an HSP. Additional investigation could identify if residual impacted soils exist and where they are so that plans to excavate and remove the affected soils could be developed. The HSP specifies worker training requirements, personnel protective equipment, air monitoring requirements along with health and safety protocols appropriate to the project. The industrial hygienists would oversee the activities to ensure compliance with the HSP. The cost estimates for this mitigation are not considered significant because the specifications of the construction project itself would likely require an HSP for the general construction so addressing this constraint could be incorporated into the construction program without adding significant costs.

Solid Waste. No effects would be expected from solid waste disposal. The installation has established procedures for managing and disposing of solid wastes. The solid waste disposal procedures would continue with implementation of the City Center Alternative. There would be preceding beneficial cumulative effects before development in that the SWMUs within the proposed development area of the City Center Alternative would first need to be investigated and remediated.

Thirty SWMUs are within the development areas of the City Center Alternative. Table 4.13-17 summarizes the status of these SWMUs.

Table 4.13-17
Status of SWMUs within the City Center Alternative footprints

Recommendation	Number of SWMUs
No Further Action	4
Administrative Closure	8
Confirmation Sampling	7
Site Investigation	11

Source: Tetra Tech, 2005b

Site Preparation Activities: Fort Belvoir has corrective action plans for these SWMUs. Mitigation ranges from administrative closure to confirmation sampling. These action plans should be implemented. However, for those sites requiring confirmation sampling, subsequent cleanup requirements could be determined only following analysis of the samples to determine if additional corrective action is required.

Asbestos. Long-term minor beneficial effects would be expected related to ACM present in existing buildings if such buildings were demolished or renovated to accommodate incoming BRAC activities. ACM would be handled in a manner consistent with applicable rules and regulations, including NESHAPS and thus, no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

The proposed development of the City Center Alternative would result in the demolition of more than 40 existing buildings. This would result in an estimated 50,000 tons of construction debris. If 1 percent of this debris is ACM, 500 tons of ACM debris could be anticipated. The potential for effects of special hazards such as ACM would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves ACM would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA, state, federal, and Army regulations. Measures to control airborne asbestos would be implemented. All construction debris that contains ACM would be disposed of at licensed disposal facilities in accordance with applicable laws.

Site Preparation Activities: Before demolition, asbestos would need to be identified and removed or abated from all the structures within the City Center Alternative. Initial asbestos surveys and supplemental asbestos surveys would be performed to gather sufficient data to prepare the abatement design. Once the asbestos abatement design is completed, appropriate permits and notification would be required. Depending on the type of asbestos, differing abatement techniques would be employed. After the asbestos is abated and air samples indicate the clearance is acceptable, the demolition of the structure could be undertaken.

Lead Based Paint. Long-term minor beneficial effects would be expected related to LBP present in existing buildings if such buildings were demolished or renovated to accommodate incoming BRAC activities. LBP would be handled in a manner consistent with applicable rules and regulations, and thus, no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

The proposed development of the City Center Alternative would result in the demolition of over 40 existing buildings. This would result in an estimated 50,000 tons of construction debris. The potential for effects of special hazards such as LBP would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves LBP would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA, state, HUD, federal, and Army regulations. Measures to control airborne lead dust would be implemented.

Site Preparation Activities: Lead paint surveys and supplemental lead paint surveys would be required to gather sufficient data to determine if LBP is present in the buildings to be demolished. A waste stream for the demolition of each facility could be estimated into the various components, concrete, roofing, windows, doors, framing, and so on. Representative samples of these components could be collected and analyzed to determine if the waste stream of components exceed the regulatory limit for lead. If the waste stream samples do not exceed the regulatory limit for lead, the waste could be managed as construction debris. If the waste stream samples exceed the regulatory limit for lead, the abatement or removal and special disposal of components containing LBP should be evaluated. All construction debris that contains lead above the regulatory limit would be disposed of at licensed disposal facilities in accordance with applicable laws.

PCBs. No effects would be expected. There would be preceding beneficial cumulative effects before development in that the electrical equipment within the proposed development area of the City Center Alternative would first need to be investigated, sampled, and managed.

Numerous pole- and pad- mounted transformers are within the City Center Alternative.-Over the years, Fort Belvoir has sampled, tested, and removed, many of the PCB-containing electrical components. However, because of the size, complexity, and age of the electrical infrastructure at EPG, the possibility of encountering PCB-containing electrical equipment still exists. All transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.

Site Preparation Activities: A survey of the electrical equipment that is likely to be removed as part of the development of the City Center Alternative would be required. All electrical equipment should be sampled and tested to determine if the electrical equipment needs to be managed as PCB-containing wastes.

Pesticides. No effects from pesticides would be expected at the City Center Alternative. Pesticides would continue to be used in accordance with the Fort Belvoir IPMP.

Regulated medical waste. Long-term minor adverse effect would be expected as the relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of regulated medical waste generated at Fort Belvoir as proposed in the development of the City Center Alternative. This increase in hospital space would result in minor adverse effects as the various hospital tenant agencies that occupy the new space would also need to comply with all regulated medical waste regulations.

Ordnance. No adverse effects would be expected from ordnance. There would be preceding beneficial cumulative effects before development in that the ordnance located within the proposed development area of the City Center Alternative would first need to be cleared and removed.

The MMRP HRR (Malcolm Pirnie, 2006) indicates that former ranges have existed in the vicinity of the City Center Alternative. About 130 acres of former training ranges are within the development areas of the City Center Alternative with the potential for OE to be encountered on the remainder of the EPG property.

Site Preparation Activities: If the 18-acre abandoned airfield (Eebee Field) on EPG East to the northwest of Heller Loop and EPG West were cleared of OE, this could free up a considerable amount of developable land.

Radioactive Material. Long-term minor adverse effects would be expected because DeWitt Army Hospital and other on-post medical facilities, such as the Logan Dental Clinic, produce low-level radioactive wastes. The relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of radioactive material generated at Fort Belvoir as proposed in the development of the City Center Alternative. This increase in hospital space would result in minor adverse effects, as the various hospital tenant agencies that occupy the new administrative space would also need to comply with all radioactive material regulations. In addition, the tenants in the additional hospital space could also generate radioactive material, which might also be considered a minor adverse effect.

Radon. Long-term minor adverse effects would be expected. The expansion of administrative space at Fort Belvoir increases the amount of people potentially exposed to radon at Fort Belvoir. No immediate site preparation activities would be required.

4.13.4.3 BMPs/Mitigation

BMPs would be same as those stated in Section 4.13.2.3.

4.13.5 ENVIRONMENTAL CONSEQUENCES OF THE SATELLITE CAMPUSES ALTERNATIVE

4.13.5.1 Land Use Plan Update

Effects would be similar to those discussed in Section 4.13.2.1.

4.13.5.2 BRAC Implementation and Facilities Projects

The major hazardous and toxic waste issues potentially affected by the Satellite Campuses Alternative are about 230 acres of former ranges, numerous SWMUs and HWMUs, and the several hundred PSAs. The specific consequences of Satellite Campuses Alternative with respect to each hazardous and toxic waste issues and required site preparations before development are further discussed in Table 4.13-18.

Petroleum. Long-term minor adverse effects would result from an increase in storage capacity requirements for petroleum. Any construction of new storage facilities to handle storage requirements from BRAC actions would be done in accordance with applicable laws regarding construction materials, leak protection, monitoring, and spill containment.

There are 226 PSAs located within the development areas of the Satellite Campuses Alternative. Preparing the PSAs for construction is a straightforward decommissioning process. Many of the open PSAs are unregulated, so a costly formal closure process could be avoided. On average, 1 in 3 USTs at Fort Belvoir have had a release so it could be expected that some USTs would have a release previously undiscovered. This preparation activity could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.

In addition, there are 38 PRSs located within the development areas of the Satellite Campuses Alternative. VDEQ has issued letters of concurrence with a no further action determination for most of these PRSs. However, acceptance was based on not disturbing the areas. If disturbance of these sites could not be avoided, additional investigations could be required by VDEQ. In addition, residual petroleum contamination likely exists in the sites. To address this issue, construction programs that call for disturbing areas around these PRSs should require the appropriate federal OSHA construction worker protection. Disturbing previously unidentified petroleum contamination would also require proper handling and disposal of contaminants as required by federal, state, local, and Army regulations.

Site Preparation Activities: Preparing the site of the development of the Satellite Campuses Alternative could be accomplished by employing a Health and Safety Program including qualified industrial hygienists and an HSP. Additional investigation could identify if residual impacted soils exists and where they are located so that plans to excavate and remove the

Table 4.13-18
Hazardous Substances and Hazardous Materials resources affected by the Satellite Campuses Alternative

Resource	Pre-development activities
Petroleum	The 226 PSAs within a proposed building envelope could be aggressively addressed as part of the site preparations. A closure process involving administrative and decontamination process would be required. Confirmation samples collected beneath USTs and potentially some AST would likely be required to demonstrate no release has occurred. It could be expected that some USTs would have a release previously undiscovered. Site investigations at each release would be approximately $40,000 each and require a month to complete. Mitigation measures could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.
Hazardous Substances and Hazardous Materials	Investigation work plans would require regulatory approval. Site investigations could be performed concurrently with site preparation activities. Additional investigation could be performed to determine if and where residual impacted soils exist.
Solid waste	Investigation work plans would require EPA and VDEQ approval. Site investigations could be performed concurrently with OE clearance and site preparation activities.
Asbestos	Before initiating renovation activities, the potential for environmental effects of special hazards such as ACM would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves ACM would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA, state, federal, and Army regulations. Measures to control airborne asbestos would be implemented. All construction debris that contains ACM would be disposed of at licensed disposal facilities in accordance with applicable laws.
Lead based paint	Before initiating renovation activities, the potential for environmental effects of special hazards such as LBP would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves LBP would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA and HUD standards; and state, federal, and Army regulations. Measures to control airborne lead dust would be implemented. All construction debris that contains LBP would be disposed of at licensed disposal facilities in accordance with applicable laws.
PCBs	Because of the size, complexity, and age of the electrical infrastructure at Fort Belvoir, the possibility of encountering PCB-containing electrical equipment still exists. All transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.
Pesticides	Proposed development in the South Post golf course would occur in areas of known historical pesticide application. A pesticide survey of the South Post Golf Course would likely be required. On the basis of the results of the pesticides survey, the waste generated during development could be properly managed if they are affected by significant levels of pesticides
Regulated Medical Waste	No immediate site preparation activities would be required. However, the relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of regulated medical waste generated at Fort Belvoir as proposed in the development of the Satellite Campuses Alternative.
Ordnance areas	Army approval of Explosive Safety Submission (ESS) would be required. Extensive OE clearance and removal actions would be required on the 230 acres of historical training ranges. All ranges areas would require site investigations.
Radioactive material	No immediate site preparation activities would be required. However, the expansion of tenants at Fort Belvoir has a potential to increase the amount of radiological material generated at Fort Belvoir.
Radon	No immediate site preparation activities would be required. However, the expansion of tenants at Fort Belvoir has a potential to increase the amount of people exposed to radon at Fort Belvoir.

impacted soils could be developed The HSP specifies worker training requirements, personnel protective equipment, air monitoring requirements along with health and safety protocols appropriate to the project. The industrial hygienists would oversee the activities to ensure

compliance with the HSP. Most large construction firms are experienced in this area. The cost estimates for a Health and Safety Program to adequately address this issue are not considered significant because the specifications of the construction project itself would likely require an HSP. This requirement could be incorporated into the construction program without adding significant costs.

Hazardous Substances and Hazardous Materials. Long-term minor adverse effects would result from an increase in the generation of hazardous substances and hazardous materials. Additional potentially hazardous materials that could be found on-post during BRAC-related construction and operational activities include paints, thinners, batteries, and fuel and motor oils for vehicles and equipment. An increase in the volume of these wastes generated and the amount of storage required would be anticipated.

Short-term minor adverse effects could result from an increase in spills associated with the use of hazardous materials. Established controls such as spill containment, emergency response and cleanup procedures would limit the impact of spills.

No effects would be expected from hazardous waste disposal. The installation is a large-quantity generator of hazardous wastes and has established procedures for managing and disposing of hazardous wastes. The current hazardous waste disposal procedures would continue with implementation of the Satellite Campuses Alternative. All hazardous wastes would be managed in accordance with the installation's *Hazardous Waste Management Plan* and RCRA requirements.

Eight HWMUs are within the development areas of the Satellite Campuses Alternative. Two of the HWMUs are associated with Vehicle Maintenance Facility in Buildings 1949 and 1950, in the southwesternmost development area on the North Post, and the remaining six are associated with a former fire training area on Davison Army Airfield. VDEQ issued letters of concurrence with a no further action determination for all HWMU sites at Fort Belvoir. However, disturbance of these sites could result in a complete exposure pathway to human health and the environment. In these cases, it is likely that VDEQ would require reopening the sites to protect human health and the environment.

Site Preparation Activities: Disturbance of HWMU sites could be mitigated by further characterizing the affected area through sample and analysis and employing a Health and Safety Program including qualified industrial hygienists and an HSP. Additional investigation could identify if residual impacted soils exist and where they are so that plans to excavate and remove the impacted soils could be developed. The HSP specifies worker training requirements, personnel protective equipment, air monitoring requirements along with health and safety protocols appropriate to the project. The industrial hygienists would oversee the activities to ensure compliance with the HSP. The cost estimates for this mitigation are not considered significant because the specifications of the construction project itself would likely require an HSP for the general construction, so addressing this constraint could be incorporated into the construction program without adding significant costs.

Solid Waste. No effects would be expected from solid waste disposal. The installation has established procedures for managing and disposing of solid wastes. The solid waste disposal procedures would continue with implementation of the Satellite Campuses Alternative.

There would be preceding cumulative impact with positive effects before development in that the SWMU located within the proposed development area of the Satellite Campuses Alternative would need to be investigated and remediated before development.

There are 38 SWMUs within the development areas of the Satellite Campuses Alternative. Table 4.13-19 summarizes the current status of these SWMUs.

Site Preparation Activities: Fort Belvoir has corrective action plans for these SWMUs. Mitigation ranges from administrative closure to confirmation sampling. These action plans should be implemented. However, for those sites requiring confirmation sampling, subsequent cleanup requirements could only be determined following analysis of the samples to determine if additional corrective action is required.

Table 4.13-19
Status of SWMUs within Satellite Campuses Alternative footprints

Recommendation	Number of SWMUs
No Further Action	8
Administrative Closure	6
Confirmation Sampling	24
Site Investigation	0

Source: Tetra Tech, 2005a.

Asbestos. Long-term minor beneficial effects would be expected related to ACM present in existing buildings if such buildings were demolished or renovated to accommodate incoming BRAC activities. ACM would be handled in a manner consistent with applicable rules and regulations, and thus, no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

The proposed development of the Satellite Campuses Alternative would result in the demolition of more than 80 existing buildings. This would result in an estimated 600,000 tons of construction debris. If 1 percent of this debris is ACM, 6,000 tons of ACM debris would be anticipated. The potential for effects of special hazards such as ACM would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves ACM would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA, state, federal, and Army regulations. Measures to control airborne asbestos would be implemented. All construction debris that contains ACM would be disposed of at licensed disposal facilities in accordance with applicable laws.

Site Preparation Activities: Before demolition, asbestos would need to be identified and removed or abated from all the structures within the Satellite Campuses Alternative. Initial asbestos surveys and supplemental asbestos surveys would be required to gather sufficient data to prepare the abatement design. Once the asbestos abatement design is completed appropriate permits and notification would be required. Depending on the type of asbestos differing abatement techniques would be employed. After the asbestos is abated and air samples indicate the clearance is acceptable, the demolition of the structure could be undertaken.

Lead Based Paint. Long-term minor beneficial effects would be expected related to LBP present in existing buildings if such buildings were demolished or renovated to accommodate incoming BRAC activities. LBP would be handled in a manner consistent with applicable rules and regulations, and thus, no environmental or health effects from the removal, handling, and disposal of these materials would be expected during demolition, renovation, or construction activities.

The proposed development of the Satellite Campuses Alternative would result in the demolition of more than 80 existing buildings. This would result in an estimated 600,000 tons of construction debris. The potential for the effects of special hazards such as LBP would be evaluated and addressed as specified in the appropriate regulatory requirements. Demolition that involves LBP would be evaluated for compliance with the OSHA standard at 29 CFR 1926.62 and EPA, state, HUD, federal, and Army regulations. Measures to control airborne lead dust would be implemented.

Site Preparation Activities: Lead paint surveys and supplemental lead paint surveys would be required to gather sufficient data to determine if LBP is present in the buildings to be demolished. A waste stream for the demolition of each facility could be estimated into the various components, concrete, roofing, windows, doors, framing and so on. Representative samples of these components could be collected and analyzed to determine if the waste stream of components exceed the regulatory limit for lead. If the waste stream samples do not exceed the regulatory limit for lead, the waste could be managed as construction debris. If the waste stream samples exceed the regulatory limit for lead then the abatement or removal and special disposal of components containing LBP should be evaluated. All construction debris that contains lead above the regulatory limit would be disposed of at licensed disposal facilities in accordance with applicable laws.

PCBs. No effects would be expected. There would be preceding beneficial cumulative effects before development in that the electrical equipment within the proposed development area of the Satellite Campuses Alternative would first need to be investigated, sampled, and managed.

Numerous pole- and pad-mounted transformers are within the Satellite Campuses Alternative. Over the years, Fort Belvoir has sampled, tested, and removed, many of the PCB-containing electrical components. However, because of the size, complexity, and age of the electrical infrastructure at Fort Belvoir, the possibility of encountering PCB-containing electrical equipment still exists. All transformers would likely require additional sampling to determine PCB content before decommissioning and disposal.

Site Preparation Activities: A survey of the electrical equipment that is likely to be removed as part of the development of the Satellite Campuses Alternative would be required. All electrical equipment should be sampled and tested to determine if the electrical equipment needs to be managed as PCB-containing wastes.

Pesticides. No effects from pesticides would be expected at the Satellite Campuses Alternative. Pesticides would continue to be used in accordance with the Fort Belvoir IPMP. The proposed hospital development in the South Post golf course area would occur in areas of known historical pesticide application. There would be preceding beneficial cumulative effects before development in that the golf course within the proposed development area would first need to be investigated, sampled, and managed.

Site Preparation Activities: A pesticide survey of the South Post golf course would likely be required. From the results of the pesticides survey, the waste generated during development could be properly managed if they are affected by significant levels of pesticides.

Regulated medical waste. Long-term minor adverse effects would be expected as the relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of regulated medical waste generated at Fort Belvoir as proposed in the development of the Satellite Campuses Alternative. This increase in hospital space would result in minor adverse effects as the various hospital tenant agencies that occupy the new space would also need to comply with all regulated medical waste regulations.

Ordnance. No adverse effects would be expected from ordnance. There would be preceding beneficial cumulative effects before development in that the ordnance within the proposed development area of the Satellite Campuses Alternative would be first need to be cleared and removed.

The MMRP HRR (Malcolm Pirnie, 2006) indicates that former ranges have existed in the vicinity of the Satellite Campuses Alternative development areas. On the North Post, former ranges of potential concern to the development areas include the T-15 Range, and *Gas Area* in the vicinity of existing Kingman Road and Woodlawn Road. About 68 acres of T-15 are within the northeastern corner of the development area on the North Post southwest of the Kingman Road and Woodlawn Road intersection. The T-15 Range was used for small-arms training until 2002, but the only ordnance used at this range was 5.56 mm blank cartridges. The Gas Area overlaps the T-15 Range at the southwest quadrant of the same intersection and consists of 17 acres within the development area. The Gas Area was used for gas training in the 1940s.

On the South Post, the former Gunston Road 1,000-inch Rifle Range overlaps 0.1 acres of the southwestern end of the South Post proposed development area along the east side of Gunston Road, and a former firing area associated with this range is adjacent to the development area to the south on the west side of Gunston Road. 1.7 acres of the fan for this firing area overlap the southwest corner of the development area. In addition, an active range is adjacent to this development area to the west and overlaps 2.0 acres of the northeast corner of the South Post development area, west of Gunston Road.

Two former ranges overlap the proposed development area on Davison Army Airfield. The Mines and Booby Trap Area was an obstacle course area used in the 1940s. This range borders the southeastern end of the development area but is not within the building envelop. The former Mounted Pistol Range was at the southeastern end of what is now Davison Army Airfield. The fan for the range has been developed over by the runways for the airfield, covering about 138 acres; the firing area is outside of, but adjacent to, the Davison Army Airfield development area.

Site Preparation Activities: These ranges are along the boundaries of the proposed building envelop of this alternative and should be avoided if possible. To date, no significant OE removal actions have been performed in any of these areas. The *Gas Area* would likely require intrusive activities to clear the area of UXO. The T-15 Range and Gunston Road 1,000-inch Rifle Range, and the other operational range would likely not require UXO removal and clearance. A site investigation under MMRP including soil and groundwater sampling could be anticipated at these ranges. On the basis of the results of the site investigation, additional corrective action(s) could also be required. OE clearance and removal actions could be performed in the range areas concurrent to site preparation activities, provided that the OE standoff distances are respected.

Radioactive Material. Long-term minor adverse effects would be expected because DeWitt Army Hospital and other on-post medical facilities, such as the Logan Dental Clinic, produce low-level radioactive wastes. The relocation/expansion of the Dewitt Hospital would likely result in an increase in the amount of radioactive material generated at Fort Belvoir as proposed in the development of the Satellite Campuses Alternative. This increase in hospital space would result in minor adverse effects, as the various hospital tenant agencies that occupy the new administrative space would also need to comply with all radioactive material regulations. In addition, the tenants in the additional hospital space could also generate radioactive material, which could also be considered a minor adverse effect.

Radon. Long-term minor adverse effect would be expected. The expansion of administrative space at Fort Belvoir increases the amount of people potentially exposed to radon at Fort Belvoir. No immediate site preparation activities required.

4.13.5.3 BMPs/Mitigation

BMPs would be same as those stated in Section 4.13.2.3.

4.13.6 NO ACTION ALTERNATIVE

No effects on hazardous and toxic wastes, or from their use, storage, or disposal would be expected from implementing the No Action Alternative.

4.13.7 SUMMARY OF COMPARISON OF ALTERNATIVES

Minor long-term adverse effects are anticipated with each alternative with respect to the construction and operations activities associated with a development project of this size. The construction activities would involve managing, storing, and generating hazardous substances and hazardous materials. In addition, minor long-term adverse effects are anticipated, as the addition of tenants would result in the additional managing, storing, and generating hazardous substances and hazardous materials.

Although not part of the proposed action, the predevelopment preparations requirements would have a long-term beneficial effect as the UXO and hazardous materials release sites are investigated and remediated which would be beneficial to both human health and the environment. The most costly alternative for corrective action predevelopment activities is the Satellite Campuses Alternative, largely due to the project sites under this alternative being located in former training ranges with costly UXO clearance and removal. The least expensive would be the Preferred Alternative. In addition, corrective action for the Preferred Alternative would be able to be completed on a faster track than the other alternatives. The estimates for the Town Center and Satellite Campuses Alternatives do not include logical costs of finding and obtaining swing space for current tenants to be relocated into while the program redevelops the Main Post. The costs and logistical requirement to execute these alternatives would also be substantial.

4.14 MITIGATION SUMMARY

Mitigation measures for the four alternatives for implementing BRAC would be expected to reduce, avoid, or compensate for most adverse impacts. Mitigation does not include legal, regulatory, or policy-driven environmental protections and best management practices (BMPs) required to comply with federal and state laws, or Army and Fort Belvoir policies. These are already part of the Proposed Action. Only those resource areas for which mitigation has been determined to be appropriate are discussed below.

4.14.1 TRANSPORTATION

Mitigation for impacts to the transportation system could occur with respect to off-post transportation improvements and mass transit expansion. Also, the Army could designate a Transportation Demand Management Coordinator.

Traffic and Transportation. The EIS examines several transportation improvements for each of the BRAC action alternatives. The following summarizes these improvements (shown in comparative format at Table 4.3-41.

- *Preferred Alternative.* Fourteen actions, costing an estimated $458 million, are identified.
- *Town Center Alternative.* Fifteen actions, costing an estimated $732 million, are identified.
- *City Center Alternative.* Fourteen actions, costing an estimated $471 million, are identified.
- *Satellite Campuses Alternative.* Fifteen actions, costing an estimated $742 million, are identified.

Mass Transit. Bus service of a high enough quality to realize a 5 to 10 percent mode share for transit could complement the road network mitigation actions and help to reduce congestion and limit vehicle delays. The EIS identifies five basic bus service areas, then proposes and examines general routes and service concepts to achieve 5 or 10 percent mode share. For all the alternatives, a 5 percent mode split would reduce by 360 the number of vehicles entering the post during peak hour. A 10 percent mode split would reduce by 725 the number of vehicles entering the post during peak hour.

Transportation Demand Management Coordinator (TDMC). To help alleviate traffic congestion, the Army could appoint a TDMC. The TDMC would be knowledgeable of principles, practices, and methods of transportation demand management. These would include, but not be limited to, employee rideshare and commute programs; current regional programs regarding air quality and transportation; employer trip reduction requirements; marketing, promotion, and event planning practices; and parking management practices. The TDMC's principal function would be to develop and manage a transportation management plan focused on measures to reduce the number of single-occupancy vehicles. Appointing a TDMC before fiscal year 2009 would allow development of transportation program initiatives before BRAC relocation of personnel.

4.14.2 AIR QUALITY

Mitigation with respect to air quality would be required with the implementation of the City Center Alternative. Under the nonattainment new source review permitting requirements, oxides of nitrogen emission offsets at a ratio of 1:1.15 would have to be located and obtained for all stationary sources sited on EPG. Emission offsets are generally unavailable in this region and could be extremely expensive if they could be obtained at all.

4.14.3 WATER RESOURCES

Depending on the alternative selected for implementation of BRAC, up to nine subwatersheds at the post would be expected to have increases of more than 10 percent in 1-year or 10-year storm event peak discharges. A potential mitigation measure would be to develop a storm water drainage system master plan study. This study would identify current deficiencies (e.g. capacity problems, outfall problems, stream bank erosion) and determine infrastructure needs to meet BRAC requirements and long-term growth.

4.14.4 OTHER RESOURCES

No specific mitigation measures are identified for affected resources. In general, actions with respect to affected resources are protected by a variety of BMPs that preserve and conserve the resources. For example, a permit would be required under the Virginia Pollutant Discharge Elimination System program for a construction project disturbing at least 2,500 square feet; as part of the permit process, the Army would have to prepare a soil erosion and sediment control plan and storm water pollution prevention plan to guide sedimentation reduction during the construction process. BMPs typically are an inherent part of project design and implementation, and their funding is included in general project costs.

4.15 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Implementing the Preferred Alternative would result in a variety of adverse environmental effects, as detailed in Sections 4.2 through 4.13. Some of the effects could be minimized, avoided, or compensated for through mitigation, but others would be unavoidable. The principal unavoidable adverse effects on the environment are the following.

Biological Resources: Unavoidable loss of approximately 113 acres of natural habitat, including several stands of mature oak trees, to accommodate incoming BRAC actions in a manner that would best serve the military mission at Fort Belvoir.

Utilities: Unavoidable generation of about 8,410 tons of construction and demolition debris from the proposed action, which would be disposed of in various landfill sites in the area.

SECTION 5.0
CUMULATIVE EFFECTS SUMMARY

CEQ regulations define a cumulative impact 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." In accordance with these regulations the EIS examines the cumulative effects of these types of actions on Fort Belvoir and in Fairfax County. Adverse minor effects due to cumulative activities would be expected on the varied resources in and around Fort Belvoir. Section 5.1 discusses past, present, and reasonably foreseeable future actions in the vicinity of Fort Belvoir. Sections 5.2 through 5.13 presents the effects of these actions on each resource area. Sections 5.14. discusses irreversible or irretrievable commitments of resources and short-term uses of man's environment. Section 5.15 discuses maintenance and enhancement of long-term productivity respectively.

5.1 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

5.1.1 Past Actions—Fort Belvoir

William Fairfax, builder of the Belvoir mansion, arrived in Virginia in the 1730s from Massachusetts. From 1734 to 1741, Fairfax assembled the property and constructed the dwelling complex at Belvoir Manor. In 1773 George William Fairfax, son of William Fairfax, left Belvoir for England. The Belvoir estate was rented and its furnishings were sold. In 1783 the mansion and several of its outbuildings were destroyed by fire, and the plantation complex gradually deteriorated into ruins. Belvoir Plantation was devastated further during the War of 1812.

The U.S. Army began using the Belvoir peninsula as an engineer training facility in 1915 when the U.S. Army Engineer School began conducting summer training exercises there. America's entry into World War I in April 1917 led to the first wave of military construction at the Virginia training site. Construction of the temporary cantonment, named Camp A.A. Humphreys in honor of Civil War Commander and former Chief of Engineers, Andrew A. Humphreys, began in January 1918 under very difficult conditions of extreme cold and unusually heavy snowfall. Some 5,000 Soldiers and 6,000 civilians cleared, surveyed, and constructed camp facilities in only 11 months. Through purchase or condemnation, the Army acquired additional acreage during 1917 and 1918. To supply the camp with building materials and other necessities, the unpaved Washington-Richmond Highway was surfaced in concrete, and a plank road was constructed that linked the camp to the Washington-Richmond Highway. Standard gauge and narrow gauge railways followed. Building these transportation systems not only facilitated deliveries to the camp, but provided engineer training experience for troops sent to the battle lines in Europe. Within only 4 months of the start of construction, Camp A.A. Humphreys was in full operation. At the end of the war in November 1918, Camp A.A. Humphreys became a demobilization center where troops were prepared for their return to civilian life. By the close of 1919, more than 14,000 men had been demobilized at Camp A.A. Humphreys. The camp retained a small garrison after the war.

The Army's commitment to the post was demonstrated by the official relocation of the Engineer School from the Washington Barracks to Camp A.A. Humphreys in 1919, thereby becoming the "home" of the U. S. Army Corps of Engineers. Following the Engineer School's move, Camp A.A. Humphreys was designated a permanent post in 1922 and renamed Fort Humphreys. An

addition to Fort Humphreys following World War I was the Engineer Board, which relocated there in 1924. The Engineer Board, forerunner of the Belvoir Research, Development, and Engineering Center, was founded in 1870 to test engineering equipment. Its establishment at Fort Belvoir marked the beginning of the installation's role in military research and development. The landscape plan adopted for Fort Humphreys also exemplified Army efforts to improve the quality of life for its personnel and the aesthetic beauty of its installations. George B. Ford, planning advisor to the War Department during the 1920s, and Howard B. Nurse, Quartermaster Corps officer, advocated creating useful and aesthetically pleasing environments that took advantage of natural vistas and used irregular lines. The results of Nurse's and Ford's philosophies are most apparent in the configuration of the officers' housing sections at Belvoir today.

In 1935 the name of the installation was changed from Fort Humphreys to Fort Belvoir. The outbreak of war in Europe in 1939 motivated the United States to begin preparing for possible involvement in the war. To prepare engineers adequately for their wartime role, Fort Belvoir once again became one of the Army's primary engineer training sites. To accommodate the influx of draftees after 1940, an additional 3,000 acres north of U.S. Route 1 were acquired to make room for the new Engineer Replacement Training Center. This included the acquisition EPG for testing of a wide range of engineering equipment. Following World War II, the engineer training role at Fort Belvoir waxed and waned according to wartime needs. In general, emphasis at Fort Belvoir in the 1950s began shifting from training to research and development. Activities on EPG dropped off after the 1950's due to commercial and residential encroachment. A detailed history of EPG can be found in Section 4.2.1.2.6. Fort Belvoir remained the home of the Engineer School until 1988. Because of a shortage of land for training at Belvoir, the Engineer School relocated to Fort Leonard Wood in Missouri, thus ending the 76-year association between the Engineer School and Belvoir.

Although its role as an engineer training center diminished after the move, Fort Belvoir continues to fulfill an important and valuable role today. The post is one of the larger installations in the MDW, which also includes Fort McNair, Fort Myer, Fort Meade, and Fort Detrick. The post's present mission is to operate and maintain the installation; execute mobilization requirements, military operations, and contingency/force protection missions; and to provide essential administrative and basic operations support to its tenant organizations. Fort Belvoir houses tenants from all armed forces, as well as such Department of Defense agencies as the Defense Logistics Agency (realigned to Fort Belvoir under 1991 BRAC Law), Defense Systems Management College and the National Geospatial-Intelligence Agency College. During this same time peroid, AMC, DCEETA, and INSCOM relocated to Fort Belvoir. Other recent actions include the ongoing Residential Communities Initiative (RCI), which involves the demolition and replacement of 1,900 homes and the renovation of 170 historically significant homes on Fort Belvoir. To carry out its missions effectively, Fort Belvoir has evolved from a traditional military installation to a more broad-based community installation. Today, Fort Belvoir functions in many ways like a small city, with its own ordinances, land use plan, building codes, utilities, public parks, and academic institutions. In addition, more than one-third of the installation's acreage has been preserved as a designated wildlife sanctuary.

5.1.2 Past Actions – Fairfax County

Fairfax County, formed in 1742 from the northern part of Prince William County, is named for Thomas Fairfax, sixth Lord of Fairfax Cameron (1693–1781), proprietor of the Northern Neck. Located near Washington, DC, Fairfax County was an important region in the Civil War. The war greatly disrupted commercial activities in the county. Both sides seized railroads and businesses, and raided and burned farms. Troops shut down business establishments depending

upon the proprietors' sympathies and the troops involved. Once the war came to an end in April 1865, the economic rebuilding of the county began quickly; but the traditional lifestyle of pre-Civil War Fairfax County never returned. In 1870 Virginia was readmitted to the Union. By that time, the economy of the county had substantially recovered from the war. Despite such growth, Fairfax County in 1870 was still mainly a rural, farm-oriented society, even while doubling its population by 1930.

The county's history from 1930 to the present is characterized as a period of growth as reflected by its population increase. The start of the shift in the county's population began in the early 1930s when Franklin D. Roosevelt's tenure as president saw increases in federal programs and bureaus. Additional employees to administer and staff the new programs and bureaus settled in Fairfax County because the automobile provided increased mobility, and the county offered a less hectic lifestyle than the inner city. The pace of growth in the county picked up in the 1940s during World War II and through the 1950s and 1960s as the federal government expanded employment to meet the war emergency, the job needs of veterans, and the creation of more programs and bureaus. By 1970 Fairfax County's total population stood at over 454,000. While federal employment growth still continued in the 1970s and 1980s, much of the county's growth during this period can be attributed to private economic interests. Because of private industry's increasing need to understand and monitor federal actions aimed at the marketplace, many corporations and industry groups began to feel a need for a presence in the Washington, DC, area during the 1970s. Encouraged by Fairfax County's growth, many firms and organizations located offices here.

Substantial growth during the past 70 years has caused broad changes in Fairfax County. The county has changed from a rural, agriculturally oriented society to an urban, business-oriented one. While this growth has altered the county's lifestyle, it has also provided county residents with one of the highest standards of living in the world. The economy has also made Fairfax County one of the wealthiest counties in the nation. It has the second highest median household income ($94,610) behind its neighbor Loudoun County (to the west) as well as the lowest homicide rate (0.3/100,000 population) of all jurisdictions in the United States. Fairfax County has an estimated population of 1,041,200, making it by far the most populous county in Virginia. The county has a total area of 407 square miles, of which 12 square miles is water and a population density of 2,455 persons per square mile. The government is the largest employer with Fort Belvoir being the county's single largest employer, and Fairfax residents make up 37 percent of employees on the installation.

5.1.3 Recent and Future Actions

The single most relevant contemporary event affecting cumulative effects analysis occurred on September 11, 2001, when terrorists hijacked U.S. airliners and flew them into buildings in New York and the Pentagon. That event led to the United States' commencement of Operation Enduring Freedom, Operation Iraqi Freedom, and the undertaking of transformation. It also affected Army doctrine concerning the provision of force protection to all military and civilian personnel. The selection of Fort Belvoir as the site for military functions within the NCR is, in large part, an outcome directly related to the events of September 11, 2001.

Other major BRAC actions in the vicinity of Fort Belvoir and the NCR include realignment of the following Department of Defense installations: Marine Corps Base Quantico in Virginia; Walter Reed Army Medical Center (WRAMC) and Bolling Air Force Base in Washington DC; and Fort Detrick and Naval Surface Warfare Center Indian Head in Maryland. Of the ones listed, WRAMC is the only closing installation. These installations were shown in Figure 1-3.

The sections that follow identify numerous other on-post and off-post actions that, in conjunction with the proposed action, have potential for creating cumulative effects.

5.1.3.1 Other Proposed Projects on Fort Belvoir

In addition to the 20 projects identified in Section 2.2.2, the Army foresees there being another 32 projects at the installation. These 32 non-BRAC projects range from small scale projects involving only renovations of existing buildings to large projects involving the construction of new sizeable structures. Chief among this latter category would be proposals such as the National Museum of the U.S. Army and associated Museum Support Center, the expansion of the Information Dominance Center, and a potential Army Reserve complex. The numerous smaller projects would occur on-post as new facilities or, in several instances, as renovations of existing facilities. Each of these projects would undergo or have already undergone their own NEPA process. A list of these 32 on-post projects can be found in Table 5-1 and their proposed locations are found on Figure 5-1.

Table 5-1
Other proposed on-post cumulative construction and renovation projects

Map number	Project number	Project title	Proposed site	Fiscal year	Size (ft^2)
1	62297	Woodlawn Connector Road[a]	Sited on forested area with forested areas on all sides	2006–2008	n/a
2	61458	Religious Education Center	Sited on semi-forested field with fields to the north, Residential area to the east, Community areas to the south and west	2010	18,000
3	64231	Physical Fitness Center (Troop Cantonment Area)	Sited on existing Community area with fields and Community areas to the north, fields and Residential area to the east, forested area and Community area to the south, Abbott Road and forested area to the west	2007	150,800
4	54897	Marina Modernization and Dogue Creek Dredging[a]	Sited on existing marina with Residential area to the north and east, Potomac River to the south, River inlet and forested area to the west	2008	6,900
5	65218	Expand Main Post Library	Sited on semi-forested field with Residential area to the north, semi-forested area to the east, Parking lots and athletic fields to the south, Community area to the west	2007	24,500
6	65314	Expand Recreation Center	Sited on existing Community area with athletic fields to the north, Belvoir Road forested area and athletic fields to the east, parking areas and Professional/Institutional areas to the south and west	2008	10,500
7	63815	Administrative Building PEO Soldier	Sited on forested area with Professional/Institutional area to the north and west, forested area to the east and south	2009	68,000

Table 5-1
Other proposed on-post cumulative construction and renovation projects *(continued)*

Map number	Project number	Project title	Proposed site	Fiscal year	Size (ft^2)
8	56184	JPRA Renovation/Addition (Building 358)	Sited on forested area with forested area to the north and west, forested area and Professional/Institutional area to the east and south	TBD	87,742
9	62539	Vet Clinic Addition	Sited on forested area and field with Warren Road and forested area to the north, forested area to the east and south, open field to the west	TBD	9,950
10	58697	Museum Support Center (MSC)[a]	Sited on semi-forested field with Route 1 and athletic fields to the north, forested area to the east, Fort Belvoir Community Club to the south, Belvoir Road and golf course to the west	2007	124,800
11	50356	Installation Industrial Support Center	Sited on field with Industrial area to the north, forested buffer and Industrial area to the east, south, and west	2010	53,000
12	59554	Battalion Headquarters for 249th Engineer Battalion	Sited on Industrial area with Pohick Road and forested area to the north Residential area to the east, forested area to the south and west	2008	14,600
13	63035	Shoppette with Gas, Burger King, Car Wash (South Post)	Sited on semi-forested field with Residential area to the north, Community area to the east, Industrial area to the south and west	TBD	7,200
14	65139	Expand Arts/Craft/Auto	Sited on a field with fields and Professional/Institutional areas to the north, semi-forested land to the east and south, forested area to the west	2008	13,000
15	n/a	D.C. National Guard (DCNG) Resources Training Center	Sited on parking area with parking area and forested area to the north, barracks to the east, vehicle storage to the south, forested area to the west	2007	20,000
16	62134	DLA Receiving and Screening Facility	Sited on field and parking lot with Kingman Road and forested area to the north, highly developed Professional/Institutional area to the west and south, forested area to the west	2007	14,800
17	65317	Golf Clubhouse/Cart Storage	Sited on forested area with golf course on north, east and west, Clubhouse to the south	2007	< 5,000
18	63206	Addition to Military Police (MP) Station	Sited on field with forested area to the north, Community buildings to the east, south, and west	TBD	< 5,000
19	55523/52694	Potomac Heritage National Scenic Trail	Sited on forested area with forested area to the north, east, and south, Residential area to the west	2007	n/a

Table 5-1
Other proposed on-post cumulative construction and renovation projects *(continued)*

Map number	Project number	Project title	Proposed site	Fiscal year	Size (ft^2)
20	57495	Soldier Support Center	Sited on fields and forested area with forested area to the north, Community areas the east and south, forested area to the west	2011	68,700
21	65141	Expand Bowling Center	Sited on South Post parking lots and athletic fields with Community area to the north, Athletic fields and Professional/ Institutional area to the east, athletic fields and community area to the south, Gunston Road and Industrial area to the west	2007	11,550
22	57837/51326	South Post Fitness Facility & Multipurpose Fields		2011	95,300
23	61453	Replace South Post Fire Station	Sited on existing fire station with semi-forested area and Gunston Road to the north, Residential area to the east, semi-forested area and Professional/Institutional to the south, forested area and field to the west	TBD	17,800
24	64742	Construct Shoppette (EPG)	Sited on forested area on EPG with mature hardwoods and young pines, scattered cleared areas, 1 active Professional/Institutional building and several abandoned buildings with tree buffer and Residential area to the north, I-95 to the east, forested area and Industrial area to the south, forested area to the west	2007	17,400
25	64230	Physical Fitness Center (EPG)		2010	70,800
26	58466	Museum of the U.S. Army Alternative Locations: (A) North Post; (B) Pence Gate[a]	*North Post*: Sited on Fort Belvoir golf course with Snyder Road and landscaped golf course to the north, Beulah Street and forested area to the east, forested area and Kingman Road to the south, residential area to the northwest, and forested area and Fairfax County Parkway to the west. *Pence Gate*: Sited on open semi-forested field with Route 1 and athletic fields to the north, forested area to the east, forested area and Professional/Institutional to the south, Belvoir Road and golf course to the west	TBD	300,300
27	n/a	DCEETA Remote Delivery Facility[a]	Sited on semi-forested field with Route 1 and athletic fields to the north, forested area to the east, forested area and Professional/ Institutional to the south, Belvoir Road and golf course to the west	2007	99,000

Table 5-1
Other proposed on-post cumulative construction and renovation projects *(continued)*

Map number	Project number	Project title	Proposed Site	Fiscal year	Size (ft^2)
28	n/a	Davison Army Airfield Flight Control Tower	Sited on existing Control Tower location with Airfield-related fields and structures in all directions	2007	n/a
29	n/a	Operations Security Evaluation Group Training Facility	Sited on forested area with forested area to the north, east, south, and west	TBD	130,000
30	n/a	Fairfax County Parkway Extension[a]	Sited on hardwood forest with forested area and Residential area to the north and west, forested area and highly developed Professional/ Institutional area to the east, forested area and Industrial area to the south	TBD	n/a
31	n/a	Information Dominance Center[a]	Sited on Professional/Institutional area with forested areas to the north and east, developed Professional /Institutional to the south and west	TBD	300,000
32	64531	PX Expansion[a]	Sited on Commercial area and forested area with forested areas to the north and south, athletic fields and a school to the east, developed commercial area to the west	TBD	186,300

[a]Projects in which compliance with NEPA has already been completed or is underway.

The Army Museum has been proposed to be located on Fort Belvoir. This action is considered in addition to the BRAC action, thus it is assessed as a cumulative effect to the BRAC action. Two sites have been identified for the Museum: a portion of the North Post golf course (the preferred site) and an area near Pence Gate on South Post.

5.1.3.2 Off-Post Proposed Projects

There are 187 off-post non-Army projects planned within 3 miles of Fort Belvoir, as shown in Figure 5-2 (Fairfax County Department of Planning and Zoning, 2006). Many of these are small in scale and would have only a negligible effect on the environment as a whole. A summary of off-post projects and a summary of land uses associated with these projects are presented in Section 4.2.1.5. Twenty projects are at least 25 acres in size and listed in Table 5-2. A complete list of the off-post cumulative projects is provided in Appendix H. There are also a number of major proposed projects outside the 3-mile area (VDOT, 2006; GWI, 2006). These include the following:

- McLane Foodservice: Construction of distribution facility (Prince William County)
- EnviroSolutions: Relocation of headquarters to area (Prince William County)
- PowerLoft: Data center under construction in new tech park (Prince William County)
- Multiple housing developments under construction in Prince William County (future projects would be postponed for one year because of a moratorium on new housing construction (Dwyer, 2006).

- Springfield Interchange (Under Construction)
- Route 123 Bridge over the Occoquan River (Under Construction)
- Woodrow Wilson Bridge (Under Construction)
- Rolling Road widening to four lanes near Old Keene Mill Road (Route 644)
- I-95/395/495 High Occupancy Toll (HOT) lanes
- Construction of a high-capacity electrical transmission line in northern Virginia by Dominion Virginia Power.

5.2 LAND USE

5.2.1 On-Post Development Not Related to BRAC

Negligible cumulative effects on land use would be expected from implementing previously planned projects for Fort Belvoir. In general, the on-post cumulative projects would be compatible with existing land use or those associated with the proposed alternatives for BRAC actions.

The Army has 32 previously planned and approved projects slated for development around the same time as the 2011 BRAC actions slated to occur by 2011. The potential total build-out gross square footage amounts to about 1.5 million gross square feet (gsf), most of it in new construction. These approved/programmed projects would appear in the planned update to the installation Master Plan.

The Museum of the U.S. Army and attendant Museum Support Center (MSC) are in the planning stages. Various sites are under consideration for both facilities. The candidate sites for the Museum include the North Post Golf Course as the preferred site and Pence Gate as the alternative site. The MSC is being considered at Pence Gate (the preferred site) and Tracy Loop on the South Post. All these sites are expected to be generally compatible with the proposed land use plan.

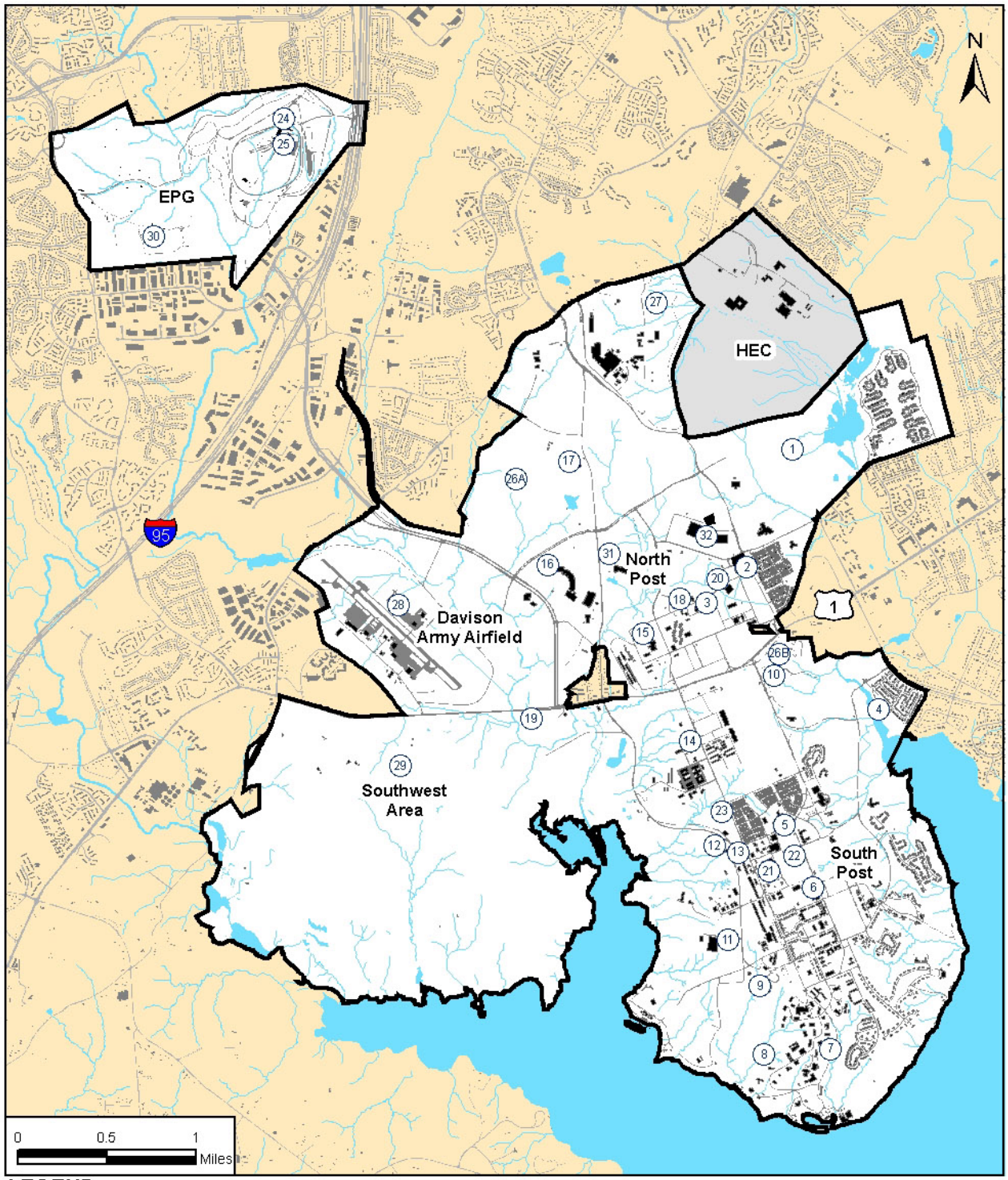
The ultimate use of EPG will not be known until the ROD for this EIS is signed, which would select a BRAC implementation alternative.

5.2.2 Off-Post Development

Negligible adverse and beneficial long-term effects on land use would be expected. The cumulative land use effects of gradual implementation of the Fairfax County Comprehensive Plan over the next 5 years would be negligible if all approved/programmed roadway improvements are realized.

The key factors that could affect cumulative land use changes for planning districts adjacent to Fort Belvoir are summarized below.

Lower Potomac District. Future developments southward along the Route 1/I-95 corridor into Prince William County are an essential component of the Fairfax County Comprehensive Plan. The most notable development in the district is the Laurel Hill planned unit development on the 3,000-acre former Lorton Prison property. This development is to be a phased operation over a decade or more and will not likely lead to changes in land use categories or cumulative effects in



LEGEND

Installation Property

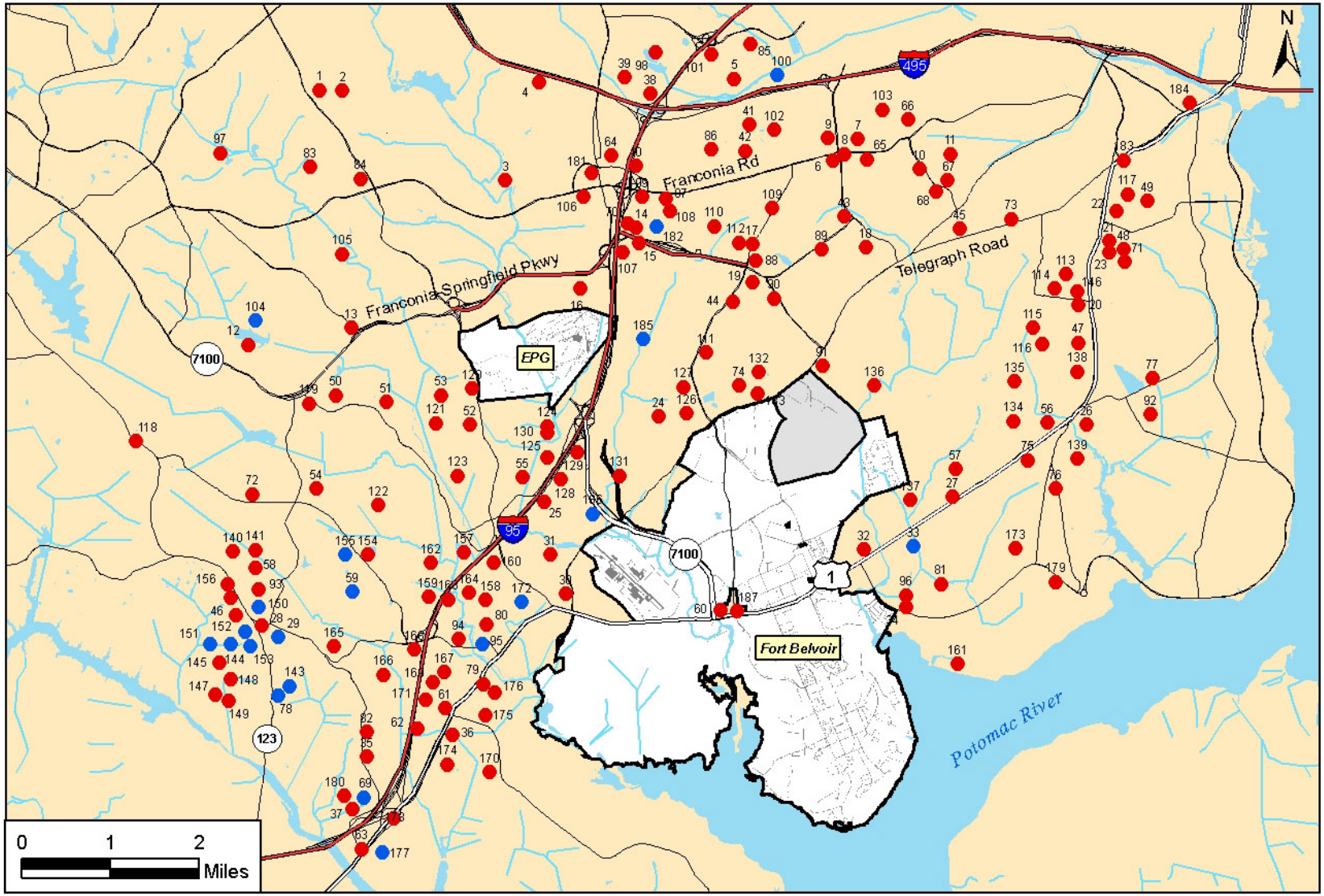
Project Location

On-Post Projects for Cumulative Impacts

Fort Belvoir, Virginia

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Figure 5-1



LEGEND

- Proposed Projects < 25 acres
- Proposed Projects > 25 acres

Sources: Fort Belvoir GIS, 2006; Fairfax County GIS, 2006.

Proposed Development Projects Surrounding Fort Belvoir

Fort Belvoir, Virginia

Figure 5-2

Table 5-2
Proposed off-post projects over 25 acres within 3 miles of Fort Belvoir

Map number	Project number	Project name	Land use type	Proposed site	Total acres
29	001183-SP-011-2	Laurel Hill Golf Course Expansion	Community	Sited on a field with Community area to the north, fields and forested area to the east, Residential area and forested area to the south and west	348.6
69	006510-SP-002-1	South Run Recreational Center Fitness Center Addition	Community	Sited on forested area with forested area and fields to the north, I-95 to the east and south, forested area to the west	182.3
185	05-IV-0S	Mixed Use Development: 1,420 Res'd Units, 262K Inst., 1.31 M Office, 1.15 M Retail, 24 Acre Pvt. Rec/Open Space Option: 2,840 Res'd Units, 524K Inst., 2.62 M Office, 2.3 M Retail, 48 Acre Pvt. Rec/Open Space	Residential, Commercial	Sited on forested area and fields with Residential area and forested area to the north and east, Commercial area to the south, I-95 to the west	160.5
33	009465-SP-002-2	Mount Vernon Country Club Golf Course Improvements	Community	Sited on golf course with Residential area to the north east and south, Residential area and forested area to the west	127.7
186	05-IV-6S	848 Office OR 556K Industrial	Professional/ Institutional or Industrial	Sited on fields with Commercial area to the north, Residential area to the east, Telegraph Road and Davison Airfield to the south, forested area to the west	117.8
144	001811-SD-001-2	Occoquan Overlook	Residential	Sited on forested area and Residential area with Residential area and forested area to the north, Residential area to the east, Industrial area to the south, and forested area to the west	100.6
182	PA-506-IV-SI	Springfield Mall—Mixed Use 2M ft^2 Retail, 1M ft^2 Office, 200K ft^2 Hotel (300 Rooms), 2,400 Residential Units	Commercial	Sited on Commercial area with Commercial and Residential areas to the north, east, and south, Commercial and I-95 to the west	82.0
153	001183-SP-006-2	South County High School	Community	Sited on forested area with forested and Residential area to the north, Residential area to the east, forested area to the south and west	69.4
172	006839-SP-004-2	Cook Inlet Residential Section Three	Residential	Sited on forested and Residential area with Residential area in all directions	60.6
155	001183-SP-012-2	Spring Hill Senior Campus	Community	Sited on field with fields to the north and east, high school to south, golf course to west	59.7
78	001183-SP-014-1	Lorton Work House (Art)	Community	Sited on former correctional facility with forested area and fields to the north, east, and south, Route 123 to the west	52.1

Table 5-2
Proposed off-post projects over 25 acres within 3 miles of Fort Belvoir *(continued)*

Map number	Project number	Project name	Land use type	Proposed site	Total acres
151	001183-SP-004-2	Laurel Hill South Landbays E And F, Section 1	Residential	Sited on forested area with Residential area to the north, forested area to the east, south, and west	48.0
59	001183-SP-015-1	Spring Hill Senior Campus Senior Housing Building	Residential	Sited on fields with fields to the north and west, correctional facility to the east and south	46.8
177	009754-SP-006-2	Gunston Commerce Center Land Bay C	Commercial	Sited on forested area with forested area to the north, fields to the east, Residential and forested area to the south, forested area and Route 1 to the west	39.9
104	005466-SD-001-2	Lakewood Hills Section 10 Phase I	Residential	Sited on forested area with Residential areas in all directions	35.1
150	001183-SD-007-2	Laurel Hill South Landbay D Section 2 (MV)	Residential	Sited on forested area with Residential and forested area to the north, south, and west, fields to the east	33.2
152	001183-SP-005-2	Laurel Hill South Landbay E And F Section 2	Residential and Commercial	Sited on forested area with Residential area to the north and forested areas to the east, south, and west	33.1
143	001100-SD-001-2	Nirvana Palace	Unknown	Sited on semi-forested area with fields to the north, east, and south, Community area to the west	30.3
100	009163-SD-006-2	Highgrove Estates Section 5	Residential	Semi-forested area with Residential area to the north, Industrial area to the east, I-495 to the south, Commercial and Residential area to the west	26.9
95	004478-SD-001-2	Adkins Property	Residential	Sited on forested area with Residential areas to the north, south, and west, Commercial area to the east	25.7

Source: Fairfax County Department of Planning and Zoning, 2006

any way associated with developments on Fort Belvoir. Master planning for the adaptive reuse of Laurel Hill is underway.

Mount Vernon District. The character of the Mount Vernon Planning District, described in Section 4.2.1.4.1, is likely to change because Fairfax County desires to intensify development on the U.S. Route 1 corridor without infringing on the historic richness of the corridor. The increased focus on the potential value on this stretch of Route 1 in the ROI meets with the approval of the Southeast Fairfax Development Corporation (SFDC) and the adjacent residential neighborhoods. Fairfax County's Comprehensive Plan recommends that vacant lots adjacent to the Fort Belvoir boundary, between Sacramento Drive and Old Mill Road, be planned for residential development at a density of 16–20 dwelling units/acre. This recommendation involves a significant planned

development density to include substantial open space and recreational areas as well as a comprehensive pedestrian circulation network.

Rose Hill District. Cumulative land use effects in Rose Hill are entirely dependent on developments in Kingstowne. There exists a considerable amount of undeveloped acreage in the planned community. Therefore, the extent of Kingstowne's contribution to cumulative land use effects is expected to be confined mainly to the roadway network that serves it and Fort Belvoir. Fairfax County's Long-Range Transportation Plan accounts for extensive planned unit development infill in Kingstowne and associated increases in daily traffic volume. The Kingstowne Community Business Center (CBC) is envisioned as a major employment center with a substantial component of high-end (Class A) office space, similar to the Reston Town Center. A future transit station area is planned near the South Van Dorn Street/I-95 interchange. Most of the planning district is slated for development as suburban neighborhoods, comprising mixed housing and supporting commercial and institutional uses. A large part of the planning district is public parkland, including Huntley Meadows, which is to be preserved.

Springfield District. The notable and major development projects within several miles of Fort Belvoir, described in Section 4.2.1.5, are clustered along the Springfield-Franconia Parkway close to inter-modal transport nodes. The other long- and short-term projects identified by the county, and SFDC are scattered throughout the district and strung out along Route 1. As long as roadway improvements are built, the Springfield District contribution to cumulative effects on land use should be negligible in this intensely developed area north and east of Fort Belvoir.

5.3 TRANSPORTATION

5.3.1 Army Museum Siting

Each of the two museum sitings will have various effects on the transportation system, as well as effects on the four land use alternatives under consideration. The sitings for the Museum are North Post Golf Course and adjacent to Pence Gate on South Post. The museum expects a total of one million visitors annually, or a peak of 4,000 visitors in a day. The museum also has a staff of approximately 150 people. To quantify the effects of the museum on the transportation system, trip generation and mode split need to be developed for site traffic. Typical museums have the majority of their visitors on the weekend and do not generate visitor traffic during the morning peak period but are open for a portion, if not all, of the evening peak period. Thus, a museum would likely generate only staff trips during the morning but include both staff and some visitor trips in the evening. Table 5-3 presents the assumptions and expected trips generated during the AM and PM peak hours.

A large percent of visitor arrivals to a museum occur via buses (tour, school, or public transit), and this trend is also assumed for the Army Museum. It is expected that an approximate total of 50 vehicles trips would occur during the AM peak hour. This volume is insignificant to the traffic flows along the Fairfax County Parkway or Route 1, which would be the primary access points to the museum site. The expected traffic volumes generated by the site would be approximately 300 to 320 vehicles in the PM peak hour. Thus, the effect during both peak periods would be minor with no significant effects, provided the mitigation measures to the transportation system identified for each of the land use alternatives were implemented. Truck traffic destined to the museum site, such as delivery trucks, would likely occur outside the peak periods, so the effect on traffic flow would not be significant.

Under the proposed siting of the Museum on the North Post golf course, several access plans have been proposed from the public roadway system. First, an access could be provided off of Fairfax County Parkway between John J. Kingman Road and Telegraph Road. This new intersection would, however, likely not be possible due to the spacing of these adjacent roadways. Also, the Fairfax County transportation plans call for upgrading intersections along the corridor to interchanges, thus continuity of the corridor would be disrupted with a signalized intersection between the two new interchanges. Alternatively, access to the Museum site could be located along John J. Kingman Road; this location would place the access near the entrance to the DLA building and Kingman Gate. Security issues could arise under this configuration, which may require some additional improvements.

The proposed siting of the Museum on South Post is near Pence Gate, along the east side of Belvoir Road. This site is directly across the street from the proposed Hospital siting under the Preferred Alternative. Additional improvements may be needed along Belvoir Road.

Table 5-3
Peak hour vehicular trips for museum

	AM peak hour	PM peak hour
Employees	150	150
% Employees absent	5%	5%
Daily reporting employees	143	143
Employee trips occurring in the peak hour	40%	38%
Peak hour employee trips	57	54
LOV person (employee) trips (88%)	50	48
HOV person (employee) trips (8%)	5	4
Transit person (employees) trips (3%)	2	2
Other (1%)	1	1
Vehicle trips (employees)	47	45
	AM peak hour	**PM peak hour**
Daily Visitors	4,000	4,000
Visitors trips occurring in the peak hour	0	33%
Peak hour visitors trips	0	1,333
LOV trips (10%)	n/a	133
HOV person trips (30%)	n/a	400
Transit person trips (58%)[a]	n/a	773
Other (2%)	n/a	27
Vehicle trips (Visitors)	0	246
Bus trips (Visitors)	0	20
Total site trips	47	311

[a] Includes tour buses, school buses, and public transit

5.3.2 Other Project Sitings

Many of the other on-post cumulative projects are modernization and renovation projects or projects that would relocate activities within the existing developed area of the Main Post. The PX Expansion project would likely generate more trips due to increased services; however, these trips would be drawn from the existing clientele and would occur outside of the peak periods of travel. Taken together, they would be expected to have negligible effects on Fort Belvoir area

traffic no matter which BRAC alternative would be implemented. Any impacts on the transportation network that are associated with the off-post projects (see Section 5.1.3.2) would be mitigated through roadway improvements by the developers. As the No Action Alternative baseline assumed Year 2011 conditions, those off-post developments and associated impacts are already incorporated into the transportation analysis. The MWCOG regional travel demand model and Round 7 Cooperative Land Use Forecast were used to develop future traffic volumes used in the analyses. The land use within the Round 7 data also accounts for future growth.

5.4 AIR QUALITY

The proposed cumulative projects would have minimal long-term adverse effects on the region's air quality. Other construction and development projects would occur within the National Capital Region (NCR), and each of the projects would produce some measurable amounts of air pollutants. The effects of all past, present, and reasonably foreseeable projects in the region and associated emissions are taken into account during the development of the State Implementation Plan (SIP). This includes all on- and off-post projects including National Museum of the U.S. Army. Estimated emissions generated by all the alternatives would conform to the SIP. Therefore, by definition, the net effects of the BRAC action at Fort Belvoir in addition to all other collectively identified cumulative projects would not contribute to significant adverse cumulative air quality effects.

The Metropolitan Washington Council of Governments (MWCOG), along with the NCR Transportation Planning Board, are responsible for developing conformity demonstrations for transportation plans and programs within this area. This includes all planned transportation projects in the region. The Transportation Improvement Program (TIP) and Constrained Long Range Plan (CLRP) for the Washington Metropolitan Region contain a list of all proposed transportation projects to be built in the region. The transportation conformity demonstration for these plans evaluates the ability of the transportation project inventory contained in the TIP and CLRP, emission controls, and subsequent mobile emissions budget ability to comply with the SIP. Because the 2005 BRAC action at Fort Belvoir is not an approved transportation project, transportation conformity is not required. Vehicle emissions were included in the emission estimations and in the general conformity demonstration. It would be necessary for MWCOG to include the changes in vehicle patterns for all actions in the region when developing the new TIP and CLRP.

5.5 NOISE

No long-term effects on noise would be expected. Implementing any of the alternatives would have negligible ongoing or cumulative effects on the noise environment because of construction or changes in traffic in or around the site. The construction activities associated with these alternatives would be temporary in nature and the current noise environment would return after the projects' completion. The past, current, and reasonably foreseeable noise environment in and around the proposed site is dominated by existing and future traffic noise without the Preferred Alternative. The change in noise for all New Source Reviews (NSRs) and all alternatives would be below *barely perceptible* levels from future noise environments under the No Action Alternative. The No Action Alternative includes naturally occurring future growth in traffic because of other activities in the area. This estimated growth would be due to the on- and off-post projects outlined above including the National Museum of the U.S. Army. In addition any transportation upgrades would more than likely improve traffic flow and traffic noise impacts. This approach naturally takes into account cumulative changes in the noise environment.

5.6 GEOLOGY AND SOILS

Past, present, and reasonably foreseeable projects proposed for Fort Belvoir and the immediate vicinity could result in localized changes to topography and minimal effects on geology. Soils in the area would undergo short- and long-term to permanent impacts depending on the nature of the disturbance.

Overall, the topography of Fort Belvoir and the surrounding area would not change as a result of any of the BRAC-related projects in concert with previous or reasonably foreseeable actions. The area's plateaus and drainages will remain intact. Minor and localized changes would occur as a result of any construction project that involved leveling the ground; however, the extent of these changes would not produce cumulative effects.

The geology of the area would not experience adverse cumulative effects. The construction of roads and infrastructure on EPG under the Preferred Alternative and City Center Alternative combined with the Fairfax County Parkway extension may require some blasting of the bedrock and removal or burial of unconsolidated geologic materials. However, because of the of the nature and depth of bedrock, none of these activities would be expected to influence the geology of the area.

Soils throughout the project area would undergo short- and long-term adverse cumulative effects. Urban and Cut and Fill soils have already been affected by development so in cases of redevelopment the impact to these soil types has already occurred. With native soils the effects related to construction would generally be minor and generally limited to the areas directly disturbed by those activities. The Museum of the US Army, its Support Center and the Fairfax County Parkway extension would all result in the permanent loss of the soil resource directly under the impervious surfaces. However, portions of these projects would occur on soils previously affected (Urban soils) and impacts to native soils would be localized.

Short-term effects would result from temporary disturbances such as the installation of utility lines associated with most development projects. These activities would result in effects such as a temporary loss of soil productivity and the potential for introducing noxious species. Short-term secondary and indirect effects could result from an increase in the amount of sediments carried to the local creeks and streams in storm water runoff. Short-term adverse effects would be controlled by implementing the Commonwealth-required standard erosion control BMPs that have been developed to minimize the amount of sediment carried off construction sites. Slope stabilization would further reduce adverse effects over the long term.

Off-post past, present and reasonably foreseeable projects would have similar types of impacts as those described above for on-post projects except over a broader scale. None of the projects considered in the cumulative impacts analysis are likely to contribute to a significant cumulative impact in terms of topography or geology. Likewise, assuming that regulatory requirements are followed, the soil resource should experience localized effects that would be both short- and long-term.

It should be noted what could be considered a significant cumulative effect on the soil resource has already occurred, that being the general loss of the applicability of the prime and unique farmland designation. While the characteristics of these highly productive soils remain in place until directly impacted, the agricultural setting in Fairfax County has been lost through continued progression of the suburban landscape. The prime and unique characterization does not apply to soils occurring outside of an agricultural context such as those in suburban Fairfax County. The

current and reasonable foreseeable future activities would not have a bearing on this loss due to the degree of development that has already occurred.

5.7 WATER RESOURCES

Minor adverse long-term effects on water resources would be expected due to cumulative actions. Various other on-post and off-post proposed development projects in the vicinity of Fort Belvoir would potentially increase storm water runoff from paved surfaces and nonpoint source pollutants (e.g., sediment, nutrients, petroleum hydrocarbons) in the area. All identified projects within the watersheds that drain Fort Belvoir are listed in Table F-3 in Appendix F (i.e. the Army Museum is considered with other non-BRAC projects and is located in the Accotink Creek Watershed) and Table F-4 lists projects situated in other watersheds not included in the cumulative effects analysis.

A cumulative effects analysis was conducted using Generalized Watershed Loading Model (GWLF) to estimate potential changes in average annual flow volume and pollutant loads as a result of the change in impervious surface area in each watershed. Separate watershed models were developed for Accotink Creek, Pohick Creek, and Dogue Creek. A fourth watershed model was developed to incorporate direct drainage areas (watershed areas that flow directly into Gunston Cove, Accotink Bay, Pohick Bay, and the Potomac River). The percent change in average annual flow volume and nutrient loading in the forms of Total Nitrogen (TN) and Total Phosphorus (TP) for each watershed are presented in Table 5-4.

Table 5-4
Cumulative percent increase in flow volume, TN, and TP loads

Watershed	Percentage increase in average annual flow volume	Percentage increase in TP	Percentage increase in TN
Accotink Creek	5%	4%	5%
Direct drainages	5%	1%	2%
Dogue Creek	6%	2%	6%
Pohick Creek	3%	3%	4%

As shown in the table, increases in flow volume and nutrient loadings are not expected to be significant at the watershed scale. Appropriate required storm water management designs would be expected to minimize the adverse effects of increased storm water and nonpoint source pollutants, and additional mitigation measures that permit infiltration are recommended for implementation on a watershed basis to limit cumulative effects to waterbodies within these watersheds and receiving waters downstream.

5.8 BIOLOGICAL RESOURCES

Long-term moderate adverse cumulative effects would be expected. Cumulative natural resource effects of the proposed on-post non-BRAC projects such as the Army Museum would generally affect the central area of the North Post, the North Post golf course, and the South Post similarly under all the alternatives. On other areas of the Main Post, cumulative projects would have a similar level of effect under the Preferred Alternative and all other alternatives. Proposed on-post non-BRAC projects and off-post projects would further diminish the availability of forest and

field habitats on and off the installation, and increase the possibility of occurrences of invasive species, edge effects on habitats, and habitat fragmentation under the Preferred Alternative and all other alternatives.

Non-BRAC projects proposed on the eastern half of EPG would likely have little cumulative effect because they would be located in an area that would be developed under the alternatives considered in the EIS. The on-post non-BRAC project on the western half of EPG, the Fairfax County Parkway extension, could disturb habitat for the small whorled pogonia and could, through edge effect, soil erosion, and habitat fragmentation, diminish the value of the habitat where the species is found on western EPG. The project could also reduce the amount of habitat of one or more Partners in Flight (PIF) species and directly or indirectly affect wetlands. In addition, clearing and grubbing of about 36 acres on EPG as part of on-going environmental corrective action activities have reduced the amount of habitat on EPG. These effects by themselves would be of some concern because of the status of EPG as a vestige of natural area in an otherwise highly developed region.

5.9 CULTURAL RESOURCES

Long-term minor adverse effects on cultural resources would be expected. Adverse visual effects on national, state, and county registered historic properties both on- and off-post would occur under each of the alternatives. These effects would be in addition to other modern developments that have already visually affected those properties. Increasing urbanization in the surrounding cities and counties, as exhibited by past and proposed future projects surrounding Fort Belvoir and proposed developments on Fort Belvoir, would likely contribute to more visual effects on these historic properties. Although the adverse visual effects from the individual BRAC projects would be mitigated to a minor level of significance, the additional visual effects from the BRAC projects, when added to existing and future visual effects would have long-term minor adverse cumulative effects to these historic properties.

Direct adverse physical effects would occur to archaeological sites under each of the alternatives. The nature of the effects is the same from one alternative to the next. Mitigation measures common to all the alternatives would reduce the effects to a minor level. Other projects both on- and off-post would also likely result in adverse effects to archaeological sites in the region. Some of these effects would be mitigated to a minor level through compliance with Section 106 of the NHPA and 36 CFR Part 800. The addition of effects from the BRAC projects on archaeological sites would be incremental and minor.

5.10 SOCIOECONOMICS

5.10.1 Economic Development

Short- and long-term beneficial and adverse cumulative effects would be expected. The past action of the establishment and continued operation of Fort Belvoir continues to have positive effects on the local economy. The proposed realignment action would add to these beneficial economic effects by generating employment, income, and business sales in the ROI from construction and operation of the proposed new facilities. There are numerous other projects (in progress or planned for the future) on Fort Belvoir and in the ROI that could have short- and long-term effects on the local economy. On-post projects include (but are not limited to) the National Museum of the U.S. Army and the Museum Support Center, a physical fitness center in the Troop Cantonment Area and on EPG and a South Post fitness facility, modernization of the marina, expansion of the Main Post library, a shoppette on the South Post, a Soldier Support

Center, an addition to the MP Station, and replacement of the South Post Fire Station. All of the proposed on-post cumulative projects are listed in Table 5-1. Projects in the ROI include, but are not limited to, ongoing development of the Lorton Town Center, housing development in Laurel Hill and Lorton, reconstruction of the I-95/I-395/I-495 interchange, improvements to Route 1, plus numerous other residential and commercial developments and transportation projects (see Table 5-2 and Section 5.1.3.2).

These proposed projects in and of themselves would have short- and long-term beneficial economic effects in terms of employment, income generation, and business sales. There would be short-term beneficial effects from the construction projects and long-term beneficial effects from the continued operation, maintenance, and use of the facilities, businesses, and houses. Population would increase as workers move to the region to fill jobs. The increase in population would increase the tax base, would increase demand for services and infrastructure, ultimately resulting in long-term increases in the types and amounts of infrastructure and services available in the ROI. The backfilling of office space vacated by the agencies moving to Fort Belvoir could create a change in regional employment. For example, Arlington County has established a task force to plan for the redevelopment of Crystal City, hoping to attract a more diverse group of businesses (Gowen, 2006). Redevelopment of vacated sites would create jobs and income, and businesses moving in could shift jobs within the region and create new jobs.

Adverse cumulative effects would occur because of the overlapping time frames for construction activities of the Proposed Action and ongoing and future projects, with the adverse effects resulting from possible construction labor and material shortages. There would be a demand for skilled building contractors (residential, industrial, and commercial), heavy and civil engineering construction contractors (for construction of roads and sewers), and specialty trade contractors (carpenters, painters, electricians, plumbers, inspectors). Lack of skilled labor could result in poor workmanship, project delays, and cost increases. Material shortages (e.g., wood products, cement, aggregate) would also lead to delays and cost increases. Over time, new workers would come in to the construction industry to fill job vacancies. Adverse effects also could result from the sustained demand from the increased population on the region's infrastructure (transportation, utilities, housing, and public services such as police, fire, and medical, public schools, and recreation) and the local economy's ability to expand to meet the demand. Price increases or declines in service could result if there is a lag as the economy responds to the new demand by increasing the supply of goods and services.

5.10.2 Sociological Environment

Long-term beneficial and adverse effects would be expected on police, fire, and medical services, schools, housing, family support and social services, shops, services, and recreation. Details on each are discussed below.

Police, Fire, and Medical Services. Long-term beneficial effects would occur on on-post police and fire services. Fort Belvoir's new facilities and increased population would require additional police, fire, and medical service facilities and personnel to maintain level-of-service and emergency response time. In addition to the BRAC projects of building and staffing an emergency services center on EPG and the new hospital and dental clinic on the South Post, under separate actions Fort Belvoir would build an addition to the Military Police station and replace the South Post fire station. These would provide adequate facilities, proper equipment, and sufficient staff to protect and serve the installation's new buildings and increased population.

Adverse effects could occur to off-post police, fire, and social services. Population projections indicate continued population growth for the ROI. The increases of individuals in the area would require increases in law enforcement, fire protection, medical, and social services. These services would be based on the number of long-term residents in the ROI and tax-based income. Declines in service could result if there is a lag in response to the increased need for these services.

Schools. Long-term adverse effects would be expected to occur on off-post schools. Continued regional population growth would increase primary and secondary school age enrollment. Many school districts in the ROI have schools operating at or above capacity. Portable classrooms are used to provide sufficient classrooms space for the students to maintain student-to-teacher ratios and small class sizes. Although the increased population base would provide education funding through taxes, having sufficient funds to meet the needs of enrollment growth, building new schools, hiring new teachers and other support staff such as guidance counselors, teacher salary agreements, and instructional materials continues to be a challenge because of budget constraints and the rising cost of education.

Family Support, Shops, Services, and Recreation. Long-term beneficial and significant adverse effects would be expected. Fort Belvoir's increased population would increase demand for shopping, service, and recreational facilities. In addition to the BRAC associated projects of building two new CDCs, a parking facility, and a family travel camp, other proposed on-post, non-BRAC projects include an expanded PX/commissary; a religious education center; two physical fitness centers on Main Post; modernization of the marina; expansion of the recreation center; a shoppette on the South Post with a gas station, fast-food restaurant, and car wash; expansion of the arts and crafts and auto crafts facilities; a new golf clubhouse; expansion of the bowling center; a scenic trail; a shoppette and a fitness center on EPG; and the Army Museum and Museum Support Center. All of the proposed on-post cumulative projects are listed in Table 5-1. These proposed actions, in addition to the BRAC actions, would result in long-term beneficial effects by providing additional shops, services, and recreation facilities to support and serve the installation's increased population.

Long-term significant adverse effects on Fort Belvoir's MWR recreation program would occur from the construction of the Army Museum and the Museum Support Center. If the museum would be constructed on the North Post golf course site, Fort Belvoir would lose a portion of this golf course, in addition to the South Post golf course as the hospital is sited there under the Preferred Alternative. In total, Fort Belvoir could lose about 60 percent of its golf course fairways, which would result in significant losses to the MWR NAF from lost revenue and undepreciated fixed assets. The Museum Support Center would eliminate one baseball field and one t-ball field used in the Fort Belvoir youth sports program, degrading the quantity and quality of youth programs offered to Soldiers living on-post. Overall, the loss of these MWR programs and facilities would reduce the quality of life for Soldiers, retirees, and their families.

5.11 AESTHETICS AND VISUAL RESOURCES

Minor adverse and beneficial effects on aesthetic and visual resources would be expected. The proposed on-post project with the largest cumulative aesthetic effect, the Museum of the U.S. Army, has two possible sites. The possibilities are the North Post golf course and the Pence Gate site on the eastern side of South Post just south of Route 1. Each site placement would have a moderate effect on aesthetics because of the size of the proposed structures, although the golf course siting would have more of an effect because of the high aesthetic integrity of the current land use. Other major changes would occur along Abbott Road on the North Post, the northeast portion of North Post, and in the Southwest Area. The building of the Operations Security

Evaluation Group Training Facility on the Southwest Area would have a moderate effect on the area because of the current forested conditions of the area, although it would be relatively secluded. The proposed Woodlawn Road replacement would have a moderate effect because of the high aesthetic integrity of the land it would pass through. Short-term adverse effects resulting from construction activities from cumulative projects would be expected to be similar to that of the Preferred Alternative. In general, the smaller buildings and additions would have a negligible adverse aesthetic change once construction is complete. The larger structures would have a more noticeable effect because of their size. Also, structures sited on areas with less development would have more of an effect on aesthetic integrity. Thus, the proposed facilities with the least effect on aesthetic integrity would be small structures sited on existing developed areas and proposed facilities with greater effect would be large structures sited on undeveloped areas.

Despite the large number of proposed off-post cumulative projects, there would not be a significant amount of aesthetic effects. The off-post portion of Fairfax County in the vicinity of Fort Belvoir, as a whole, has a large amount of development, which includes large areas of residential and commercial development along I-95 and U.S Route 1. The existing development makes the addition of these cumulative projects result in a minor effect on the aesthetic integrity of this portion of Fairfax County.

5.12 UTILITIES

Minor short- and long-term adverse cumulative effects would be expected. Implementing the Preferred Alternative would result in short-term disconnections and reconnections of all buried and aboveground utility systems during the construction phase on- and off-post as required. Activities resulting from the BRAC action and other on- and off-post development projects such as office buildings, shops, and housing complexes would result in additional building space requiring utility services, thus resulting in a cumulative increase in demand on the existing utility infrastructure. This would require existing private and public providers of utility services in the area to increase the quantity of utility services provided to meet the demand from users directly and indirectly associated with Fort Belvoir and its surroundings. These entities must review and revise the existing short- and long-term projections for providing adequate and reliable utility services for the area in the future.

To provide the required level of electricity supply at the EPG site, Dominion Virginia Power will need to upgrade its existing off-site capacity significantly. Timely action is necessary in order to plan, obtain the required permits and rights-of-way easements to ensure uninterrupted electricity supply to Fort Belvoir and the surrounding community at large.

The Energy Policy Act of 2005 (Public Law 109-58—August 8, 2005) stipulates that energy consumption per gross square foot of the Federal Buildings in fiscal years 2006 through 20015 be reduced in comparison to the base year of 2003. The percentage reduction required in 2006 is 2 percent from the baseline consumption and 20 percent in 2015. This required reduction will mitigate some of the cumulative effects of the above on- and off-post construction.

The Preferred Alternative, together with on-post construction and renovation projects planned in the near term at Fort Belvoir and off-post projects would generate additional quantities of construction and demolition debris (CDD) and result in cumulative reduction of the lifespans of local area landfill sites.

For the list of projects proposed in the near term, approximately 1.5 million square feet of building space would be constructed, generating a total of approximately 3,400 tons of CDD.

With the Army's stipulated policy requirement of recycling 50 percent of CDD, an estimated 1,700 tons of CDD would be generated over an estimated construction period of 4 years. This would result in disposing of 425 tons of CDD per year or 35 tons per month to local area landfill sites. The total volume of CDD generated as a result of the BRAC action and the proposed on-post cumulative construction and renovation projects would amount to 2,528 tons (2,103 tons from the Preferred Land Use Alternative plus 425 tons from cumulative projects) per year or 210 tons (175 tons from the Preferred Land Use Alternative plus 35 tons from cumulative projects) per month. CDD from the BRAC action, on- and off-post construction and renovation projects would result in a cumulative reduction in the lifespan of the area landfills.

5.13 HAZARDOUS SUBSTANCES AND HAZARDOUS MATERIALS

Minor short-term and long-term adverse cumulative effects would be expected. Short-term cumulative effects would be expected from the increased use of petroleum during construction. Construction would adhere to OSHA and EPA guidelines to minimize the risk of spills. Minor long-term adverse effects would be expected from the increase in generation of hazardous and solid waste generated as more people would work at Fort Belvoir and the surrounding area.

5.14 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENTS OF RESOURCES

Irreversible and irretrievable commitments of resources are related to the use of nonrenewable resources and the effects that use of such resources would have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time. Irretrievable resource commitments involve a loss in the value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species).

Construction of facilities and subsequent operations at Fort Belvoir would involve irreversible commitments of common resources to build structures (i.e., sand and stone). The Army would use energy during both construction and operations. Relative to societal demands for such resources, neither of these commitments would be significant. Implementing the Preferred Alternative would not involve irretrievable commitments of resources.

5.15 SHORT-TERM USES OF MAN'S ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Short-term uses of the biophysical components of man's environment include direct construction-related disturbances and direct effects associated with an increase in population and activity that would occur over a period of less than 5 years. Long-term uses of man's environment include effects occurring over a period of more than 5 years, including permanent resource loss.

Several kinds of activities could result in short-term resource uses that would compromise long-term productivity. Examples of such actions that affect long-term productivity are filling of wetlands or loss of other especially important habitats, conversion of prime or unique farmlands to nonagricultural use, and consumption of high-quality water at nonrenewable rates.

Implementing the Preferred Alternative would not be expected to materially affect maintenance and enhancement of cumulative long-term productivity. Construction and operation of facilities at Fort Belvoir would affect several resources, including air quality, traffic, and storm water runoff. On-post construction projects would respect management measures in the installation's INRMP, ICRMP, and other management plans designed to protect and conserve environmental resources.

Environmental effects would occur at discrete locations, and they would be of a nature that generally would not affect long-term productivity.

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SECTION 9.0
ACRONYMS AND ABBREVIATIONS

AAFES	Army and Air Force Exchange Service
ABWR	Accotink Bay Wildlife Refuge
AC	Administrative Closure
ACHP	Advisory Council on Historic Preservation
ACM	asbestos containing materials
ACP	Access Control Point
ACS	Army Community Service
ACSIM	Assistant Chief of Staff for Installation Management
ADNL	A-weighted day night average sound level
ADT	Average Daily Traffic
AFB	Air Force Base
AHERA	Asbestos Hazard Emergency Response Act of 1986
AHPA	Archaeological and Historic Preservation Act
AKO	Army Knowledge Online
AIRFA	American Indian Religious Freedom Act
AMC	Army Materiel Command
APE	Area of Potential Effect
APM	Asbestos Program Manager
AQCR	Air Quality Control Region
AQCR 47	National Capital Interstate Air-Quality Control Region
AQCR 225	State Capital Intrastate Air-Quality Control Region
AQCR 224	Northeastern Virginia Intrastate Air-Quality Control Region
AR	Army Regulation
ARPA	Archeological Resources Protection Act
ASP	Ammunition Supply Point
AST	aboveground storage tank
AT	Antiterrorism
AT/FP	Antiterrorism/ Force Protection
ATM	asynchronous transfer mode
BACT	best available control technology
BES	Baseline Environmental Survey
BMP	best management practice
BRAC	Base Realignment and Closure
BRDEC	Belvoir Research and Development Engineering Center
BRT	Bus Rapid Transit
BTU	British Thermal Units
°C	degrees Celsius
C	commercial
C-5	Neighborhood Retail Commercial District
C-6	Community Retail Commercial District
C-8	Highway Commercial District
C&D	construction and demolition
CAA	Clean Air Act
CBC	Community Business Center
CBP	Chesapeake Bay Program
CBPA	Chesapeake Bay Preservation Act
CDC	Child Development Center
CDD	Construction and Demolition Debris
CDNL	C-weighted day night average sound level
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CIDC	Criminal Investigation Division Command
CIP	Capital Improvement Program
CIS	Capital Investment Strategy
CLRP	Constrained Long Range Plan
CO	carbon monoxide
CRMP	Coastal Resources Management Program
CS	Confirmatory Sampling
CTB	Commonwealth Transportation Board
CTT	closed, transferring, and transferred
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMARA	Coastal Zone Management Act Reauthorization Amendment
DA	Department of the Army
DAAF	Davison Army Airfield
DAIM	Department of the Army Installation Management
DAR	defense access roads
dB	decibel
dBA	A-weighted decibel
dBC	C-weighted decibel
dBP	Peak Level decibel
DC	District of Columbia

DCEETA	Defense Communications Electronics Evaluation and Testing Agency
DCMA	Defense Contract Management Agency
DCNG	D.C. National Guard
DD	Department of Defense (acronym used for forms only)
DDT	Dichloro-diphenyl-trichloroethane
DeCA	Defense Commissary Agency
DERP	Defense Environmental Restoration Program
DLA	Defense Logistics Agency
DMM	discarded military munitions
DNH	Virginia Department of Natural Heritage
DNL	Day-night average sound level
DO	Dissolved Oxygen
DoD	Department of Defense
DoDI	Department of Defense Instruction
Dominion	Dominion Virginia Power Company
DPW	Department of Public Works
DPW-ENRD	Directorate of Public Works–Environmental and Natural Resources Division
DPWL	Directorate of Public Works and Logistics
DRMO	Defense Reutilization and Marketing Office
DTRA	Defense Threat Reduction Agency
EBS	Environmental Baseline Survey
EIFS	Economic Impact Forecast System
EIS	Environmental Impact Statement
EMS	Emergency Medical Services
ENRD	Environmental and Natural Resources Division
EO	Executive Order
EOC	Emergency Operations Center
EPG	Engineer Proving Ground
EPA	U.S. Environmental Protection Agency
EQC	Environmental Quality Corridor
ERDL	Engineer Research & Development Laboratories
ERTC	Engineer Replacement Training Center
ESS	Explosive Safety Submission
EUL	enhanced use leasing
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FACEUP	Federal Agencies Chesapeake Ecosystem Unified Plan
FAR	Federal Aviation Regulations
FAR	Floor Area Ratio
FBRC-LLC	Fort Belvoir Residential Communities Limited Liability Company
FCPS	Fairfax County Public School System
FEMA	Federal Emergency Management Agency
FFCA	Federal Facilities Compliance Agreement
FHWA	Federal Highway Administration
FICUN	Federal Interagency Committee on Urban Noise
FPCON	Force Protection Condition
FPPA	Farmland Protection Policy Act
FR	Federal Register
ft^2	square feet
ft/veh	feet per vehicle
FY	Fiscal Year
GCD	general conformity determination
GCR	General Conformity Rule
GIS	geographic information system
GP	General Purpose
gpd	gallons per day
GSA	General Services Administration
gsf	gross square feet
gpm	gallons per minute
GW	George Washington
GWLF	Generalized Watershed Loading Functions Model
HABS	Historic American Buildings Survey
HAP	Hazardous Air Pollutant
HEC	Humphreys Engineering Center
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
HQ	Headquarters
HRR	Historical Records Review
HSP	Health and Safety Plan
HUC	Hydrologic Unit Code
HUD	Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
HWMU	Hazardous Waste Management Unit
Hz	Hertz
I	industrial
I-3	Light Intensity Industrial District
I-395	Interstate 395, Shirley Highway
I-495	Interstate 495, Capital Beltway
I-6	Heavy Industrial District
I-95	Interstate 95
ICRMP	Integrated Cultural Resources Management Plan
IDG	Installation Design Guide
INRMP	Integrated Natural Resources Management Plan

INSCOM	U.S. Army Intelligence and Security Command
IPM	Integrated Pesticide Management
IPMP	Integrated Pesticide Management Plan
ISDN	integrated services digital network
ITE	Institute of Transportation Engineers
ITEC4	Information Technology, E-Commerce, and Commercial Contracting Center
JMAWR	Jackson Miles Abbott Wetland Refuge
JPRA	Joint Personnel Recovery Agency
K ft^2	thousand square feet
kV	kilovolt
L_{eq}	Equivalent Sound Level
$L_{eq}(1)$	1-hour Equivalent Sound Level
lb	pound
LAER	Lowest Achievable Emission Rate
LBP	lead-based paint
LEED	Leadership in Energy and Environmental Design
LF	Linear Feet
LID	Low Impact Development
LOS	Level of Service
LPM	Lead Program Manager
LRC	long-range component
LRT	Light-rail transit
LRTP	Long Range Transportation Plan
M ft^2	million square feet
MACT	Maximum Achievable Control Technology
MAPS	Monitoring Avian Productivity and Survivorship Program
MASC	magnetometer-assisted surface clearance
MC	Munitions Constituents
MDA HQCC	Missile Defense Agency Headquarters Command Center
MDW	Military District of Washington
MEC	munitions and explosives of concern
MEDCOM	U.S. Army Medical Command
µg/l	micrograms per liter
mg/l	milligrams per liter
µg/m3	micrograms per cubic meter
mgd	million gallons per day
MGMC	Malcolm Grow Medical Center
mm	millimeter
MMcf	Million Cubic Feet
MMRP	Military Munitions Response Program
MN	Map Number
MOE	Measures of Effectiveness
MP	Military Police
MPO	Metropolitan Planning Organization
MSA	Metropolitan Statistical Area
MS4s	municipal separate storm sewer systems
MSC	Museum Support Center
MWAQC	Metropolitan Washington Air Quality Committee
msl	mean sea level
MVA	megavolt amperes
MWCOG	Metropolitan Washington Council of Governments
MWR	Army and Air Force Morale, Welfare, and Recreation
NAA	Nonattainment area
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAF	Nonappropriated Funds
NAGPRA	Native American Graves Protection and Repatriation Act
NAICS	North American Industry Classification System
NARMC	North Atlantic Regional Medical Center
NAWQA	National Water-Quality Assessment
NB	Northbound
NBC	nuclear, biological, and chemical
NCPC	National Capital Planning Commission
NCR	National Capital Region
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	no further action
NGA	National Geospatial-Intelligence Agency
NHPA	National Historic Preservation Act
NIH	National Institutes of Health
NMFS	National Marine Fisheries Service
NNMC	National Naval Medical Center
NNSR	Nonattainment New Source Review
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
NOA	Notice of Availability
NOI	Notice of Intent
NOISEMAP	Aircraft Noise Prediction Model
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service

NRHP	National Register of Historic Places
NSPS	new source performance standards
NSR	new source review
NSR	Noise Sensitive Receptors
NVTC	Northern Virginia Transportation Commission
O_3	ozone
OB/OD	Open Burning/Open Detonation
OE	Ordnance and Explosives
OSAA	Operational Support Airlift Agency
OSACOM	Operational Support Airlift Command
OSHA	Occupational Safety and Health Administration
OTR	Ozone Transport Region
PA	Programmatic Agreements
PAH	polycyclic aromatic hydrocarbon
PAM	Department of the Army Pamphlet
PAO	Directorate of Public Affairs Office
PAT	Petersburg Area Transit
Pb	lead
PCB	polychlorinated biphenyls
pCi/L	Picocurie per liter
PCPI	per capita personal income
PDA	Physical Disability Agency
PDH	Planned Development Housing
PEO EIS	Program Executive Office, Enterprise Information Systems
PFM	Public Facilities Manual
PIF	Partners in Flight
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PMCL	primary maximum contaminate level
PM DCATS	Project Manager Defense Communications and Army Transmission Systems
PMP	Petroleum Management Program
POL	petroleum, oil, and lubricants
POTTF	Upper Potomac River segment of the Chesapeake Bay Program
POV	privately owned vehicle
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
PRG	Preliminary Remediation Goals
PRS	Petroleum Release Site
PSA	Petroleum Storage Area
PSD	prevention of significant deterioration
PVC	polyvinyl chloride
PX	post exchange
R	Residential
R-1	Residential District, 1 dwelling unit per acre
R-3	Residential District, 3 dwelling units per acre
R-8	Residential District, 8 dwelling units per acre
R-20	Residential District, 20 dwelling units per acre
R-E	Residential Estate District
R&D	Research and Development
RCI	Residential Communities Initiative
RCRA	Resource Conservation and Recovery Act
REX	Richmond Highway Express Metrobus service
RFID	radio frequency identification
RMA	Resource Management Area
ROD	Record of Decision
ROI	region of influence
ROTC	Reserve Officers Training Corps
ROW	Right-of-Way
RPA	Resource Protection Area
RPMP	real property master plan
RTV	Rational Threshold Value
RV	Recreational Vehicle
SA	Secretary of the Army
SAB	Special Advisory Board
SARA	Superfund Amendments and Reauthorization Act of 1986
SAV	submerged aquatic vegetation
SB	Southbound
SCIF	sensitive compartmented information facility
SDDC	Surface Deployment and Distribution Command
SEAhut	Southeast Asia huts
sec/veh	seconds per vehicle
SFDC	Southeast Fairfax Development Corporation
sf	square feet
SHPO	State Historic Preservation Officer
SI	Site Investigation
SIP	State Implementation Plan
SM-1	Stationary, Medium Power–First Prototype nuclear power plant
SNA	Special Natural Area
SO_2	Sulfur Dioxide
SOP	Standard Operating Procedures
SOV	Single Occupancy Vehicle
SPL	sound pressure level
SRC	Short-range component
STORET	STOrage and RETrieval

SU	standard units (units of measure for pH)
SWM	Storm Water Management
SWMU	Solid Waste Management Unit
SWPPP	Storm Water Pollution Prevention Plan
TAZ	Traffic Analysis Zone
TBD	to be determined
TBO	Total Build-Out
TBT	Tributyltin
TDMC	Transportation Demand Management Coordinator
TIP	Transportation Improvement Plan
TKN	Total Kjeldahl Nitrogen
TMDL	Total Maximum Daily Load
TMP	Transportation Management Plan
TN	Total Nitrogen
TNM	Traffic Noise Model
TOC	Total Organic Carbon
Total N	Total Nitrogen
Total P	Total Phosphorus
TP	Total Phosphorus
tpd	tons per day
tpy	tons per year
TR-55	Technical Release 55 small watershed model
TRB	Transportation Research Board
TSCA	Toxic Substances Control Act
TSS	Total Suspended Solids
UFC	Unified Facilities Criteria
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USANCA	U.S. Army Nuclear and Chemical Agency
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UST	underground storage tank
UXO	unexploded ordnance
VA	Virginia
VAC	Virginia Administrative Code
V/C	volume to capacity
VDCR	Virginia Department of Conservation and Recreation
VDCR-NHP	Virginia Department of Conservation and Recreation–Natural Heritage Program
VDACS	Virginia Department of Agriculture and Consumer Services
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VMRC	Virginia Marine Resources Commission
VMT	vehicle miles traveled
VOC	volatile organic compounds
VPDES	Virginia Pollution Discharge Elimination System
vph	vehicles per hour
vph/gate	vehicles per hour per gate
vphpl	vehicles per hour per lane
VRE	Virginia Railway Express
VSI	visual site inspection
VSMP	Virginia Stormwater Management Program
VWP	Virginia Water Protection
WHS	Washington Headquarters Services
WMATA	Washington Metropolitan Area Transit Authority
WRAMC	Walter Reed Army Medical Center
WWII	World War II

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