



BRAC

REPORT

SUBMITTED BY



Maryland Department of Planning

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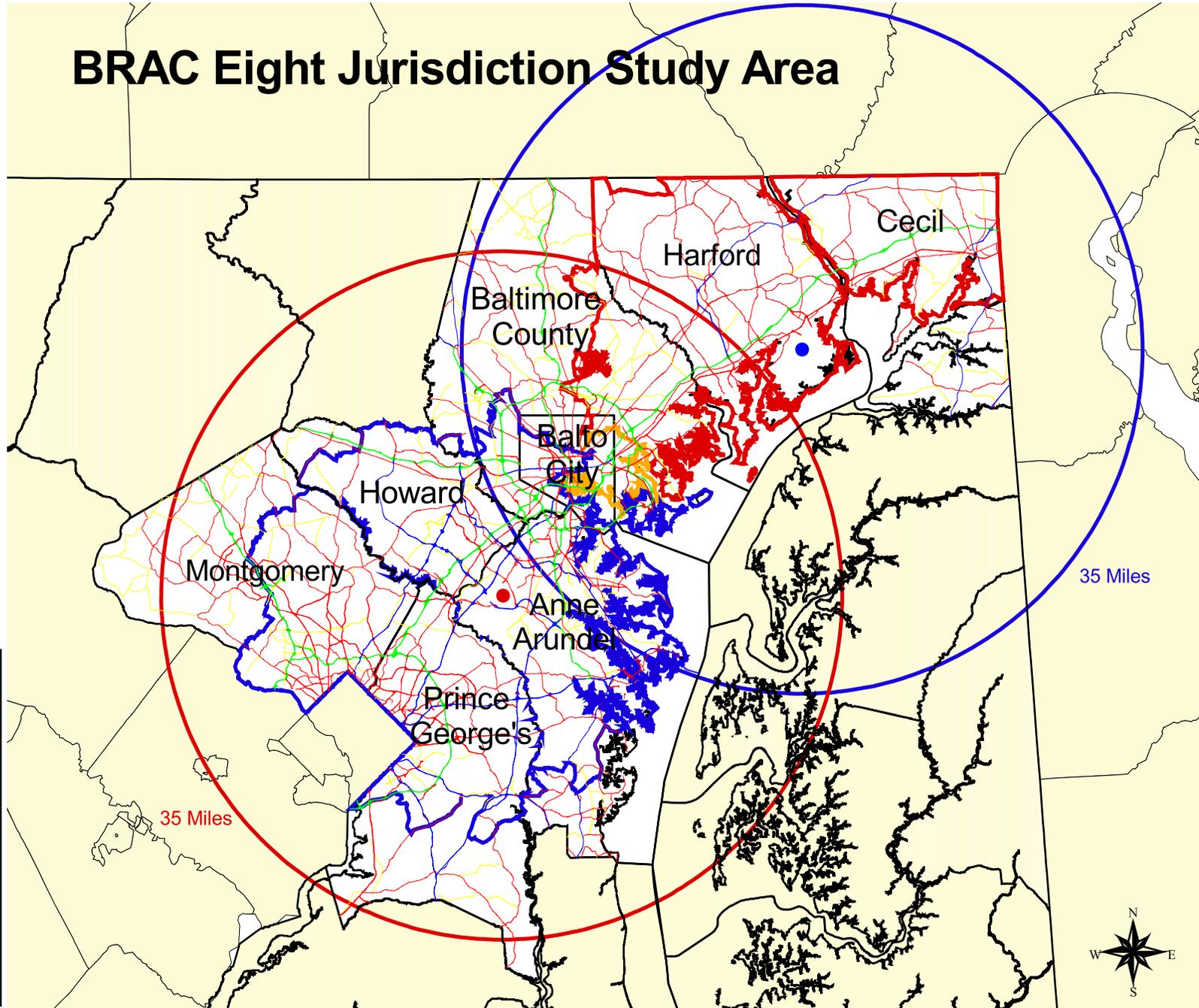
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BRAC Eight Jurisdiction Study Area



20 0 20 40 Miles

NOTE ON REPORT COVERAGE

Report Coverage

This report covers the impact from those jobs and associated household changes specifically tied into the Base Realignment and Closure (BRAC) Commission recommendations that became law in November 2005. The impacted bases in Maryland covered in this report include Aberdeen Proving Ground in Harford County, Andrews Air Force Base in Prince George's County, National Naval Medical Center in Montgomery County and Fort George G. Meade in Anne Arundel County.

It should be noted that this report does **NOT** cover additional job growth and associated households resulting from expansion of the National Security Agency (NSA) at Fort George G. Meade. It has been reported that beginning in 2004 the NSA has been adding 1,500 new jobs each year, and will have added a total of 7,500 jobs by the end of 2008.

I. INTRODUCTION

This report examines the growth impacts associated with BRAC-related employment changes at each of the following military installations:

- Aberdeen Proving Ground
- Fort Meade
- National Naval Medical Center
- Andrews Air Force Base

The study area for this report is the City of Baltimore and the following counties that are directly and indirectly impacted by the influx of BRAC related workers: Harford, Cecil, Baltimore, Anne Arundel, Howard, Prince George's and Montgomery. The analysis incorporates the employment projections reported by SAIC and the likely residence of BRAC-related workers (including indirect and induced workers) as reported by RESI of Towson University. The potential impacts of these projections are reviewed from several perspectives:

- housing supply and demand;
- water and sewer;
- power;
- fiber optic;
- transportation; and
- school impacts.

This report also includes a housing evaluation of each of the above-listed jurisdictions. This evaluation utilizes the employment projections and allocations from previous tasks, together with the income expectations that are associated with each employment segment, to determine the estimate of new household demand by jurisdiction and income grouping. Using this projected household demand, the analysis evaluates the capacity of each jurisdiction's existing and projected housing inventory to satisfy the expected demand.

Also included in this report are K-12 public and private school surveys in the eight-jurisdiction study area. For public schools, this survey includes the current capacity, future enrollments and individual school performance measures. For private schools, type of school and current enrollment information is listed.

II. EXECUTIVE SUMMARY

A. Key Findings

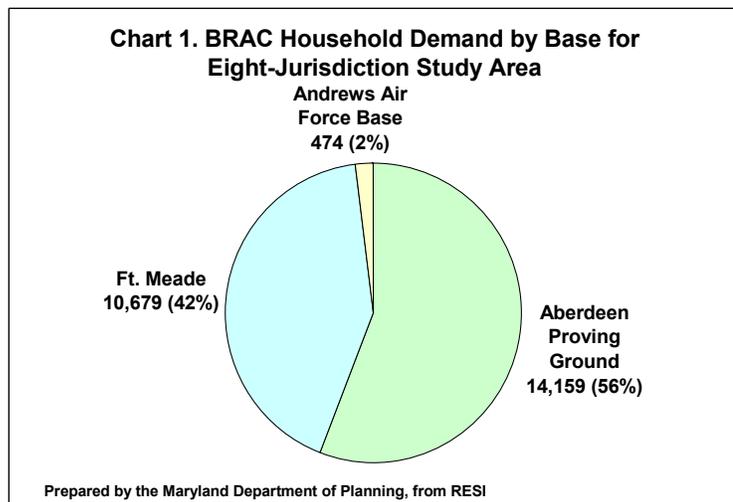
- Overall, the growth due to BRAC will increase development pressures in several jurisdictions in the context of what are already fairly high growth rates across much of the Baltimore-Washington, D.C. metropolitan area. These growth pressures will be strongest in Harford and Cecil counties based on an analysis of BRAC demand and anticipated supply of both new and existing housing units available to all in-migrants over the 2009 to 2015 time period, the seven-year period when BRAC housing demand is expected to be strongest.

- In light of the BRAC growth, many jurisdictions will need to take significant steps now to enable their growth areas (i.e., Priority Funding Areas (PFAs) and areas served by sewer and water, existing or soon to be served) to accommodate more development capacity (upzoning, providing infrastructure and public services, etc.). In addition, some jurisdictions need to take actions now to better protect their rural areas, principally due to weak rural zoning, given the anticipated additional development pressures from BRAC-related growth. Otherwise these areas could see faster build out of their Priority Funding Areas with increased development pressure spilling out to the remaining rural lands.

B. Housing Demand and Supply – Eight Jurisdiction Overview

- A total of 25,312 of the 28,176 total BRAC households are expected to locate to the eight-jurisdiction study area as a result of the BRAC-related jobs coming to Maryland.

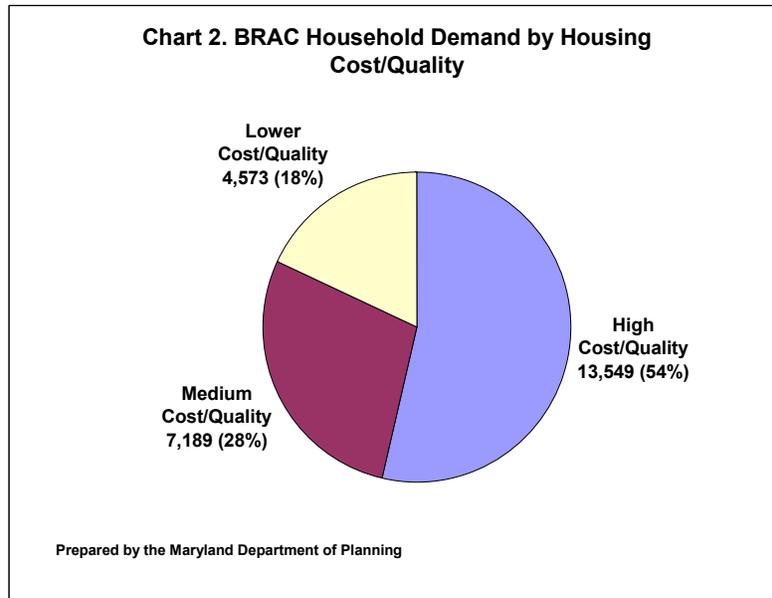
- The largest portion of new households are expected to be generated by expansion at Aberdeen Proving Ground (14,159, or 55.9%), with the bulk of the remaining households associated with expansion at Fort Meade (10,679, or 42.2%). Approximately 474 households (1.9%) are associated with new jobs at Andrews Air Base.¹ (See Chart 1.)



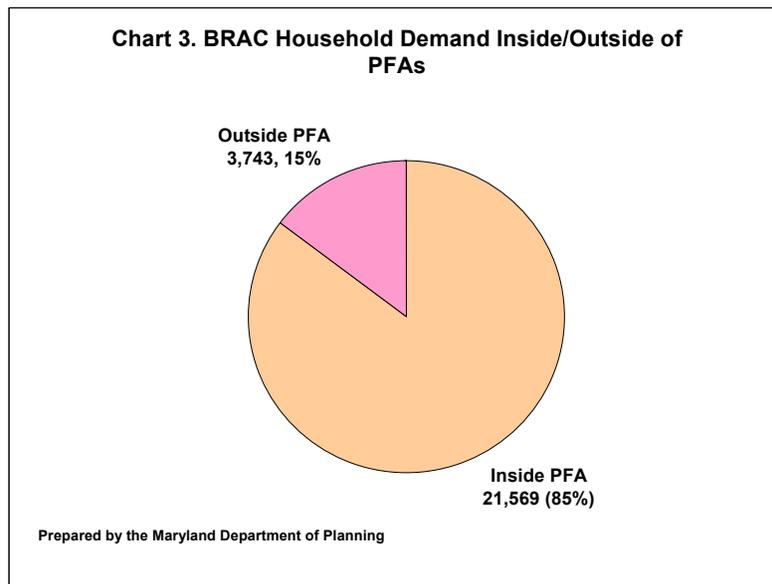
¹ For the purposes of this report, the shifting of 1,200 positions from the Walter Reed Army Medical Center in Washington, D.C. to the National Naval Medical Center in Montgomery County was viewed as a “wash” in terms of household impact since the two facilities are only six miles apart. The household impact of this move was also not evaluated by RESI. However, the increased staff levels were taken into account in the transportation analysis.

•Of these new households, approximately 3,500, or 13.9 percent, are expected to be renters, with the remaining portion homeowners.

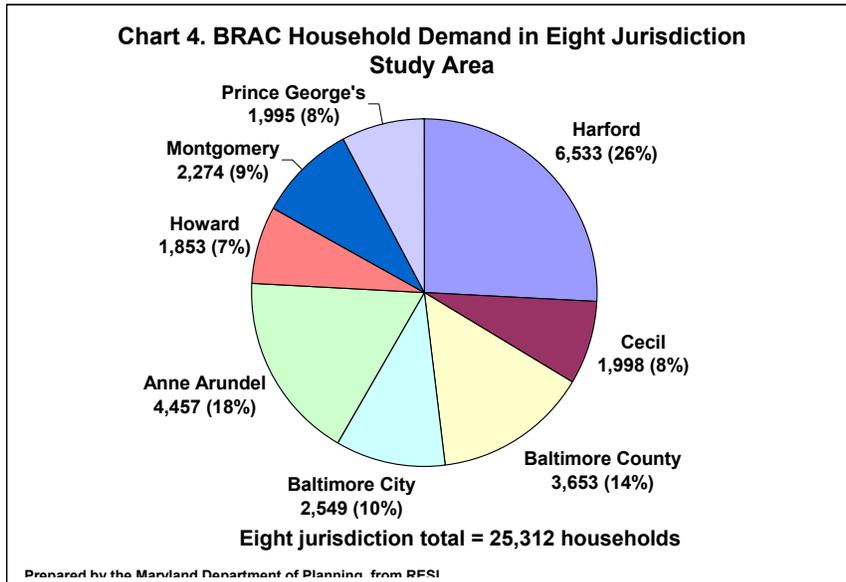
•Of the 25,312 new households, 13,549 (53.5%) are expected to look for housing of “higher cost/quality,” 7,189 (28.4%) are expected to look for housing of “medium cost/quality,” and 4,573 (18.1%) are expected to look for housing of “lower cost/quality.” (See Chart 2.)



•Of the 25,312 households, 21,569, or 85.2 percent, are expected to locate within areas designated as Priority Funding Areas (PFAs) or served by sewer, existing or shortly planned, and 3,743, or 14.8 percent, are expected to locate outside of a PFA/sewer area. (See Chart 3.)



- Household totals are expected to be highest in Harford County (6,533, or 25.8%), and Anne Arundel County (4,457, or 17.6%), followed by Baltimore County (3,653, or 14.4%), Baltimore City (2,549, or 10.1%), Montgomery County (2,274, or 9.0%), Cecil County (1,998, or 7.9%), Prince George’s County (1,995, or 7.9%) and Howard County (1,853, or 7.3%). (See Chart 4.)



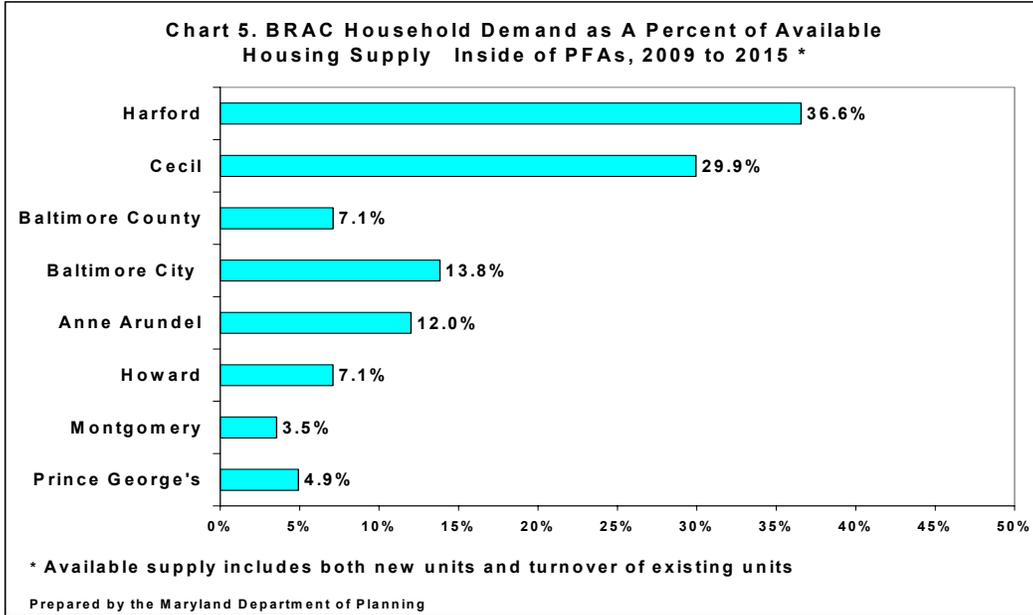
B.1 Housing Demand and Supply – Individual Jurisdictions

- Harford County** appears to have the greatest development pressures from BRAC. BRAC households in Harford County (6,533) represent well over one-third (38.1%) of the County’s supply of housing units expected to be available to all in-migrants over the 2009 to 2015 time period.² This pressure is higher outside of PFAs, where BRAC demand (1,501 households) is closer to one-half (44.5%) of expected available supply, while it is just over one-third (36.6%) of the expected supply within PFA/sewer areas (5,032 units). (See Charts 5 & 6.)

- With development pressure accelerating because of BRAC, there is an increased urgency for plans and actions now to address infrastructure and public services needs (especially water and sewer service, schools, and transportation). If BRAC development occurs without this investment, the likely consequences are further threats to rural land preservation in the County and/or further deflecting of growth outward to surrounding jurisdictions, specifically Cecil County in Maryland or out of state (Pennsylvania and Delaware).

² Available units are the sum of both new and existing units (through sales turnover) expected to be available to **all** new in-migrants (not just from BRAC) over the 2009 to 2015 time period. See Section E.1 for a discussion on the derivation of available housing to all in-migrants.

- Most Harford County BRAC households are expected to locate within a 45-minute commute of Aberdeen Proving Ground (APG). In this area, there is the possibility of substantial development pressure with respect to higher cost/quality housing both within and outside of PFA/sewer areas. Within PFA/sewer areas, BRAC demand (over 2,200 households) is seen as equaling two-thirds (66.7%) of the available supply of higher cost/quality housing to in-migrants, while outside the PFA areas, BRAC demand of just under 1,300 households is well over one-half (57.9%) of the expected available higher cost/quality housing supply.



- To a lesser extent, but still significant, pressures will also exist in the 45-minute commute shed to develop lower cost housing inside of PFAs. In this case, expected BRAC demand (1,150 households) is seen as making up nearly one-third (31.3%) of the available housing supply in this cost/quality range.

- If these potential development pressures, particularly from high-income households, are to not lead to accelerated loss of rural lands, then planning and support for infrastructure investments need to be made now to better match supply and demand.

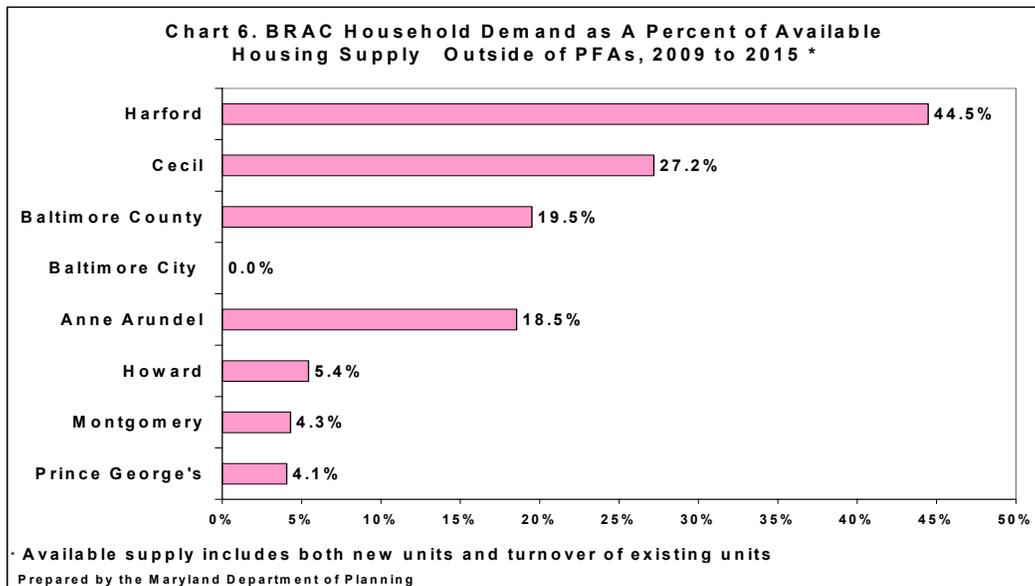
- Cecil County** is expected to have the second strongest development pressure due to BRAC even though it is only expected to have the sixth highest number of BRAC households in the eight-jurisdiction study area. In Cecil County, the 1,998 BRAC households are estimated to represent 28.9 percent of the expected supply of housing available to all in-migrants over the 2009 to 2015 time period. These development pressures are slightly higher inside of PFAs (29.9%) than outside of PFAs (27.2%).

- The greatest potential development pressure between demand and supply in Cecil County will be for higher cost/quality housing both inside and outside of PFA/sewer areas. Within PFAs, the BRAC household demand of 336 units is estimated to be over

one-half (57.0%) of the housing supply available to in-migrants over the 2009 to 2015 time period. Outside of the PFAs, the BRAC expected demand of 452 units is estimated to be just under one-half (48.1%) of the available supply.

- In contrast, development pressure for the medium and lower cost/quality housing inside of PFAs is expected to be much less, where BRAC demand is estimated to make up around one-fourth of available housing supply in each of these two categories.

- In general, Cecil County has the land capacity to absorb the expected BRAC households, but must immediately take the steps and get the appropriate funding necessary for the investments to meet infrastructure requirements which will support a more compact development pattern inside the PFA/sewer areas and reduce the more scattered pattern of development outside of PFA/sewer areas.



- Anne Arundel County**, with the second largest total of BRAC related households (4,457) is expected to have the fourth strongest BRAC-related development pressure in the eight-jurisdiction study area. BRAC households are expected to make up 12.5 percent of the estimated housing supply available to in-migrants over the 2009 to 2015 time period. This development pressure is stronger outside of PFAs (18.5%) than inside of PFAs (12.0%).

- The overwhelming majority (96.7%) of BRAC households in Anne Arundel County are expected to locate within a 45-minute commute of Fort Meade. Less significant differences are seen between BRAC household demand and available housing supply to in-migrants in this area. BRAC housing demand as a percent of expected available housing supply is highest for higher cost/quality households outside of PFA areas, where the BRAC demand (500 households) is seen as taking up about one-fifth (20.1%) of the available housing supply for in-migrants compared to 16.9 percent (or just over 1,800 units) for higher cost/quality households inside the PFA areas. About the same share of

available supply is seen for BRAC demand associated with lower cost/quality housing inside of PFAs (19.6%, or just over 800 units).

- Baltimore County**, unlike most other jurisdictions, will be impacted directly from expansions at both Fort Meade and APG. Just over 1,500 households out of 3,653 are expected to locate within a 45-minute commute of APG, mostly on the east side of Baltimore County. The relationship between expected demand and available supply is tightest here in the higher cost/quality areas inside PFAs where demand (nearly 500 households) makes up over one-half (57.0%) of expected available supply through 2015.

- The other major portion of BRAC-related households for Baltimore County is expected to locate within a 45-minute commute time of Fort Meade, mostly on the southwest side of the County (just over 700 households). Here, too, the demand for high cost/quality housing (about 350 units) is seen as comprising nearly two-thirds (64.8%) of the supply of housing expected to be available to all in-migrants over the 2009 to 2015 time period.

- Despite apparent potential growth pressures for areas of higher cost/quality housing, however, overall, BRAC household demand is seen as comprising only 8.1 percent of the housing supply available to all in-migrants over the 2009 to 2015 period. This pressure is less within PFAs (7.1%) than outside of PFAs (19.5%).

- Baltimore City**, like Baltimore County, is expected to receive BRAC-related households from the expansions at both APG and Fort Meade. Areas of the City that are within both of the 45-mile commute sheds around APG and Fort Meade are expected to exhibit the most development pressure. Specifically, this pressure should be highest for higher cost/quality housing, where BRAC demand (just over 1,000 households) is expected to be just less than one-half (48.6%) of the estimated supply available to all in-migrants. For medium cost/quality housing, demand for about 250 units is estimated to be about one-fifth (21.6%) of expected supply. For lower cost/quality housing, BRAC demand is seen as being less than 10 percent of the anticipated supply in all affected areas of the City. Overall, BRAC household demand is seen as comprising 13.8 percent of the housing supply available to all in-migrants over the 2009 to 2015 period.

- Montgomery County's** nearly 2,300 BRAC-related households represent less than 4.0 percent of the anticipated supply available to in-migrant households over the 2009 to 2015 period.³ No major demand versus available supply issues are identifiable at the small area level.

- Prince George's County's** nearly 2,000 BRAC-related households are less than 5.0 percent of the estimated housing supply to be available to all in-migrants over the 2009 to 2015 time period. Here, too, no major demand versus anticipated supply issues are identifiable at the sub-County level.

³ The just over 1,700 households for Montgomery County are the total impact (direct, indirect and induced) from expansions at Aberdeen Proving Ground, Fort Meade and Andrews Air Force Base.

•**Howard County's** 1,853 BRAC-related households represent just 6.9 percent of the estimated supply available to all in-migrants in the 2009 to 2015 time period. One potential area of increased development pressure for the County is within the 45-minute commuting shed of Fort Meade where the BRAC housing demand in the lower cost/quality category (just under 300 households) makes up one-quarter of the estimated available supply.

C. Water and Sewer

•**Update Plans:** All jurisdictions should review the impact of BRAC on the water resources in their communities and promptly review and update their local Comprehensive Plans and County Water and Sewerage Plans. They should also initiate preparation of the newly required Water Resources Element. These plans must reflect and accommodate the BRAC growth and take into consideration the best water resources information available including any development limitations resulting from regulatory programs such as TMDLs, Tributary Strategies and the Chesapeake Bay Program.

•**Harford and Cecil Counties:** Harford and Cecil Counties and their municipalities are facing challenges for providing adequate community water supply resources and water and sewage treatment capacity. It is recommended that they accelerate efforts to resolve inter-jurisdictional planning, regulatory, and other related issues.

•**Federal and State Financial and Technical Assistance:** Federal and State financial and technical assistance should be provided to help all impacted local governments expedite meeting the planning prerequisites necessary to support the BRAC in migration in a manner consistent with State and local Smart Growth policies.

•**Rural Preservation Programs:** In conjunction with providing adequate community water and sewerage facilities to accommodate growth in designated growth areas, all counties should review and make appropriate improvements to their rural preservation programs to assure that the added growth pressure from BRAC will not damage rural economies and other important values. In particular, Harford and Cecil Counties should review their programs in this regard.

D. Power and Fiber Optic Capacity

•Residential growth attributable to BRAC does not concern BGE, the supplier of power in the area. Most of the residential development has been planned for with or without the influx of BRAC households.

•In all areas around each of the three military bases that BGE serves (APG, Fort Meade and NNMC) capacity is not an issue for the foreseeable future. However, because of the

expected upsurge in high tech business needs, BGE is currently evaluating its existing capacities in and around each of the three bases.

- All major cable and Internet companies indicate that they are fully prepared to provide or continue to provide service to all communities impacted by BRAC. No companies are changing their growth or expansion plans due to the influx of new employees to any of the Maryland military bases.

E. Transportation Overview

- Since BRAC does not bring new and different sources of funding with it, it will be necessary to work within Maryland's existing financial capabilities to address the most important transportation needs.
- It should be noted that MDOT does not have all the financial resources to construct all of the investments that are indicated in this report. Identifying priorities and coordinating resources among all parties (state agencies, local jurisdictions and the military communities) will remain critical in realizing effective transportation project starts. Partnering with local governments, developers, and other innovative strategies will be required to implement most of the studies and projects that are described herein.
- Many of the recommended transportation studies and investments would most likely be needed with or without BRAC. The necessity and feasibility of individual projects should be determined through additional study. Also, it will be vitally important for Maryland to identify additional funding sources such as Defense Access Funds to assist in the planning and construction of BRAC related transportation facilities. This does not supersede MDOT's own analyses of BRAC related transportation impacts as well as funding priorities and financial estimates for recommended facilities.
- As the impacts of BRAC-related growth continue to be realized, the Maryland Department of Transportation intends to partner with local governments, transit providers, and regional agencies to identify changing priorities and to explore creative new funding mechanisms that can bolster Maryland's Transportation Trust Fund.

E.1 Transportation Impacts by Individual Base

Andrews Air Force Base

- Address operational characteristics along MD 337 and MD 5/MD 337 interchange to accommodate increased peak period demand. Move forward with existing CTP highway projects at MD 4, MD 5 and I-95/I-495 in the vicinity of the installation.

- Explore Transportation Management Demand techniques to reduce single occupant mode split and reduce vehicle congestion during peak periods. Encourage increased use of local Metrorail transit by base employees and contractors through shuttle service and existing transit.

National Naval Medical Center

- Initiate studies to address operational characteristics at MD 355 and Cedar Lane, MD 355 at South Drive/Wood Road, MD 195 at Jones Bridge Road, and MD 355 at Pooks Hill Road to address increased congestion.
- Explore increased Transportation Management Demand including a "Vehicle Rate Reduction Cap" at this installation to reduce vehicle congestion during peak periods. Encourage increased use of existing Metrorail transit through intersection improvements including medians and timed pedestrian signal heads.
- A feasibility study of bus transit in the vicinity of the National Naval Medical Center in Bethesda should be conducted with particular emphasis on expansion of the number of bus transit bays at the Medical Center Metrorail Station or at a nearby location.

Aberdeen Proving Ground

- The feasibility of value pricing options and transportation demand management should be studied for I-95 to accommodate BRAC-related increase travel demand on crossing roadways in the interchange areas.
- Reexamine the Perryman Access Study to provide improved access from the Perryman Peninsula to the state road network and to APG.
- Initiate feasibility or planning studies of, MD 7, MD 543, MD 22, MD 152, MD 715, and MD 155 as the need arises to alleviate forecasted congestion resulting from BRAC related expansion at Aberdeen.
- Explore expansion of a variety of rail and transit services in the Aberdeen area to meet forecasted demand associated with BRAC employee growth. Exploration of Aberdeen multi-modal transit center is recommended.
- Explore a variety of Transportation Management Demand techniques and base shuttle service to reduce single occupant vehicle use and reduce overall vehicle congestion including a "Vehicle Rate Reduction Cap" to manage forecasted vehicular congestion.
- Operational improvements to local thoroughfares in Aberdeen including improvement studies at MD 22 and MD 715 should be initiated or accelerated to alleviate projected vehicular congestion. Sidewalk connections and bicycle access should be incorporated.

- Explore the feasibility of regular Shuttle Bus Service to/from the existing/relocated MARC Station to APG to encourage increased use of MARC and AMTRAK service by employees and contractors at APG.

Fort Meade

- Complete current project planning and seek construction of MD 175, MD 198, and MD 3 to meet projected BRAC demand. Sidewalk and bicycle access should be incorporated from the Odenton MARC station.
- Initiate planning of segments of I-95, MD 170, MD 713, MD 32 and US 1 to address forecasted congestion resulting from BRAC related growth at Fort Meade.
- Explore a variety of Transportation Management Demand techniques and base shuttle service to reduce single occupant vehicle use and reduce overall vehicle congestion including a "Vehicle Rate Reduction Cap" to manage forecasted vehicular congestion.
- Explore expansion of a variety of rail and transit services in the Fort Meade area to meet forecasted demand associated with BRAC employee growth. Accelerate planning and construction of Central Maryland Transit Operations Facility to serve as a local transit hub.
- Initiate feasibility study of WMATA Green Line to Fort Meade as a long- term horizon project.

F. Public Schools

- The anticipated in-migration of households associated with projected employment growth at the four BRAC installations will result in what is currently an undetermined increase in the number of school-aged children in each of the affected jurisdictions. Affected LEAs should review BRAC household demand in Table 2 of this report to assist in their determination of estimates of school enrollment forecasts resulting from BRAC household in-migration. These forecasts should be used in the development of BRAC related public school construction requests for the upcoming FY 2009 CIP cycle.
- Any additional school capacity, including that potentially generated by BRAC, must be substantiated by a county's Local Education Agency (LEA) and approved by the State through established mechanisms. The Interagency Committee on School Construction (IAC) determines whether requested building improvements are warranted, and considers them based on formulas for State construction assistance and guidelines for assessing facility needs that are established in State law and in regulation. Priority of need is a top consideration, and a constant factor during review

is the equitable distribution of CIP funding throughout the State and fulfillment of State commitments for providing equal educational opportunities across the State. It is very important for LEAs to effectively analyze BRAC related enrollment increments and to phase enrollment and capacity needs over several years in order to meet projected school needs in 2015.

- The recently submitted FY 2008 CIP requests from the BRAC impacted jurisdictions do not appear to incorporate hard data to assess the projected BRAC school impact needs in the eight jurisdictions covered in this report. This should be corrected for the FY 2009 CIP cycle.
- The finite amount of State funding allocated each year for school construction projects does not currently meet the total needs submitted by LEAs, and in future years it will not likely meet the additional funding needs resulting from BRAC.
- In order to meet BRAC related school construction needs, it may become necessary to develop a supplemental procedure for out of cycle funding. It may also become necessary to seek supplemental funding from federal sources for those school districts that are most heavily impacted by BRAC-related population increases. Should the need arise, an additional round of funding could be considered if it is determined that the initial BRAC related school construction needs cannot be addressed through the FY 2009 CIP process which begins in the autumn of 2007.
- It is recommended that the BRAC school construction process prioritize school construction needs based upon school location and Priority Funding Area/Sewer Area status. Proximity to the military installations should be a factor in determination of school funding priorities. Through this process, both the proximity to the affected military installation and whether or not the school facility resides in a certified Priority Funding Area/sewerage area should be considered in the CIP prioritization process with school facilities located nearer to BRAC sites and in Priority Funding Areas receiving higher priorities.

III. HOUSING DEMAND AND SUPPLY

A. Overview – Demand

A total of 25,312 of the 28,176 statewide BRAC households are expected to locate in the eight-jurisdiction study area. Based on the expected incomes of the employees by industry classification, over one-half (53.5%) of these households will be looking for housing of “higher cost/quality,” just over one-quarter (28.4%) for housing of “middle cost/quality,” and just under one-fifth (18.1%) for “lower cost/quality” housing. (See Chart 7.) Since housing prices can be volatile and change quite rapidly over a relatively short period of time, the terms “lower,” “middle” (or “medium”) and “higher” refer to market segments over the entire housing stock distribution at a point in time.

The distribution of household demand by income group will vary by jurisdiction and depends on the type of jobs (direct, indirect and induced) generated at the three military bases covered in this study. Also relevant are the associated commutation patterns for the employees who fill these jobs, which determines where these households locate. While much has been made of the high-paying federal government and ancillary contractor jobs coming to Maryland because of BRAC, there are a number of less well-paying jobs that would be generated in indirect (secondary) and especially in the induced (tertiary) rounds of job generation, with the latter heavily concentrated in the traditional, household-servicing sector (e.g. retail trade or personal services).

As a result, the share of households by income group varies by jurisdiction. For example, in two of the jurisdictions that are most directly impacted by the expansion at APG – Harford and Cecil counties – Harford has a larger total and a larger share of higher income households (4,026 households, or 61.6% of total BRAC demand) than does Cecil County (973 households, or 48.6%). (See Chart 8 and Table 1.)

Of particular concern from a locational perspective is where these households will locate within jurisdictions. One key consideration is if the BRAC households will locate within Priority Funding Areas (PFAs) – areas served, or soon to be served, by water and sewer. Based on past development patterns, it is estimated that the overwhelming majority of BRAC households (85.2%) will seek to locate within PFA/sewer areas in the eight jurisdiction study area, with about one out of seven households (14.8%), locating outside of these planned growth areas.

The share of BRAC households by inside/outside PFAs varies somewhat across the eight-jurisdiction study area. The highest shares of BRAC households inside of PFAs are expected for Prince George’s (99.0%), Montgomery (95.3%) and Howard (91.1%) counties, with the lowest share seen for Cecil County (64.5%).⁴ (See Table 2.)

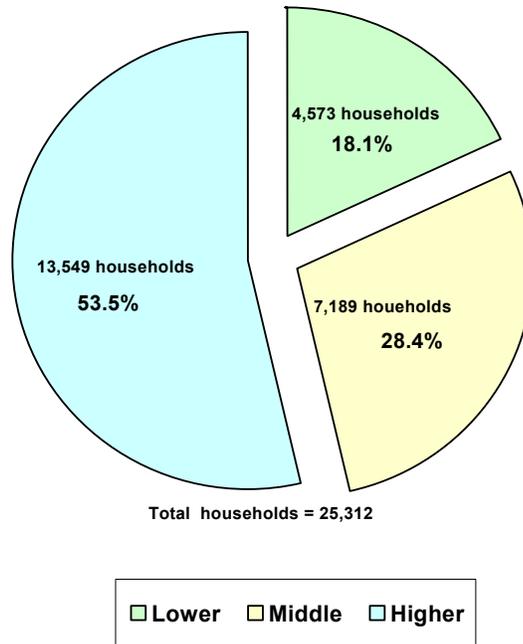
⁴ Technically, Baltimore City would have the highest share of BRAC households locate within a PFA (100.0%) since the entire City is a PFA.

Table 1 - BRAC Demand for Housing by Income Range of Workers *

	HHs Associated with all Bases - Phase 1				HHs Associated with all Bases - Phase 1				HHs Associated with all Bases - Phase 1			
	All Households				Homeowners				Renters			
	Low	Middle	High	Total	Low	Middle	High	Total	Low	Middle	High	Total
Harford	0	262	1,066	1,328	0	188	765	953	0	74	301	375
Cecil	0	69	255	324	0	50	183	233	0	19	72	91
Baltimore County	0	35	375	410	0	25	269	294	0	10	106	116
Baltimore City	0	14	250	264	0	10	179	189	0	4	71	75
Anne Arundel	0	11	703	714	0	8	505	513	0	3	198	201
Howard	0	5	239	244	0	4	171	175	0	2	67	69
Montgomery	0	8	75	83	0	6	54	59	0	2	21	23
Prince George's	0	43	116	159	0	31	83	114	0	12	33	45
Total	0	446	3,079	3,525	0	320	2,209	2,529	0	126	870	995
	HHs Associated with all Bases - Phase 2				HHs Associated with all Bases - Phase 2				HHs Associated with all Bases - Phase 2			
	All Households				Homeowners				Renters			
	Low	Middle	High	Total	Low	Middle	High	Total	Low	Middle	High	Total
Harford	773	1,472	2,960	5,205	659	1,300	2,708	4,667	114	172	252	538
Cecil	465	491	718	1,673	396	421	659	1,476	69	70	59	198
Baltimore County	674	934	1,635	3,243	574	800	1,499	2,873	100	134	136	370
Baltimore City	498	576	1,211	2,284	424	493	1,113	2,029	74	83	98	255
Anne Arundel	728	981	2,034	3,743	621	835	1,861	3,316	107	146	173	427
Howard	327	472	811	1,609	279	402	740	1,421	48	70	70	189
Montgomery	633	1,015	543	2,191	539	866	486	1,891	94	149	57	300
Prince George's	476	803	558	1,837	405	690	504	1,600	71	112	54	237
Total	4,573	6,743	10,470	21,787	3,897	5,806	9,571	19,273	677	938	900	2,514
	HHs Associated with all Bases - Phases 1 & 2				HHs Associated with all Bases - Phases 1 & 2				HHs Associated with all Bases - Phases 1 & 2			
	All Households				Homeowners				Renters			
	Low	Middle	High	Total	Low	Middle	High	Total	Low	Middle	High	Total
Harford	773	1,734	4,026	6,533	659	1,488	3,473	5,620	114	246	553	913
Cecil	465	560	973	1,997	396	471	842	1,709	69	89	131	289
Baltimore County	674	969	2,010	3,653	574	825	1,768	3,167	100	144	243	486
Baltimore City	498	590	1,461	2,548	424	502	1,292	2,218	74	87	169	331
Anne Arundel	728	992	2,737	4,457	621	842	2,366	3,829	107	149	371	627
Howard	327	477	1,049	1,853	279	406	912	1,596	48	71	138	257
Montgomery	633	1,023	618	2,274	539	871	540	1,951	94	152	78	324
Prince George's	476	845	675	1,996	405	721	588	1,714	71	124	87	282
Total	4,573	7,189	13,549	25,312	3,897	6,126	11,780	21,802	677	1,063	1,769	3,509

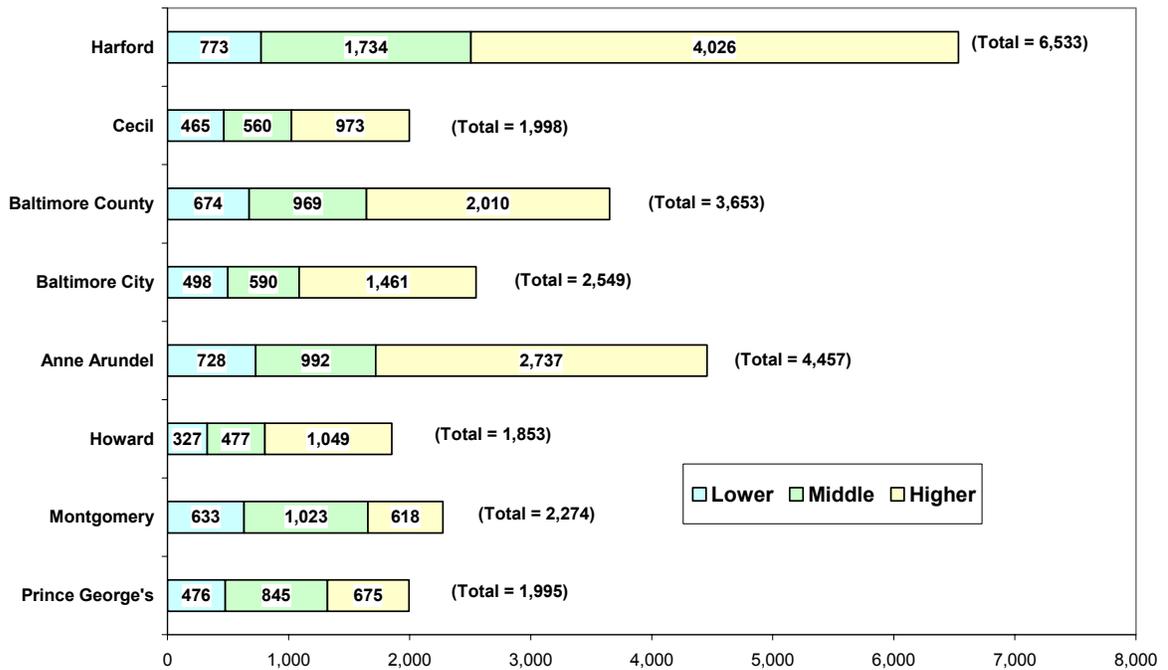
* "Low" = annual wage < \$30,000; "Middle" = annual wage between \$30,001-\$75,000; "high" = annual wage > 75,000

Chart 7. BRAC Household Demand by Income Group for the Eight Jurisdiction Study Area



Source: Maryland Department of Planning

Chart 8. BRAC Household Demand by Income Group



Source: Maryland Department of Planning

Table 2 - Summary of BRAC Household Demand Through 2015 in Relation to Expected Housing Supply

County	Harford	Cecil	Baltimore County	Baltimore City	Anne Arundel	Howard	Montgomery	Prince George's	Eight Jurisdiction Total
BRAC Household Demand:									
Phase 1 & 2 All HHs	6,533	1,998	3,653	2,549	4,457	1,853	2,274	1,995	25,312
Percent of Total:	25.8%	7.9%	14.4%	10.1%	17.6%	7.3%	9.0%	7.9%	100.0%
Inside PFA/Sewer Areas	5,032	1,288	2,953	2,549	3,917	1,688	2,166	1,976	21,569
Percent inside PFAs	77.0%	64.5%	80.8%	100.0%	87.9%	91.1%	95.3%	99.0%	85.2%
Outside PFA Sewer Areas	1,501	710	700	-	540	165	108	19	3,743
Percent outside PFAs	23.0%	35.5%	19.2%	-	12.1%	8.9%	4.7%	1.0%	14.8%
Expected New Units Available to Satisfy Household Demand for all In-Migrants /1									
Inside PFA/Sewer Areas	4,606	2,236	4,385	3,449	5,792	6,043	12,894	7,885	47,290
Outside PFA Sewer Areas	1,471	1,210	896	-	243	1,486	984	244	6,534
Expected Existing Units Available to Satisfy Household Demand for all In-Migrants /2									
Inside PFA/Sewer Areas	9,159	2,065	37,163	14,994	26,822	17,766	48,263	32,257	188,489
Outside PFA Sewer Areas	1,904	1,401	2,693	-	2,669	1,549	1,523	224	11,963
Expected Total Units Available to Satisfy Household Demand for all In-Migrants /3									
Inside PFA/Sewer Areas	13,765	4,301	41,548	18,443	32,614	23,809	61,157	40,142	235,779
Outside PFA Sewer Areas	3,375	2,611	3,589	-	2,912	3,035	2,507	468	18,497
Projected New HHs 2009 to 2015									
Inside PFA/Sewer Areas	9,032	4,968	8,250	10,450	11,594	9,683	26,848	17,573	98,398
Outside PFA Sewer Areas	2,941	2,688	1,840	-	517	2,476	2,343	609	13,414
Residential Buildout Capacity in 2009 /4									
Inside PFA/Sewer Areas	13,913	40,340	28,111	70,785	33,488	19,382	67,188	82,626	355,833
Outside PFA Sewer Areas	10,479	24,047	11,531	-	7,930	7,251	6,898	9,338	77,474
BRAC Household Demand as a Percent of Expected Total Units (both new and existing) Available to In-Migrants									
Total 2009-2015	38.1%	28.9%	8.1%	13.8%	12.5%	6.9%	3.6%	4.9%	10.0%
Inside PFA/Sewer Areas	36.6%	29.9%	7.1%	13.8%	12.0%	7.1%	3.5%	4.9%	9.1%
Outside PFA Sewer Areas	44.5%	27.2%	19.5%	-	18.5%	5.4%	4.3%	4.1%	20.2%

1/ New units available to in-migrants after allowing for intra-county migration and new household formation

2/ Existing units available to in-migrants after allowing for intra-county migration and new household formation

3/ Sum of new and existing units available to in-migrants

4/ The number of new units that can be accommodated beginning in 2009.

Prepared by Maryland Department of Planning, December 2006

B. Overview – Supply

There has been a good deal of debate as to what constitutes the “supply” of housing for BRAC households. Most analyses of these types of large economic migrations assume that all in-migrants will be accommodated by new housing. While new housing may well be the preference for many BRAC households coming into Maryland, particularly for those with higher incomes, the fact is that a substantial portion of BRAC households will be purchasing existing housing units.

As such, a methodology was developed that estimates the total supply of housing units that would be available to in-migrants (both BRAC related and other) taking into account the production of new units, the sales turnover of existing housing units, and the portion of each which are “consumed” by in-migrants as opposed to intra-county migrants and new in-county household formations. (See Table 3 for the derivation of total units available to in-migrant households. See Section E.1 for a description of the methodology.)

Over the 2009 to 2015 time period, the seven-year period when BRAC demand is expected to be most prominent, it is estimated that a total of 254,275 housing units would be available to all in-migrants (not just BRAC in-migrants) in the eight-jurisdiction study area. (See Table 2.) Of this total, approximately 200,450 (78.8%) would be available from the sales turnover of existing units, while 53,800 (21.2%) would be new units.

This new/turnover share varies by inside/outside of the PFAs as well as by jurisdiction. Overall, for the eight-jurisdiction study area nearly eight out of 10 (188,489/235,779, or 79.9%) of the available units inside of PFAs are due to sales turnover of existing units while the share outside of PFAs is a little more than six out of 10 (11,963/18,497, or 64.6%). (See Table 2.)

Cecil and Harford counties have the lowest share of available units comprised of sales turnover of existing units. For Cecil this share is only one-half (50.1%, or 3,466 units), while for Harford County it is just over six out of 10 (64.5%, or 11,062 units). (See Chart 9.) For Prince George’s (80.8%), Baltimore City (81.3%), Anne Arundel (83.0%) and Baltimore County (88.3%), the sales turnover of existing units makes up 80.0 percent or more of the total units available to all in-migrants.⁵

C. Overview – Demand vs. Supply

The comparison of BRAC household demand with available supply is not straightforward in a region as dynamic as the eight-jurisdiction study area. Each jurisdiction is subject to expansion and contraction of existing households; intra-county movements; migration between other counties in Maryland; migration between other states and Maryland counties; and, growth through foreign immigration. Even without BRAC, all of these

⁵ The reason for this is largely due to the size of the existing housing stock within the largest jurisdictions that yields the most turnover due to sales of existing units. Conversely, in jurisdictions like Harford and Cecil, new construction is a bigger share of the existing housing stock.

Table 3 - Derivation of Housing Unit Supply Available to all In-Migrants (BRAC and non-Brac Households)

	Harford	Cecil	Baltimore County	Baltimore City	Anne Arundel	Howard	Montgomery	Prince George's	Eight Jurisdiction Total
Derivation of Available Housing Unit (H.U.) Supply (2009 to 2015)									
1 Existing H.U.s through end of 2004	80,725	32,021	310,138	236,651	183,991	94,651	345,113	298,914	1,582,204
2 + Proj New H.U.s 2005 through end of 2008	6,891	3,975	10,314	4,229	8,701	7,112	18,283	11,947	71,452
3 = Total H.U.s at beginning of 2009	87,616	35,996	320,452	240,880	192,692	101,763	363,396	310,861	1,653,656
4 X Seven-Year turnover rate, 2009-2015 /a.	24.84%	21.38%	23.58%	19.49%	31.07%	30.26%	29.55%	23.52%	25.59%
5 = Turnover of existing units, 2009-2015 /b.	21,766	7,698	75,569	46,958	59,870	30,799	107,386	73,108	423,154
6 + Proj new H.U.s, 2009-2015	11,973	7,656	10,090	10,450	12,111	12,159	29,191	18,182	111,812
7 = Total available H.U.s, through 2015	33,739	15,354	85,659	57,408	71,981	42,958	136,577	91,290	534,966
8 In-migrants as a pct of total migrants /c.	51%	45%	53%	32%	49%	63%	47%	45%	48%
9 New units "available" to all in-migrants /d.	6,077	3,446	5,281	3,449	6,035	7,529	13,878	8,129	53,824
10 + Existng units "available" to all in-migrants/e.	11,062	3,466	39,856	14,994	29,491	19,315	49,786	32,481	200,451
11 = Total units available to all in-migrants	17,139	6,912	45,137	18,443	35,526	26,844	63,664	40,610	254,275

a. = calculated seven-year sales turnover rate based on data from the 1998 to 2004 period

b. = line 3 times line 4

c. = In-migrants as a share of total migrants, (i.e. excludes intra-county movers). Derived from 2000 Census PUMs data

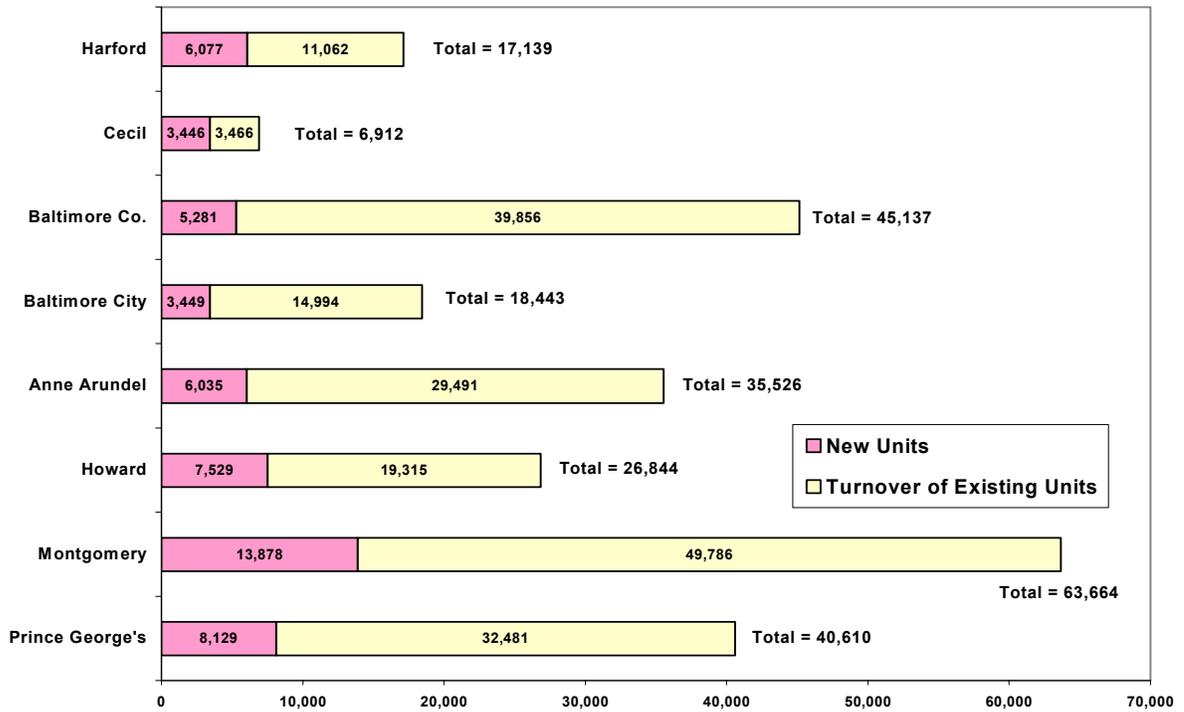
d. = line 6 times line 8

e. = line 5 times line 8

Because of rounding, numbers may not add up to totals

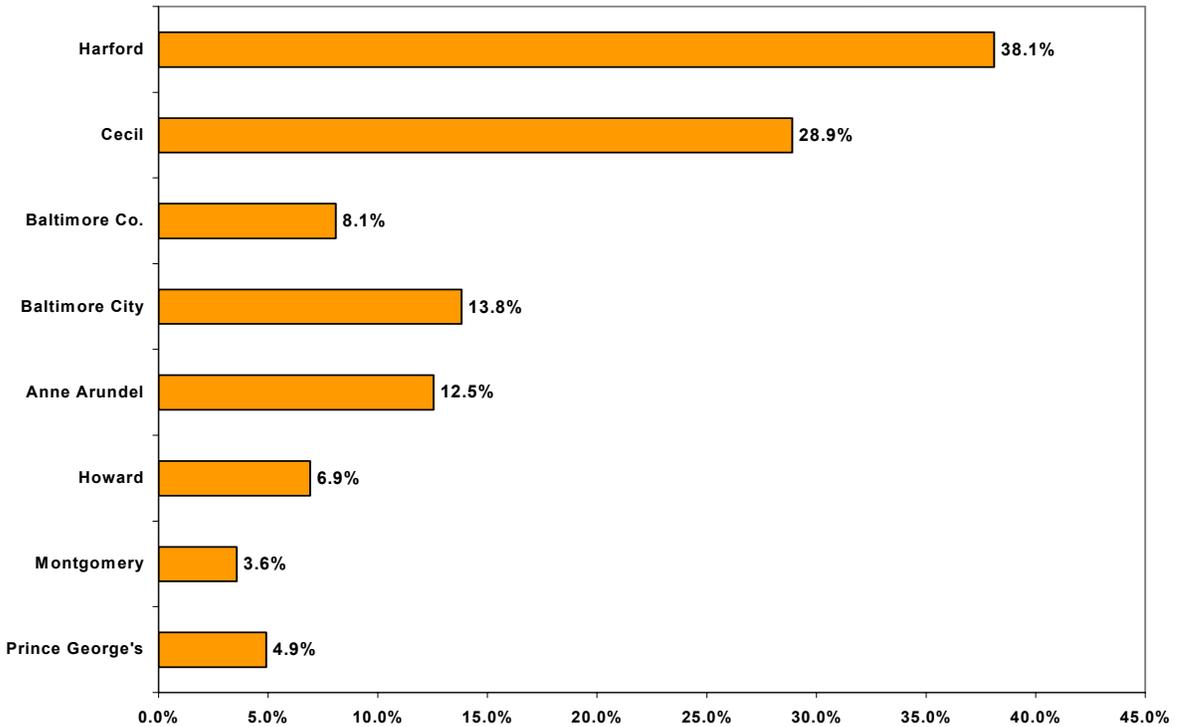
Prepared by the Maryland Department of Planning, December 2006

Chart 9. New and Existing Units Estimated to be Available to All In-Migrants, 2009 - 2015



Source: Maryland Department of Planning

Chart 10. BRAC Demand as a Pct of Estimated Available Units to All In-Migrants, 2009 - 2015



Source: Maryland Department of Planning

sources of movement and growth would be taking place with the BRAC in-migration just adding to (and most likely affecting) the mix. As such, it is not so easy to assess what portion of total growth, or even total in-migration, that the BRAC movement would encompass.

What can be done, however, is to compare the total BRAC household demand with what is the estimated supply of total housing units available to all in-migrants. This comparison can be used to determine the relative “development pressure” that BRAC household demand might bring to an individual county. If this pressure is relatively high, then steps would need to be taken to ensure that demand is adequately served by supply such that there is no undue effect on the acceleration of housing prices or having development “pushed” into places that are not as desirable, such as outside of PFA/sewer areas or to more rural locations in counties further out including those bordering Maryland.

Across the eight-jurisdiction study area, BRAC demand represents only 10.0 percent of the estimated housing supply available to all in-migrants. However, this share is double (20.2%) outside of PFA/sewer areas. (See Table 2.)

Within the eight-jurisdiction study area, Harford (38.1%) and Cecil (28.9%) have BRAC demand making up the largest share of available housing units to all in-migrants. (See Chart 10.) It is these two jurisdictions, therefore, which will have to be most vigilant about the impact that BRAC households will have on future land use.

The development pressures in Harford and Cecil counties, and in the other six jurisdictions in the study area, will vary by location within each county as well as by the three broad market segments for housing (lower, middle and higher).

D. Demand and Supply by Jurisdiction

The following are the highlights of the small area analysis of BRAC demand and anticipated supply available to all in-migrants. The main focus of this analysis is a 45-minute commute shed around the two major receiving bases, APG and Fort Meade, as these are the areas deemed most likely to attract BRAC households. Other dimensions evaluated are whether or not an area was inside/outside of a PFA, and the three broad market segments of housing cost/quality (lower, middle and higher).

D.1 Harford County

- Of the eight BRAC jurisdictions, development pressures will be greatest in Harford County, where the projected 6,533 BRAC households represent well over one-third (38.1%) of the County’s anticipated supply of housing units (both new and existing) available to all in-migrants over the 2009 to 2015 time period. For the County as a whole, this development pressure is highest outside of the PFA/sewer areas where BRAC household demand (1,501 households) is seen as taking up nearly one-half (44.5%) of the anticipated supply of housing available to all in-migrants over the 2009 to 2015 period.

Inside the PFA/sewer areas, BRAC demand (5,032 households) is estimated to be 36.6 percent of housing available to all in-migrants. (See Table 2.)

- It is expected that virtually all of Harford County's BRAC related households will locate within a 45-minute commute of Aberdeen Proving Ground (APG). Within this area there is the possibility of substantial development pressures with respect to higher cost/quality housing in PFA/sewer areas. Expected demand for this type of housing is estimated to represent two-thirds (66.7%) of the expected available supply to all in-migrants over the 2009 to 2015 period, thus creating development pressure to meet some of this demand by increased development outside of the PFA/sewered areas. (See Table 4.) Outside of the PFAs, however, development pressure will also be high as BRAC demand is estimated to make up well over one-half (57.9%) of available housing supply to all in-migrants over the 2009 to 2015 period.

- The second strongest development pressures within the 45-minute commute shed are seen for lower cost/quality housing, where the BRAC demand is almost exclusively in areas inside PFA/sewer areas. Here BRAC households are estimated to represent just under one-third (31.3%) of the anticipated supply available to all in-migrants.

- The above strongly suggests the need for planning and support for infrastructure investments to make sure that BRAC demand does not "use up" an inordinate share of the available supply of housing to all in-migrants. Otherwise, anticipated increased development pressure could accelerate the increase in housing prices as well as the conversion of resource lands, agriculture and forest, to accommodate BRAC and other future growth.

D.2 Cecil County

- Despite having only the sixth highest BRAC household demand, Cecil County is expected to have the second strongest BRAC related development pressure. The 1,998 BRAC households are estimated to represent 28.9 percent of the anticipated supply of housing units available to all in-migrants over the 2009 to 2015 period. Of the County's nearly 2,000 BRAC households, all but 175 are expected to locate within a 45-minute commute of APG.

- The development pressure in Cecil County does not appear to be entirely evenly distributed within this 45-minute commute shed. The greatest pressure will be in meeting the demand for higher cost/quality housing inside PFA/sewer areas where demand is expected to be over one-half (57.0 %) of the expected 2009 to 2015 supply of available units to all in-migrants. Development pressures should be less for medium and lower cost/quality housing where projected BRAC demand is just under one-quarter of anticipated available supply. (See Table 4.)

- Outside of PFA/sewer areas, development pressures are also anticipated to be greatest for higher cost/quality housing where the BRAC demand is expected to be just under one-half (48.1%) of the anticipated supply.

Table 4 - BRAC Household Demand Through 2015 by County and Area Cluster in Relationship to Expected Housing Supply

CLUSTERS	1a + 1b =		1a%	1b	2	1 + 2 =		4%	3 * 4% =		5 + 6 =	8%	5 * 8% =		6 * 8% =		9 + 10 =		** see below	13a thru 13d		13 / 11 %		13a	13b	13c	13d
	1	1a				P_APRT	TOT_PRE_05		APRT_UNITS	3			TOT_PRE_09	SA_PRE09	6	7	9	10	11	12	13	14%	P1_OWN				
8 Jurisdictions	1,582,204	348,475	22.0%	1,233,729	71,453	1,653,657	25.6%	423,153	111,812	534,965	48%	200,451	53,822	254,272	362,520	25,312	10.0%	2,531	19,274	995	2,512						
<i>Aberdeen Proving Ground 45 Minute Commute TZs*</i>																											
APG45	314,422	53,362	17.0%	261,060	16,383	330,805	22.9%	75,631	27,310	102,941	46%	34,904	12,831	47,736	97,385	11,590	24.3%	1,398	8,582	569	1,041						
IN_APG45	276,140	53,173	19.3%	222,967	13,388	289,528	23.7%	68,673	21,701	90,374	46%	31,558	10,148	41,706	69,302	9,316	22.3%	954	6,754	568	1,040						
IN_HIGH\$_APG45	36,079	5,505	15.3%	30,574	3,805	39,884	25.0%	9,986	6,160	16,146	43%	4,289	2,602	6,891	12,575	4,077	59.2%	740	3,126	79	132						
IN_MED\$_APG45	87,166	14,543	16.7%	72,623	6,008	93,174	26.5%	24,688	9,340	34,028	47%	11,637	4,514	16,150	31,977	2,833	17.5%	214	2,048	215	356						
IN_LOW\$_APG45	151,150	31,417	20.8%	119,733	3,513	154,663	21.7%	33,583	6,107	39,691	46%	15,378	2,985	18,363	23,567	2,357	12.8%	0	1,580	251	526						
IN_und10_APG45	1,745	1,708	97.9%	37	62	1,807	22.9%	415	94	509	59%	254	48	302	1,183	50	16.5%	0	0	23	27						
OUT_APG45	38,282	189	0.5%	38,093	2,995	41,277	16.9%	6,959	5,609	12,568	48%	3,347	2,683	6,030	28,083	2,273	37.7%	444	1,828	0	1						
OUT_HIGH\$_APG45	23,748	69	0.3%	23,679	1,676	25,424	17.4%	4,429	3,095	7,524	48%	2,142	1,496	3,638	12,325	1,918	52.7%	405	1,513	0	0						
OUT_MED\$_APG45	13,986	120	0.9%	13,866	1,280	15,266	16.2%	2,472	2,445	4,917	47%	1,177	1,155	2,331	15,364	340	14.6%	39	300	0	1						
OUT_LOW\$_APG45	548	0	0.0%	548	36	584	9.7%	57	68	125	48%	27	32	60	397	15	24.7%	0	15	0	0						
OUT_und10_APG45	0	0		0	3	3	25.0%	1	0	1	55%	0	0	1	-3	0	0.0%	0	0	0	0						
<i>Ft. Meade 45 Minute Commute TZs</i>																											
FTM45	972,812	233,277	24.0%	739,535	40,210	1,013,022	26.2%	265,240	63,727	328,967	49%	128,232	31,617	159,849	180,274	11,368	7.1%	908	8,714	402	1,344						
IN_FTM45	931,838	233,250	25.0%	698,588	37,559	969,397	26.4%	255,634	59,758	315,392	49%	123,538	29,530	153,068	162,644	10,529	6.9%	751	8,032	402	1,344						
IN_HIGH\$_FTM45	322,220	39,420	12.2%	282,800	16,953	339,173	26.8%	90,850	23,137	113,987	48%	43,120	11,176	54,296	81,368	4,218	7.8%	702	3,120	79	316						
IN_MED\$_FTM45	367,534	111,936	30.5%	255,598	14,679	382,213	29.9%	114,197	22,783	136,980	49%	56,424	11,324	67,748	50,421	4,188	6.2%	49	3,225	229	685						
IN_LOW\$_FTM45	237,400	77,291	32.6%	160,109	4,022	241,422	20.3%	48,908	8,192	57,100	47%	23,004	3,661	26,665	19,347	2,091	7.8%	0	1,687	85	320						
IN_und10_FTM45	4,684	4,603	98.3%	81	1,906	6,590	25.5%	1,680	5,646	7,325	60%	990	3,369	4,359	11,507	32	0.7%	0	0	9	24						
OUT_FTM45	40,974	27	0.1%	40,947	2,651	43,625	22.0%	9,606	3,969	13,575	50%	4,695	2,087	6,781	17,630	839	12.4%	157	683	0	0						
OUT_HIGH\$_FTM45	39,009	27	0.1%	38,982	2,600	41,609	22.2%	9,249	3,838	13,087	50%	4,528	2,024	6,552	16,936	812	12.4%	156	655	0	0						
OUT_MED\$_FTM45	1,938	0	0.0%	1,938	50	1,988	17.6%	350	132	482	47%	164	63	227	613	28	12.1%	0	27	0	0						
OUT_und10_FTM45	27	0	0.0%	27	1	28	24.1%	7	-1	6	40%	3	0	3	81	0	0.0%	0	0	0	0						

*Includes TZs that overlap with Ft. Meade 45 minute commute in Baltimore County and Baltimore City

<u>8 Jurisdiction Study Area</u>			
1	TOT_PRE_05	1,582,204	Total Parcel Units (Col 1a + Col 1b) as of the beginning of 2005
1a	APRT_UNITS	348,475	Parcel Count of Apartment Units
1a%	P_APRT	22.0%	Apartment Units as a Percent of Total Parcel Units
1b	HU_PRE05	1,233,729	Parcel Count of Housing Units (Single-Family, Townhouse, Condo, Mobile Home) year built 2004 or earlier
2	HH05_08	71,453	Projected new Housing Units 2005 through end of 2008
3	TOT_PRE_09	1,653,657	Total Parcel Units (Col 1 + Col 2) as of the beginning of 2009
4%	SPERCENT	25.6%	Seven Year Turnover Rate, 2009 - 2015, based on seven-year sales turnover rate for 1998 to 2004 period
5	SA_PRE09	423,153	Turnover of Existing Housing Units, 2009 - 2015, (Col 3 * Col 4%)
6	HH09_15	111,812	Projected new Housing Units 2009 through end of 2015
7	TURNOVER	534,965	Total Available Housing Units from 2009 through 2015 (Col 5 + Col 6)
8%	P_MIGTRN	48%	Portion of Turnover (Sales of Existing plus New Construction) Available to In-Migrants Derived from 2000 Census PUMs data
9	MIG_SA09	200,451	Sales Units "Available" to In-Migrants (Col 5 * Col 8%)
10	MIGH9_15	53,822	New Units "Available" to In-Migrants (Col 6 * Col 8%)
11	MIG_TRNVR	254,272	Turnover Units "Available" to In-Migrants (Col 9 + Col 10)
** 12	CAP09	362,520	Residential Buildout Capacity (number of new units that can be accommodated) beginning of 2009 (Not Available for Baltimore City)
13	P1_2ALL_T	25,312	BRAC Households - Total Phase 1 & 2 (Sum of Cols 13a, 13b,13c, 13d)
14%	BRAC_PER	10.0%	BRAC Households (Demand) as a Percent of "Available" Units (Col 13/Col 11%)
13a	P1_OWN	2,531	BRAC Households - Owner Phase 1
13b	P2_OWN	19,274	BRAC Households - Owner Phase 2
13c	P1_RENT	995	BRAC Households - Renter Phase 1
13d	P2_RENT	2,512	BRAC Households - Renter Phase 2

Table 4 - BRAC Household Demand Through 2015 by County and Area Cluster in Relationship to Expected Housing Supply

	1a + 1b =				1 + 2 =			3 * 4% =		5 + 6 =		5 * 8% =	6 * 8% =	9 + 10 =	** see below	13a thru 13d	13 / 11 %				
CLUSTERS	TOT_PRE_05	APRT_UNITS	1a%	1b	2	TOT_PRE_09	4%	5	6	7	8%	9	10	11	12	13	14%	13a	13b	13c	13d
8 Jurisdictions	1,582,204	348,475	22.0%	1,233,729	71,453	1,653,657	25.6%	423,153	111,812	534,965	48%	200,451	53,822	254,272	362,520	25,312	10.0%	2,531	19,274	995	2,512
Harford County	80,725	7,818	9.7%	72,907	6,891	87,616	24.8%	21,766	11,973	33,739	51%	11,062	6,077	17,139	24,392	6,533	38.1%	953	4,667	375	538
24025_IN_HIGH\$_APG45	14,720	960	6.5%	13,760	1,463	16,183	26.0%	4,214	2,326	6,539	51%	2,149	1,186	3,335	2,212	2,226	66.7%	481	1,704	12	29
24025_IN_MED\$_APG45	25,209	2,937	11.7%	22,272	2,764	27,973	29.5%	8,264	4,916	13,180	51%	4,215	2,507	6,722	8,769	1,656	24.6%	163	1,127	170	196
24025_IN_LOW\$_APG45	19,768	3,823	19.3%	15,945	1,089	20,857	26.2%	5,473	1,745	7,217	51%	2,791	890	3,681	2,834	1,150	31.3%	0	646	192	312
24025_OUT_HIGH\$_APG45	13,821	31	0.2%	13,790	1,034	14,855	17.2%	2,550	1,902	4,453	50%	1,275	951	2,226	5,285	1,289	57.9%	284	1,004	0	0
24025_OUT_MED\$_APG45	6,504	67	1.0%	6,437	478	6,982	16.9%	1,177	969	2,146	50%	589	484	1,073	4,804	163	15.2%	20	141	0	1
Balance of Harford	703	0	0.0%		62	765	11.5%	88	116	204	50%	44	58	102	489	50	48.8%	5	45	0	0
Cecil County	32,021	2,569	8.0%	29,452	3,975	35,996	21.4%	7,698	7,656	15,354	45%	3,466	3,446	6,912	64,387	1,998	28.9%	233	1,476	91	198
24015_IN_HIGH\$_APG45	2,541	171	6.7%	2,370	308	2,849	20.4%	583	727	1,310	45%	262	327	589	6,743	336	57.0%	70	252	3	12
24015_IN_MED\$_APG45	5,349	311	5.8%	5,038	1,144	6,493	25.3%	1,642	1,698	3,339	45%	739	764	1,503	15,827	369	24.6%	30	250	11	78
24015_IN_LOW\$_APG45	8,711	1,542	17.7%	7,169	889	9,600	22.9%	2,196	2,451	4,647	45%	988	1,103	2,091	16,618	499	23.8%	0	357	53	89
24015_OUT_HIGH\$_APG45	5,041	38	0.8%	5,003	512	5,553	21.1%	1,171	917	2,088	45%	527	413	940	5,167	452	48.1%	98	354	0	0
24015_OUT_MED\$_APG45	5,705	48	0.8%	5,657	729	6,434	17.2%	1,109	1,281	2,390	45%	499	577	1,076	9,128	167	15.5%	18	149	0	0
Balance of Cecil	4,674	459	9.8%	4,215	393	5,067	19.7%	998	582	1,580	45%	451	263	713	10,904	175	24.6%	18	115	23	19
Baltimore County	310,138	80,665	26.0%	229,473	10,314	320,452	23.6%	75,569	10,090	85,659	53%	39,856	5,281	45,137	39,642	3,653	8.1%	294	2,873	116	370
24005_IN_HIGH\$_APG45	5,933	853	14.4%	5,080	465	6,398	17.9%	1,145	588	1,733	50%	573	294	867	3,450	494	57.1%	69	420	2	3
24005_IN_MED\$_APG45	39,966	9,739	24.4%	30,227	1,717	41,683	24.2%	10,095	1,925	12,020	52%	5,249	1,001	6,250	7,367	442	7.1%	15	316	34	78
24005_IN_LOW\$_APG45	45,482	15,142	33.3%	30,340	1,426	46,908	22.3%	10,480	945	11,425	54%	5,659	510	6,169	2,650	425	6.9%	0	348	3	73
24005_OUT_HIGH\$_APG45	4,886	0	0.0%	4,886	129	5,015	14.1%	708	276	984	48%	340	133	472	1,874	177	37.6%	22	155	0	0
24005_IN_HIGH\$_FTM45	4,838	643	13.3%	4,195	102	4,940	19.1%	944	159	1,104	50%	472	80	552	717	357	64.8%	62	279	7	9
24005_IN_MED\$_FTM45	13,938	2,414	17.3%	11,524	247	14,185	23.9%	3,388	169	3,557	51%	1,728	86	1,814	1,507	208	11.4%	1	124	36	46
24005_IN_LOW\$_FTM45	55,738	19,235	34.5%	36,503	921	56,659	22.8%	12,918	840	13,758	54%	6,976	454	7,429	3,734	145	2.0%	0	85	13	47
24005_IN_HIGH\$_PLUS5M	22,099	4,405	19.9%	17,694	868	22,967	27.5%	6,310	1,002	7,312	51%	3,218	511	3,729	2,478	349	9.4%	50	272	10	17
24005_IN_MED\$_PLUS5M	43,032	16,558	38.5%	26,474	2,175	45,207	30.2%	13,667	1,171	14,837	55%	7,517	644	8,161	3,690	343	4.2%	7	279	10	47
24005_OUT_HIGH\$_PLUS5M	12,507	1,230	9.8%	11,277	718	13,225	17.9%	2,361	606	2,968	50%	1,181	303	1,484	5,086	370	24.9%	54	314	0	3
24005_IN_LOW\$_BOTH45	31,326	3,687	11.8%	27,639	384	31,710	19.2%	6,078	958	7,036	50%	3,039	479	3,518	1,465	108	3.1%	0	74	0	34
Balance of Baltimore County	30,393	6,759	22.2%	23,634	1,162	31,555	23.7%	7,475	1,451	8,926	53%	3,905	787	4,692	5,624	234	5.0%	15	206	0	13
Baltimore City	236,651	65,392	27.6%	171,259	4,229	240,880	19.5%	46,958	10,450	57,408	32%	14,994	3,449	18,442	N.A.	2,549	13.8%	189	2,030	75	255
24510_IN_HIGH\$_BOTH45	12,303	3,521	28.6%	8,782	1,478	13,781	28.9%	3,977	2,590	6,567	32%	1,273	829	2,102		1,021	48.6%	121	750	61	89
24510_IN_MED\$_BOTH45	11,087	295	2.7%	10,792	343	11,430	27.7%	3,167	787	3,954	30%	950	236	1,186		256	21.6%	5	250	0	1
24510_IN_LOW\$_BOTH45	38,921	6,426	16.5%	32,495	-330	38,591	19.7%	7,609	82	7,691	31%	2,359	25	2,384		147	6.2%	0	128	2	17
24510_IN_MED\$_APG45	5,212	1,213	23.3%	3,999	33	5,245	27.8%	1,457	10	1,466	31%	452	3	455		108	23.7%	2	103	0	3
24510_IN_HIGH\$_FTM45	3,297	2,450	74.3%	847	1,400	4,697	28.1%	1,320	2,839	4,159	35%	462	994	1,456		77	5.3%	10	61	0	6
24510_IN_MED\$_FTM45	9,907	7,738	78.1%	2,169	203	10,110	26.9%	2,718	908	3,626	35%	951	318	1,269		78	6.2%	1	57	1	20
24510_IN_LOW\$_FTM45	84,919	22,505	26.5%	62,414	305	85,224	12.8%	10,888	2,702	13,590	32%	3,484	865	4,349		329	7.6%	0	252	9	68
24510_IN_HIGH\$_PLUS5M	15,763	6,397	40.6%	9,366	174	15,937	27.3%	4,348	385	4,733	33%	1,435	127	1,562		368	23.5%	49	302	1	16
24510_IN_MED\$_PLUS5M	14,237	5,721	40.2%	8,516	186	14,423	24.7%	3,564	318	3,882	33%	1,176	105	1,281		99	7.8%	2	83	1	14
Balance of Baltimore City	41,005	9,126	22.3%	6,145	436	41,441	19.1%	7,911	-171	7,740	31%	2,453	-53	2,400		67	2.8%	0	44	1	22

Table 4 - BRAC Household Demand Through 2015 by County and Area Cluster in Relationship to Expected Housing Supply

CLUSTERS	1a + 1b =		1a%	1b	2	1 + 2 =		3 * 4% =	6	5 + 6 =		5 * 8% =	6 * 8% =	9 + 10 =		** see below	13a thru 13d		13 / 11 %		13a	13b	13c	13d	
	1	1a				P_APRT	TOT_PRE_09			4%	5			7	8%	9	10	11	12	13					14%
Anne Arundel County	183,991	21,726	11.8%	162,265	8,701	192,692	31.1%	59,870	12,111	71,981	49%	29,491	6,035	35,526	41,418	4,457	12.5%	513	3,317	201	426				
24003_IN_HIGH\$_FTM45	57,530	2,666	4.6%	54,864	2,981	60,511	30.2%	18,278	4,118	22,396	48%	8,773	1,977	10,750	17,684	1,820	16.9%	378	1,386	30	26				
24003_IN_MED\$_FTM45	75,845	12,954	17.1%	62,891	3,530	79,375	34.5%	27,413	5,179	32,592	50%	13,707	2,590	16,296	11,791	1,176	7.2%	8	802	121	245				
24003_IN_LOW\$_FTM45	19,626	5,674	28.9%	13,952	1,086	20,712	31.1%	6,452	1,505	7,957	52%	3,355	783	4,138	1,562	809	19.6%	0	621	47	141				
24003_OUT_HIGH\$_FTM45	20,387	4	0.0%	20,383	529	20,916	23.5%	4,906	437	5,343	47%	2,306	206	2,511	6,098	504	20.1%	106	398	0	0				
Balance of Anne Arundel	10,603	428	4.0%	10,175	575	11,178	25.2%	2,822	871	3,692	50%	1,351	480	1,831	4,283	149	8.1%	21	111	3	14				
Howard County	94,651	16,406	17.3%	78,245	7,112	101,763	30.3%	30,799	12,159	42,958	62%	19,315	7,529	26,843	26,632	1,853	6.9%	175	1,421	69	188				
24027_IN_HIGH\$_FTM45	48,828	6,443	13.2%	42,385	4,192	53,020	27.6%	14,630	6,307	20,937	62%	9,071	3,911	12,981	11,555	828	6.4%	139	607	25	57				
24027_IN_MED\$_FTM45	30,531	8,782	28.8%	21,749	1,607	32,138	37.4%	12,012	2,387	14,400	64%	7,688	1,528	9,216	6,775	562	6.1%	4	402	41	115				
24027_IN_LOW\$_FTM45	3,834	1,181	30.8%	2,653	118	3,952	39.5%	1,562	292	1,854	64%	1,000	187	1,186	663	299	25.2%	0	279	4	16				
24027_OUT_HIGH\$_FTM45	9,635	0	0.0%	9,635	1,089	10,724	20.6%	2,210	2,182	4,391	60%	1,326	1,309	2,635	5,720	140	5.3%	28	112	0	0				
Balance of County	1,823	0	0.0%	1,823	106	1,929	19.9%	385	991	1,376	60%	231	595	826	1,919	25	3.1%	4	21	0	0				
Montgomery County	345,113	72,965	21.1%	272,148	18,283	363,396	29.6%	107,386	29,191	136,577	47%	49,786	13,878	63,664	74,086	2,274	3.6%	60	1,891	23	300				
24031_IN_HIGH\$_FTM45	149,863	18,321	12.2%	131,542	3,119	152,982	26.2%	40,038	3,898	43,936	44%	17,617	1,715	19,332	28,638	554	2.9%	36	319	7	193				
24031_IN_MED\$_FTM45	110,602	37,814	34.2%	72,788	6,649	117,251	30.9%	36,275	10,994	47,269	49%	17,775	5,387	23,162	9,295	1,293	5.6%	5	1,179	12	97				
24031_IN_LOW\$_FTM45	5,965	5,254	88.1%	711	271	6,236	37.7%	2,348	433	2,781	60%	1,409	260	1,669	1,292	91	5.5%	0	81	3	8				
24031_OUT_HIGH\$_FTM45	7,845	11	0.1%	7,834	775	8,620	22.4%	1,933	1,028	2,961	42%	812	432	1,244	3,208	99	8.0%	10	90	0	0				
24031_IN_MED\$_PLUS5M	31,973	8,684	27.2%	23,289	1,453	33,426	41.2%	13,774	2,741	16,515	47%	6,474	1,288	7,762	2,375	145	1.9%	1	142	1	2				
24031_IN_HIGH\$_PLUS5M	29,045	1,584	5.5%	27,461	4,128	33,173	30.7%	10,172	4,949	15,121	43%	4,374	2,128	6,502	9,204	82	1.3%	8	73	0	1				
Balance of Montgomery	9,820	1,297	13.2%	8,523	1,888	11,708	24.3%	2,846	5,147	7,993	50%	1,326	2,667	3,993	20,074	11	0.3%	1	9	0	1				
Prince George's County	298,914	80,934	27.1%	217,980	11,947	310,861	23.5%	73,108	18,182	91,290	44%	32,481	8,129	40,610	91,964	1,995	4.9%	114	1,599	45	237				
24033_IN_HIGH\$_FTM45	57,864	8,897	15.4%	48,967	5,160	63,024	24.8%	15,640	5,815	21,455	43%	6,725	2,500	9,226	22,773	583	6.3%	78	469	11	25				
24033_IN_MED\$_FTM45	126,711	42,234	33.3%	84,477	2,443	129,154	25.1%	32,391	3,145	35,536	45%	14,576	1,415	15,991	21,053	872	5.5%	30	660	19	163				
24033_IN_LOW\$_FTM45	67,318	23,442	34.8%	43,876	1,321	68,639	21.5%	14,740	2,419	17,160	46%	6,781	1,113	7,894	12,096	419	5.3%	0	369	10	40				
Balance of Prince George's	47,021	6,361	13.5%	40,660	3,023	50,044	20.7%	10,337	6,802	17,140	44%	4,399	3,100	7,500	36,042	122	1.6%	6	101	6	9				

Prepared by Maryland Department of Planning, December 2006

- Development pressure for medium cost/quality housing is not expected to be much of a problem, with BRAC demand just 15.5 percent of the anticipated supply over the 2009 to 2015 time period.

- All of the above suggests that Cecil County will need to pay attention to the provision of higher cost/quality housing within PFA/sewer areas to ensure that a more scattered pattern of development does not occur outside of PFA/sewer areas, or in areas further out from APG.

D.3 Anne Arundel County

- Anne Arundel County will have the second largest BRAC household demand (4,457) but should experience far less development pressure in the aggregate. Countywide, it is estimated that the BRAC households will encompass approximately 12.5 percent of the estimated housing units available to all in-migrants over the 2009 to 2015 time period.

- Virtually all (96.7%) of the BRAC households in Anne Arundel County are expected to locate within a 45-minute commute of Fort Meade. Within this area, development pressures are expected to be highest for high cost/quality housing outside of PFA/sewer areas. Here the projected BRAC demand of 504 households makes up about one-fifth (20.1%) of the anticipated available supply to all in-migrants. (See Table 4.)

- For higher cost/quality housing inside of PFAs, BRAC household demand of 1,820 units represents about one-sixth (16.9%) of anticipated available housing units.

- An overall greater level of development pressure is expected for lower cost/quality housing inside of PFA/sewer areas. The 809 BRAC household demand is estimated to also be around one-fifth (19.6%) of the anticipated supply from both new and existing units.

- Overall, the more modest development pressure that BRAC brings to Anne Arundel County is a function of the large housing stock and the relatively high number of housing units that turnover in the County. In Anne Arundel County, the turnover rate of existing units makes up 83.0 percent of the anticipated supply, the second highest in the eight-jurisdiction study area.

D.4 Baltimore County

- Just over 3,650 households are expected to locate to Baltimore County as a result of the BRAC-based expansions. Unlike most of the other jurisdictions in the study area, the County will be impacted directly from expansions at both Fort Meade and APG.

- Just over 1,500 BRAC households are expected to locate within a 45-mile commute of APG, mostly on the east side of Baltimore County. Within this area, the relationship between expected demand and supply is tightest in the higher cost/quality areas inside

PFAs where demand makes up over one-half (57.1%) of expected available supply to all in-migrants through 2015. (See Table 4.)

- The second highest development pressure within the 45-mile commute shed of APG is for high cost/quality housing outside of PFA/sewer areas. In these areas, an estimated 177 BRAC households make up just over one-third (37.6%) of anticipated supply.
- BRAC household pressure will also be comparatively high (24.9 percent of anticipated supply) for high cost/quality housing beyond the 45-minute commute shed outside of PFA/sewer areas. A total of 370 households (less than 10.0 percent of the entire BRAC households) are expected to locate outside of PFA/sewer areas five-miles beyond the 45-minute commute shed.
- Another 710 BRAC households are expected to locate within a 45-minute commute to Fort Meade, mostly on the southwest side of Baltimore County. In these locations, development pressure is also expected to be highest for the higher cost/quality housing inside of PFA/sewer areas where the BRAC demand of 357 units is estimated to take up nearly two-thirds (64.8%) of the anticipated available supply to all in-migrants.
- Overall, BRAC household demand is seen as taking up only 8.1 percent of the available housing supply to all in-migrants over the 2009 to 2015 period. However, in both the Fort Meade and APG commuting sheds, the County will need to ensure that an adequate supply of higher cost/quality housing is available to accommodate BRAC demand such that this type of development is not met outside of PFAs.

D.5 Baltimore City

- Just over 2,500 households are expected to locate to Baltimore City as a result of the BRAC-based expansions, or 13.8 percent of the housing anticipated being available to all in-migrants. About 60 percent of these households are within the 45-minute commute of APG or Fort Meade and just over one-half are within a 45-minute commute of both.
- Within the area that is impacted by both Fort Meade and APG, development pressures are greatest for higher cost/quality housing. The over 1,000 BRAC households in this group are estimated to comprise nearly one-half (48.6%) of the anticipated available supply to all in-migrants. In this same area, a much smaller BRAC household demand for medium cost/quality housing of around 250 units is estimated to comprise just over one-fifth (21.6%) of the anticipated supply. (See Table 4.)
- BRAC household pressure is also likely to be comparatively high (23.5 percent of the estimated available supply of units to all in-migrants) for high cost/quality housing outside the 45-minute commute shed in the north part of the City where 368 households are expected to locate.
- Citywide, just over eight out of ten (81.3%) of the anticipated housing units available to all in-migrants are from turnover of existing units. In the area of greatest development

pressure, however, higher cost/quality areas within a 45-minute commute of both Fort Meade and APG, turnover of existing units are only a bit over six out of ten (60.6%). More than likely, then, any diminishing of development pressure in the City will come from the addition of new units.

D.6 Montgomery County

- Nearly 2,300 households are expected to locate to Montgomery County as a result of the BRAC-based expansions, representing just 3.6 percent of the County's anticipated supply of housing units available to all in-migrants over the 2009 to 2015 time period. An overwhelming majority (95.3%) of the BRAC households are expected to locate within Priority Funding Areas. No major demand versus available supply issues is readily identifiable at the small area level.

D.7 Prince George's County

- Nearly 2,000 households are expected to locate to Prince George's County as a result of the BRAC-based expansions representing just 4.9 percent of the anticipated supply of housing units available to all of the County's in-migrants over the 2009 to 2015 time period. Virtually all (99.0%) of BRAC households are expected to locate within Priority Funding Areas.

- The overwhelming majority of the BRAC households are expected to locate within a 45-minute commute of Fort Meade. No major demand versus available supply issues is readily identifiable in this location or at other locations in the County due to BRAC.

D.8 Howard County

- Just under 1,900 BRAC-related households are expected to locate to Howard County representing just 6.9 percent of the anticipated supply of housing units available to all in-migrants over the 2009 to 2015 time period. Just over nine out of ten (91.1%) of BRAC households in Howard County are expected to locate within a Priority Funding Area.

- Virtually all of the County's BRAC households are expected to locate within a 45-minute commute of Fort Meade. One potential problem in this area is that the lower cost/quality category of BRAC household demand (just under 300) makes up one-quarter (25.2%) of the expected available supply over the 2009 to 2015 period.

E. METHODOLOGY

E.1 Housing Supply Side Analysis

1. Using the latest edition of MdProperty View for the eight BRAC jurisdictions as it existed on March 1, 2006 (Maryland Department of Planning's Property Mapping GIS, go to <http://www.mdp.state.md.us/data/index.htm> for more information on MdProperty View), extracts for the jurisdictions of existing residential parcels are created and assigned their housing unit type (SF- Single family detached, TH – Townhouse, CO – Condominium, multi unit structure, MH – Mobile Home, Rental Dwelling units in Baltimore City), year built and assessment cycle year (last assessed full market value). Each of the 1,241,705 resulting residential parcels are tagged with their 2000 Census Block Group. Similarly, all parcels sold (arms-length transaction) for the 18-month period (January 1, 2004 thru June 30, 2005) are extracted and tagged with the same characteristics (134,055 residential sales). (Note: residential parcels on agricultural properties are not included in the analysis since they are not likely to be prime destinations for BRAC households. See Table 5 for a summary of housing unit characteristics by County.)

Apartment unit parcels are also extracted and tagged by type (high rise, garden, other or not specified and townhouse). For apartment parcels where units are not specified, estimates of units are derived based on the average assessed value per unit where units are specified. Estimates are performed by apartment type for sub-county areas for improved accuracy. The resulting apartment unit's derived estimates are 348,475 units for the eight-jurisdiction region, of which 304,124, or 87.3%, are actually reported. This brings the total parcel derived housing unit stock to 1,590,180. (Note: not included in deriving the apartment units are apartment parcels identified in the Assessment database as subsidized, exclusively for seniors or adult care (e.g. retirement, nursing home), or located in a retail establishment).

2. For block groups within each county, residential sales are analyzed by housing unit type and assessment cycle and the relationship (ratio) between the median sales price and the assessed fair market price is determined. The derived ratios are then applied to the assessed fair market price for all housing units located within the block group (based on housing unit type and assessment cycle) to derive a "new fair market" price that corresponded more closely to the sales data for the period July 1, 2004 to June 30, 2005.
3. The resulting records of all residential parcels (1,241,705) and sales (134,055) are then tagged by their TZ (Transportation Analysis Zone). For each of the 1,834 TZs in the eight-jurisdiction study area, summary distributions of the housing unit stock and sales are derived by housing unit type, year built ranges and value (new market value for existing units and sales price for sales units). An Example of this profile is shown in [Appendix A](#).

Table 5: Summary of Housing Unit Characteristics by County Based on TZs (Transportation Analysis Zone)

County FIPS Code Jurisdiction	24025 <u>Harford</u>	24015 <u>Cecil</u>	24005 <u>Baltimore County</u>	24510 <u>Baltimore City</u>	24003 <u>Anne Arundel</u>	24027 <u>Howard</u>	24031 <u>Montgomery</u>	24033 <u>Prince George's</u>	8 Jurisdictions
<i>Number of Transportation Analysis Zones (TZs)</i>	140	88	342	217	208	149	310	380	1,834
Total Housing Units	81,506	32,408	311,059	236,853	184,572	96,157	347,023	300,602	1,590,180
Multi-Unit Structure	12,437	3,131	92,937	72,686	28,907	22,562	120,194	102,864	455,718
<i>Percent Multi-Family</i>	15.26%	9.66%	29.88%	30.69%	15.66%	23.46%	34.64%	34.22%	28.66%
Apartment ("Renter" Units)	7,818	2,569	80,665	65,392	21,726	16,406	72,965	80,934	348,475
Condominium ("Owner" Units)	4,619	562	12,272	7,294	7,181	6,156	47,229	21,930	107,243
Single Unit Structure	69,069	29,277	218,122	164,167	155,665	73,595	226,829	197,738	1,134,462
<i>Percent Single-Family</i>	84.74%	90.34%	70.12%	69.31%	84.34%	76.54%	65.36%	65.78%	71.34%
Detached Single-Family ("Owner" Units)	53,074	25,863	149,139	32,804	123,239	53,424	176,029	160,228	773,800
Townhouse ("Owner" Units)	14,947	2,868	68,968	118,505	32,340	20,087	50,793	37,436	345,944
Mobile Home ("Owner" Units) (for Balto City - Residential Rental Dwelling Units)	1,048	546	15	12,858	86	84	7	74	14,718
Total "Owner" Housing Units	73,688	29,839	230,394	171,461	162,846	79,751	274,058	219,668	1,241,705
Detached Single-Family*	53,074	25,863	149,139	54,020	123,239	53,424	176,029	160,228	795,016
Detached Single-Family (Baltimore City*)				32,804					32,804
<i>Percent Detached Single-Family*</i>	72.03%	86.68%	64.73%	31.51%	75.68%	66.99%	64.23%	72.94%	64.03%
SF DT Built Since 1990 (1980 Balto City**)	15,772	8,536	21,342	2,901	25,349	18,562	26,231	33,356	152,049
<i>Percent SF DT Built Since 1990*</i>	21.40%	28.61%	9.26%	1.69%	15.57%	23.27%	9.57%	15.18%	12.25%
Median Value (\$)									
Total "Owner" Housing Units	\$235,983	\$199,468	\$198,128	\$83,480	\$292,491	\$387,503	\$425,963	\$248,588	\$268,326
Detached Single-Family	\$272,026	\$210,903	\$233,303	\$133,892	\$327,372	\$462,520	\$526,823	\$273,030	\$336,801
Townhouse	\$170,392	\$119,918	\$143,786	\$74,612	\$228,453	\$266,827	\$313,610	\$199,942	\$167,112
Condominium	\$135,960	\$199,936	\$163,748	\$117,200	\$193,970	\$174,468	\$235,000	\$126,936	\$186,065
Mobile Home (Rental Dwelling-Balto City)	\$153,476	\$67,731	\$70,080	\$42,585	\$193,532	\$77,359	\$205,070	\$100,315	\$52,890
Sales of "Owner" Housing Units									
Total Sales (01/01/2004 - 06/30/2005)	7,993	2,981	22,487	18,127	17,906	8,649	30,687	25,225	134,055
Detached SF Sales (01/01/2004 - 06/30/2005***)	4,470	2,276	11,557	7,114	10,867	4,128	14,997	16,420	71,829
Apartment Units	7,818	2,569	80,665	65,392	21,726	16,406	72,965	80,934	348,475
Highrise	27	0	1,250	16,402	1,391	717	13,299	7,284	40,370
Garden	4,756	1,574	60,839	33,296	17,235	13,439	33,214	71,234	235,587
Not Specified	2,808	807	14,375	13,612	1,956	1,724	25,445	2,282	63,009
Townhouse	227	188	4,201	2,082	1,144	526	1,007	134	9,509
Aprt Units Average Assessed Value (\$)	\$36,119	\$51,535	\$38,204	\$26,885	\$70,146	\$62,761	\$103,110	\$46,611	\$54,822
Highrise	\$73,963	----	\$71,648	\$31,724	\$57,245	\$113,070	\$136,032	\$54,221	\$73,734
Garden	\$38,234	\$59,201	\$37,051	\$21,739	\$66,168	\$61,607	\$110,521	\$45,587	\$51,529
Not Specified	\$32,093	\$39,797	\$40,127	\$32,897	\$108,061	\$60,714	\$76,134	\$54,590	\$55,940
Townhouse	\$37,111	\$37,734	\$38,375	\$31,765	\$80,947	\$30,366	\$105,497	\$41,254	\$48,712

* For Baltimore City only Single Family HUs plus Non-Single Family HUs where NewMarket value \$150,000 or more

(Actual single family for Baltimore City in red)

** For Baltimore City only includes Single Family built since 1980 and Non-Single Family Hus built since 1980 where NewMarket value \$150,000 or more

*** For Baltimore City only Single Family Hus Sales plus Non-Single Family Hus Sales where Consideration value \$150,000 or more

Similarly, apartment parcels (and units) by type are tagged by TZ. For each TZ the apartment units are aggregated by type with counts of units and assessed fair market value. For each TZ, the average value per apartment unit, total and by type, is derived.

4. For each TZ, key indicators of the “owner” housing stock are derived, including: number and percent single family detached; percent of total stock single family detached built since 1990; and, median value of housing stock. Using these three ranking variables, TZs are scored (with weights applied to the three indicators, 20%, 20%, 60% respectively). Based on the calculated weighted score, TZs are grouped into three types – HIGH, MEDIUM and LOW in terms of housing cost/quality or “attractiveness” relative to matching income groupings of BRAC “owner” households (High, Middle and Low). (See Map B.) A description of the derivation of the Housing Cost/Quality measure for “owner” households can be found in [Appendix B](#). (Note, for Baltimore City, assumptions used for deriving the Housing Cost/Quality measure by TZ are modified from the assumptions used for the seven counties. Attachment B describes these differences as well.)

Similarly, TZs are assigned to “renter” groupings based on the average assessed value per apartment unit for the TZ. The groupings correspond to their likely relative attractiveness to households with higher, medium and lower income groupings (see [Appendix B](#), last section). Map D shows the location and concentration of apartment units by TZ.

Table 5 shows a summary of the housing unit characteristics derived by summing over the TZs for each of the eight jurisdictions

5. For each TZ a determination is made as to whether it is inside or mostly inside a Priority Funding Area (PFA) and whether it is a TZ that is serviced or likely to be serviced soon by sewer. TZs that are entirely or mostly inside a PFA or an area served or soon to be served by sewer are tagged as “IN” and all other TZs are tagged as “OUT” of PFA/Sewer Areas (see Map C).

TZs are also assigned to commute zones with the primary zones being TZs that are within the 45-minute commute shed around the BRAC facilities, Aberdeen Proving Ground (APG45) and Fort Meade (FTM45). Some TZs overlap and are located in both 45-minute commute sheds and are so identified, BOTH45. TZs beyond the 45-minute commute shed are classified as those within an additional 5 miles of the commute sheds (PLUS5) or beyond the additional 5 miles (zOUT). TZs are also identified in terms of their distance (in miles) from the two major impacted military installations, APG and Fort Meade. Some small adjustments are made to the 45-minute commute shed based on distance and resulted in a few TZs contiguous to but outside the 45-minute commute shed being assigned to the 45-minute commute shed for the purposes of this analysis. (See Map A.)

Map A - BRAC Transportation Analysis Zones (TZs) by 45-Minute Commute Sheds around BRAC Facilities - Aberdeen Proving Ground (APG) and Ft. Meade (FTM)

Legend

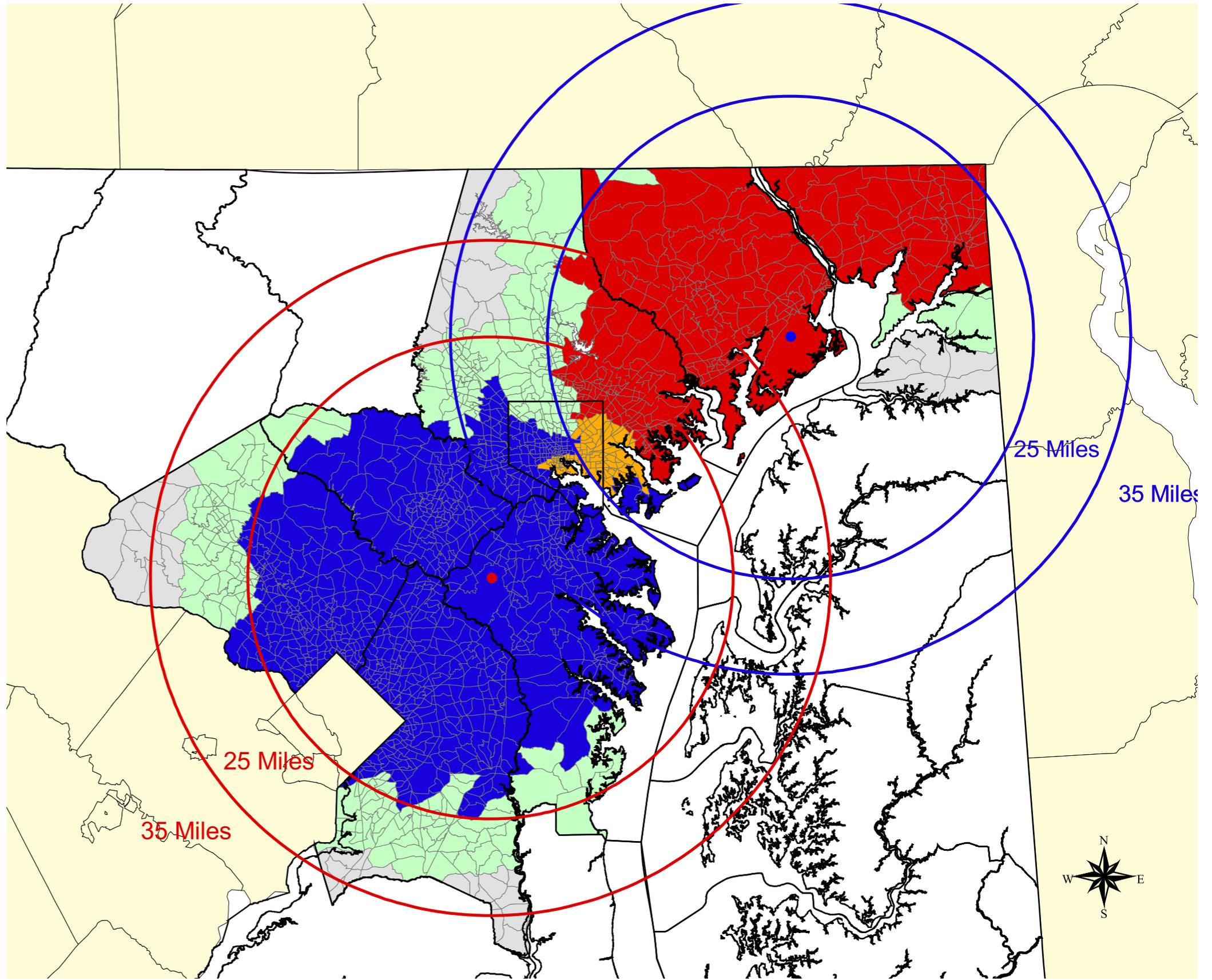
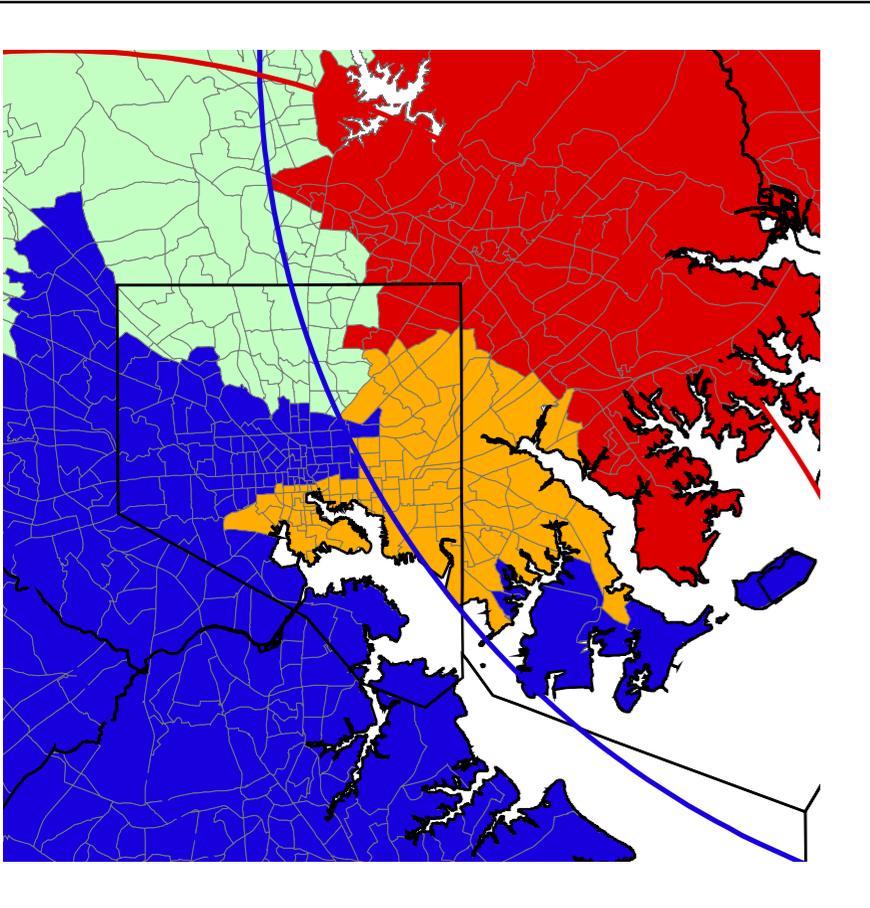
- Jurisdictions In Maryland
- Jurisdictions Outside Maryland

BRAC Installations

- Aberdeen Proving Ground (APG) and Distance Rings in Miles
- Ft Meade (FTM) and Distance Rings in Miles

TZ Commute Sheds around APG and Ft. Meade Study Area

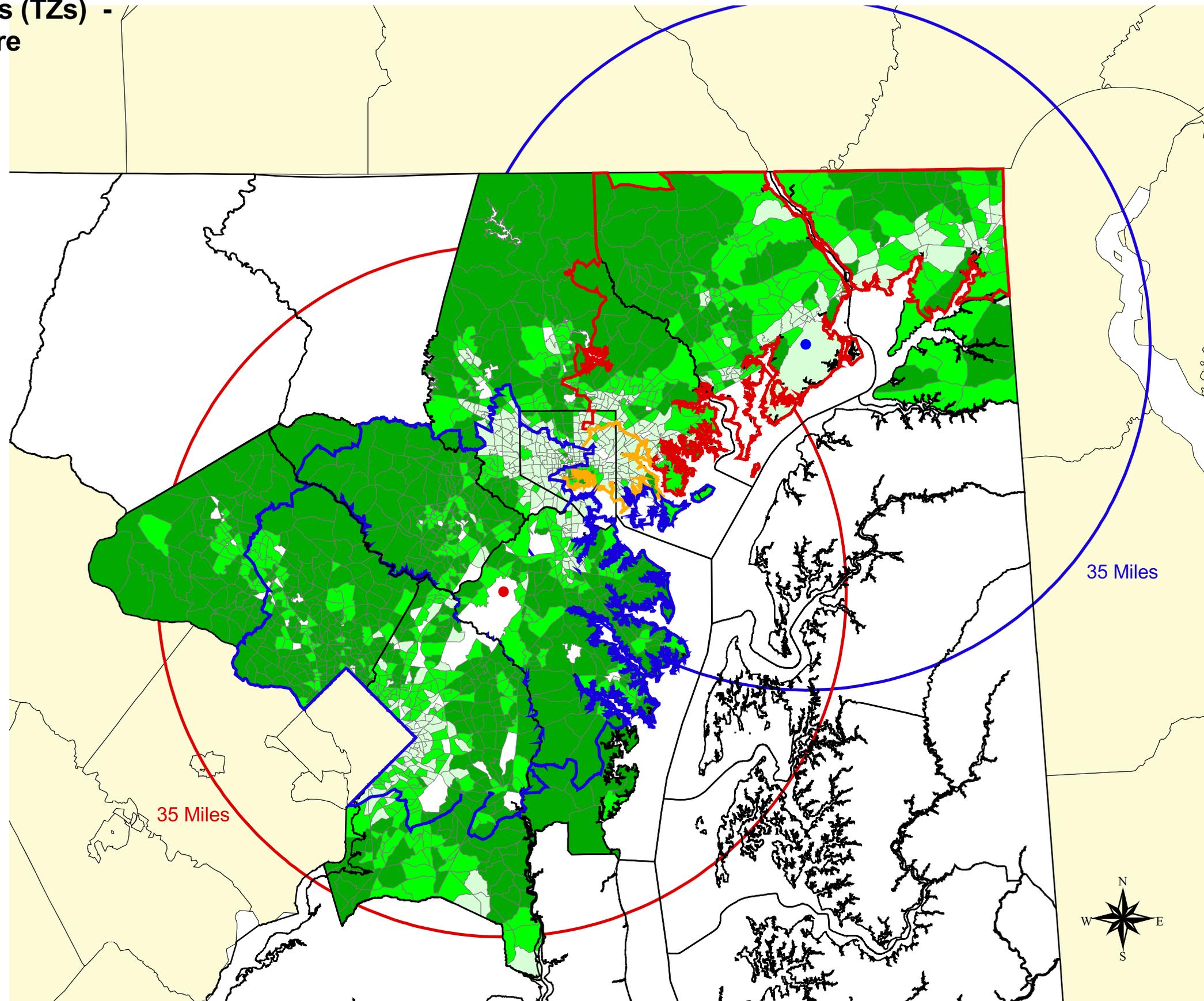
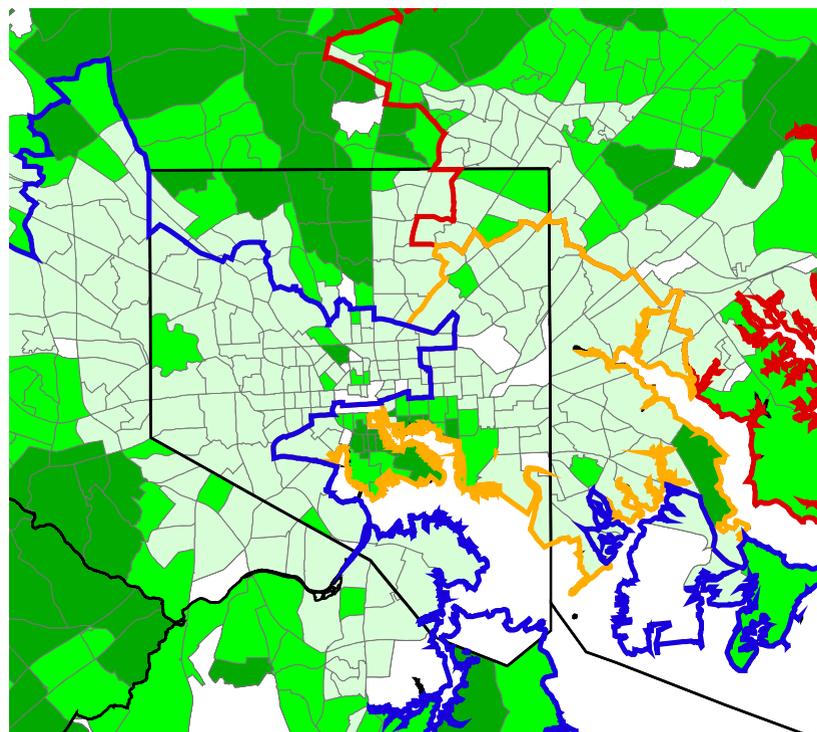
- APG 45-Minute Commute
- BOTH 45-Minute Commute, APG & FTM
- FTM 45-Minute Commute
- Additional 5 Miles
- Beyond Additional 5 Miles



Map B - BRAC Transportation Analysis Zones (TZs) - Housing (Owner) Cost/Quality Measure

Legend

-  Jurisdictions In Maryland
 -  Jurisdictions Outside Maryland
 -  APG 45-Minute Commute
 -  BOTH 45-Minute Commute, APG & FTM
 -  FTM 45-Minute Commute
- TZ Commute Sheds around APG and Ft. Meade Study Area
-  Aberdeen Proving Ground (APG) and 35 Mile Distance Ring
 -  Ft Meade (FTM) and 35 Mile Distance Ring
- TZs by Housing Cost/Quality for Owner Units
-  Higher Cost/Quality Housing Area (HIGH\$)
 -  Medium Cost/Quality Housing Area (MED\$)
 -  Lower Cost/Quality Housing Area (LOW\$)
 -  Under 10 Housing Units in Area (und10)



20 0 20 40 Miles

Map C - BRAC Transportation Analysis Zones (TZs) - Designated as "IN" or "OUT" of Priority Funding or Sewer Service Areas, Existing or Shortly Planned

Legend

Jurisdictions

- Jurisdictions In Maryland
- Jurisdictions Outside Maryland

TZ Commute Sheds around APG and Ft. Meade Study Area

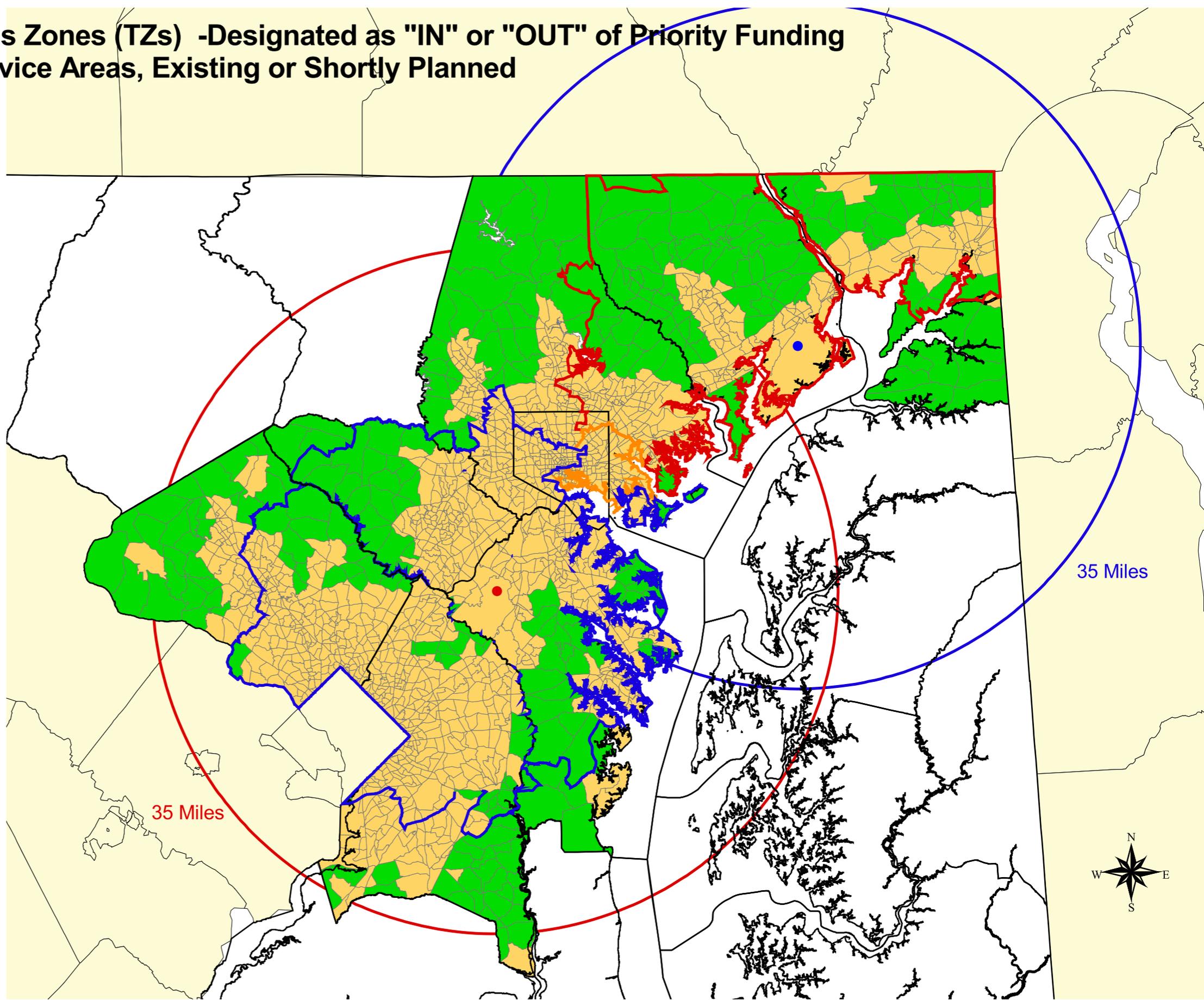
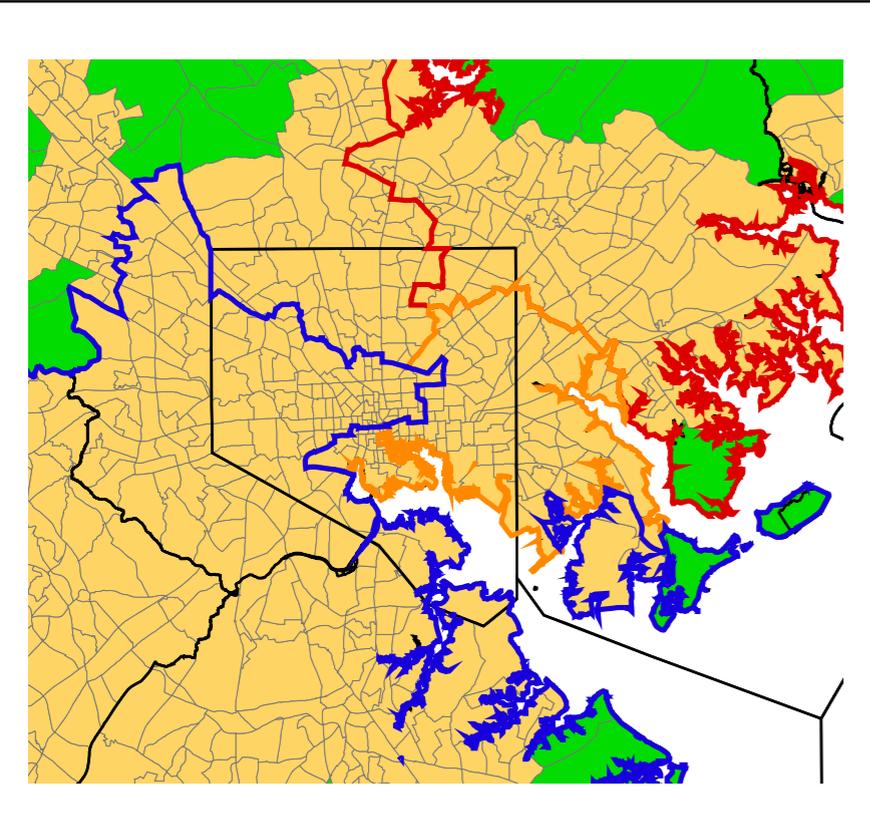
- APG 45-Minute Commute
- BOTH 45-Minute Commute, APG & FTM
- FTM 45-Minute Commute

TZ Designation - Priority Funding or Sewer Service Areas

- "IN"
- "OUT"

BRAC Installations

- Aberdeen Proving Ground (APG) and 35 Mile Distance Ring
- Ft Meade (FTM) and 35 Mile Distance Ring



20 0 20 40 Miles

Map D - BRAC Transportation Analysis Zones (TZs) - Location of Existing Apartment Units

Legend

Jurisdictions

- Jurisdictions In Maryland
- Jurisdictions Outside Maryland

TZ Commute Sheds around APG and Ft. Meade Study Area

- APG 45-Minute Commute
- BOTH 45-Minute Commute, APG & FTM
- FTM 45-Minute Commute

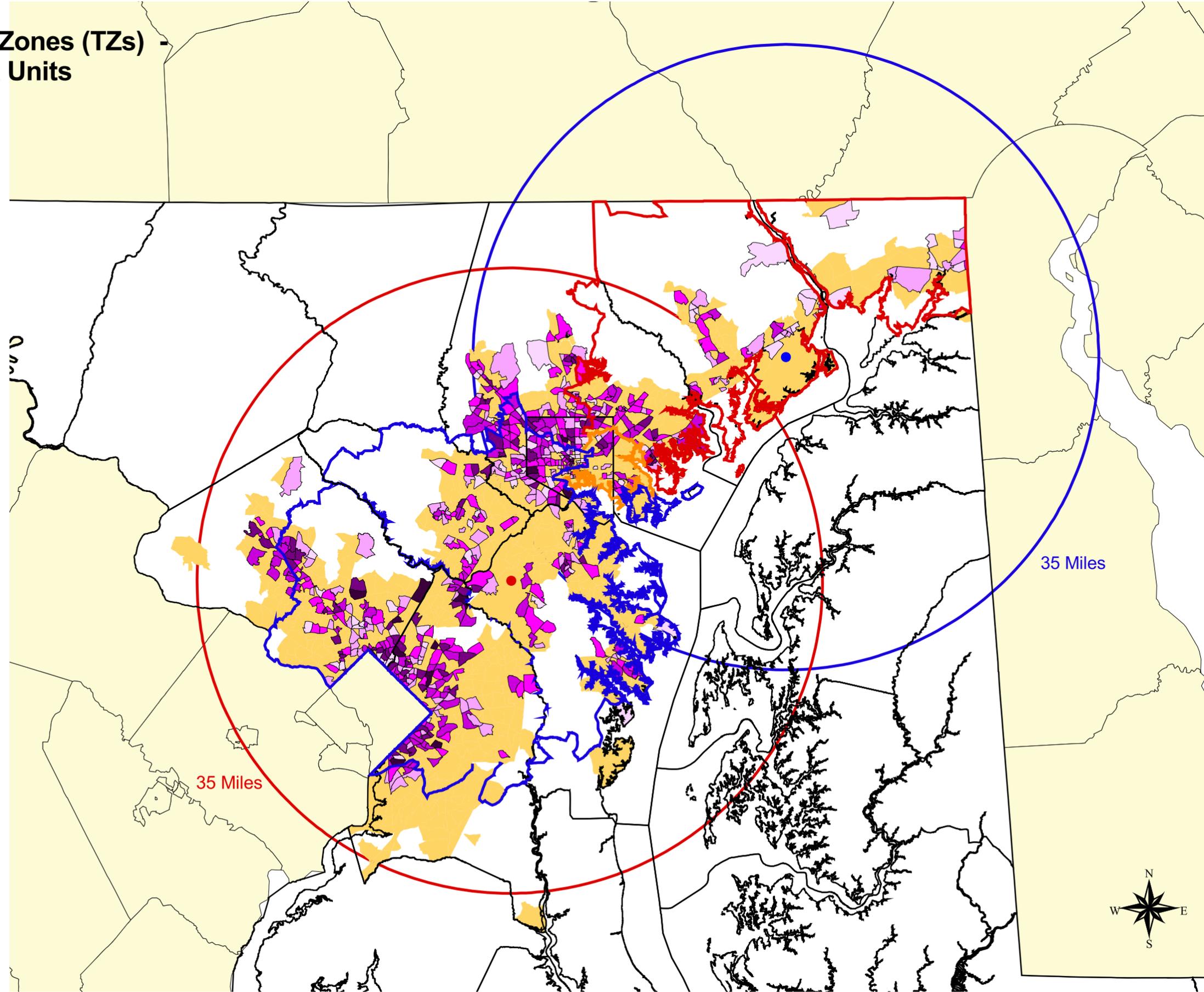
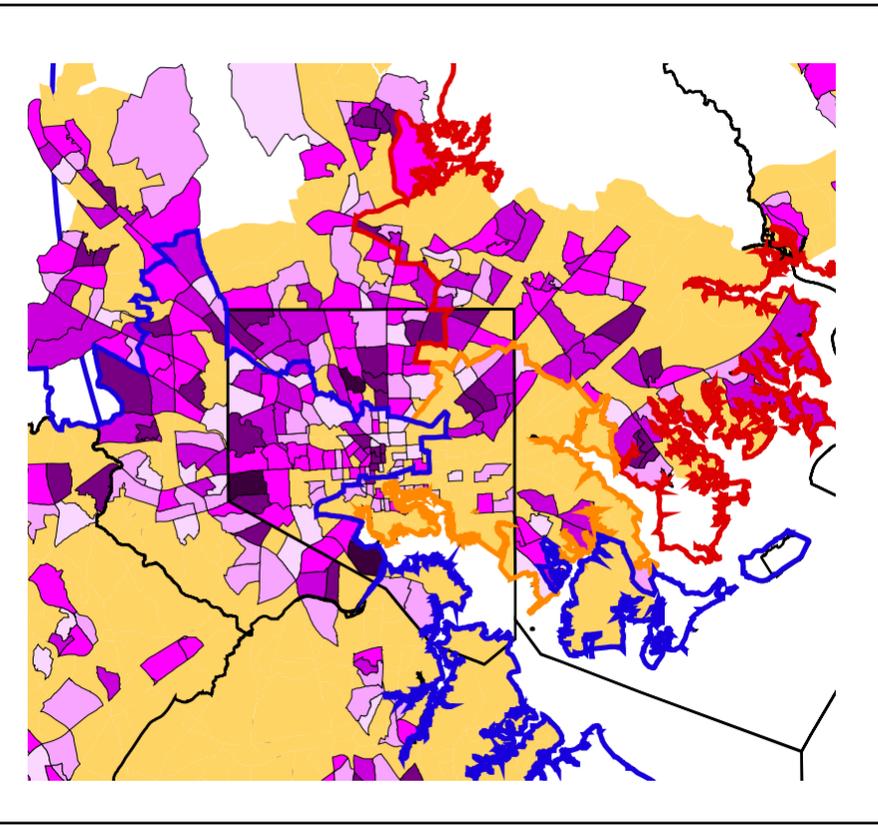
BRAC Installations

- Aberdeen Proving Ground (APG) and 35 Mile Distance Ring
- Ft Meade (FTM) and 35 Mile Distance Ring

Number of Apartment Units by TZ (TZs with 25 or more Apartment Units)

- 25 - 99
- 100 - 249
- 250 - 499
- 500 - 999
- 1000 - 1,999
- 2,000 and over

TZ Designation - "IN" Priority Funding or Sewer Service Areas



Each TZ is then assigned a cluster type within its jurisdiction based on its PFA/SEWER Service Area (IN or OUT), Housing Cost/Quality Measure (see Step 4 above – HIGH, MEDIUM and LOW), and Commute Zones (APG45, FTM45, PLUS5, zOUT). The resulting 1,834 TZs are collapsed into 103 unique clusters of Housing Type. For example, cluster “24025_IN_HIGH\$_APG45”, is the cluster of TZs in Harford County (24025), located inside PFA/Sewer areas (IN), with housing of higher cost/quality (HIGH\$) and within the 45-minute commute shed for Aberdeen Proving Ground (APG45).

6. For each of the 1,834 TZs, the anticipated total supply of households available to movers (intra-county and in-migrant movers) is derived based on two components “sales turnover of existing units” and “new units constructed.” The intent being to model for each TZ the expected number of units (sales turnover or new) that are likely to be available for the seven principal years (2009 through 2015) in which BRAC households are to arrive in the eight jurisdictions.

To derive a seven-year sales turnover rate for each TZ, the owner parcel units built as of the end of 2004 are examined for their historical sales turnover. Households built in the seven years 1998 through 2004 are assumed to be new units and sales turnover is the number of units existing as of the beginning of 1998 (i.e. year built 1997 or earlier) that are sold via an arms length transfer between January 1, 1998 and December 31, 2004 (seven years sales turnover). The seven years sales turnover rate is then derived for each TZ as the seven years of sales (1998 through 2004) divided by the number of units as of the beginning of 1998.

For each TZ the estimated units as of the beginning of 2009 are derived as follows: “owner” units from the parcel counts as of the end of 2004 + apartment units from the parcel counts + new households constructed in the 4 years 2005 through 2008 (based on the household projections by five year intervals provided by the Baltimore Metropolitan Council (BMC Round 6Cprime), the Metropolitan Washington Council of Governments (MWCOG, Round 7.0) and Cecil County). The resulting Total Housing Units as of the beginning of 2009 for each TZ is then multiplied by the seven-year sales turnover rate to derive the estimate of total sales of existing units as of the beginning of 2009 that are expected to turnover in the seven years 2009 through 2015. To the sales turnover are added the projected households to be built over the seven years 2009 to 2015 (interpolated from the BMC and MWCOG TZ household projections) to derive the total housing units that are expected to be available to all movers over the seven-year period.

The resulting sales turnover and new construction for 2009 through 2015 are then summed over the 103 TZ clusters to derive the total housing supply available to movers by cluster. To estimate the portion of this total turnover (sales turnover plus new units constructed) that are available to in-migrants, data from the 2000 census (public use microdata samples, or PUMs) is examined on residence of

movers, owner and renter, 5-years previously to determine inter and intra-county movers. (See [Appendix A.2.](#)) For each cluster the in-migrant turnover as a share of all movers is estimated using the Census rates and the mix of owner and rental units in each cluster). This percent (in-migrant percentage of total migrants or movers) is then multiplied times the total turnover (sales turnover and new units constructed) to derive the number of units by cluster expected to be available to in-migrants over the seven years period of maximum BRAC household demand. The above calculations and estimates are derived for each county by summing the TZ clusters within each county and are summarized in Table 3.

7. The results of Steps 1-6 is the derivation of the supply side of housing—current housing stock (“owner” and “renter”), projected new households and the expected sales turnover and share expected to be available to in-migrating households (of which BRAC households are a subset). This describes the potential receiving areas for the BRAC households and the supply of households expected to be available.

E.2 BRAC Housing Demand Side Analysis

1. BRAC Housing demand is a function of the direct, indirect and induced jobs coming to or being created in Maryland through the BRAC process. For each of the three modeled bases – APG, Fort Meade and Andrews Air Force Base – total BRAC housing demand (both homeowner and renter) is separated into direct, indirect and induced rounds, by phase, from RESI’s IMPLAN model run under the following assumptions:
 - all households are in place by 2015
 - two-thirds of all BRAC-related jobs generate new households to Maryland with the remaining one-third of BRAC jobs being filled by: a) those already living in Maryland; b) by in-commuters into Maryland; or c) by more than one worker per new household to Maryland
2. The original distribution of households to the eight-jurisdiction study area from the IMPLAN model was adjusted to a small degree by the Maryland Department of Planning with the concurrence of the Baltimore Metropolitan Council and RESI. These adjustments reflect future commutation taking into account expected residential growth patterns which differ from historical trends. By and large, these adjustments yielded somewhat more households to Baltimore City, Cecil and Baltimore counties, and somewhat fewer households to Anne Arundel and Harford counties.

3. The BRAC homeowner/renter split at the end of Phase 1 & 2 is determined by the income of workers based on homeownership rates by income from the 2000 Census. For Phase 1, the homeowner/renter split is set at the Maryland average for the latest year available from the U.S. Census Bureau's Current Population Survey resulting in the temporary affect of a higher share of households that are rental, than would have been true had homeownership rates been set based on the income of workers.
4. The percent of jobs by direct, indirect and induced rounds by three broad income groupings (< \$30,000, \$30,000-\$74,999" and \$75,000+, corresponding to "low," "middle/medium" and "high" income workers) is calculated from the IMPLAN model run for each of the three bases based on earnings of employees by the North American Industrial Classification System (NAICS) industry group.
5. The percentages calculated above are then applied to the BRAC households by Phase (1 & 2) for each base to yield total households by county in the low, middle and high income ranges associated with each base.
6. The above totals for each group, broken out into homeowners and renters, are the BRAC household demand in the low, middle and high-income categories that corresponds to the three housing "attractiveness" categories on the supply side, high, medium and low.

Table 1 shows the BRAC households by jurisdiction associated with all bases by the three broad household income groups.

Tables 2 & 3 shows the relationship between BRAC household demand and the supply of housing expected to be available to all in-migrants (BRAC and non-BRAC) over the 2009 to 2015 period, the seven-years in which BRAC household creation is expected to be the strongest.

E.3 Allocation of BRAC Housing Demand to Housing Supply:

1. For each of the eight BRAC jurisdictions, the County housing demand numbers from Section A above are distributed to the TZ cluster types within the jurisdiction (103 cluster types in total).
2. BRAC Phase 1 and Phase 2 owner households by income, are allocated to the commute zones within the county based on the zones' share of projected households (with, in some instances, weighting of the projected households for distance i.e. outer areas more distant from APG or FTM getting a lower weight for their projected households compared to areas more approximate to the facility). BRAC Households by Income Grouping allocated to each commute zone are then distributed based on the shares of more recent housing development (using years 1990 to 2004) built "IN" or "OUT" of the PFA/Sewer TZ areas for

that income and commute zone. BRAC Phase 1 and 2 renter households by income are distributed based on existing apartment units by commute zone (sometimes weighted by distance depending on the jurisdiction and its relationship to the military installations) and then within the commute zones based on existing apartment units by value groupings (High, Medium and Low). Since existing renter stock is almost exclusively in areas served by sewer, renter households are in clusters that are “IN” as tagged by the PFA/Sewer map layer. (See Map C).

Table 3 and [Appendix A.2](#) show by jurisdiction the resulting allocations of BRAC households “IN” and “OUT” of PFA/sewer areas to the various housing/quality and commute zone clusters and how the anticipated BRAC demand for housing units relates to the expected supply of housing units (sales turnover and projected new households) available to in-migrants for the seven year period, 2009-2015). Map E shows the TZ clusters with the BRAC demand for housing units as a percent of the expected housing unit supply for in-migrants.

3. Once the BRAC Phase 1 & 2 Projected households by Income Groupings (High, Middle and Low) and Tenure (Owner, Renter) are assigned to the 103 TZ clusters, such that the sum of all numbers by cluster matches the County BRAC projections, the next task is to assign the numbers to individual TZs. Owner occupied units are distributed to TZs based on the relationship to the available “owner” Turnover (expected owner units for sale or constructed for the period 2009 to 2015). For each TZ in a cluster, the TZ receives its share of the BRAC Phase 1 and Phase 2 owner households based on its share of the TZ clusters “owner” Turnover. For the BRAC Phase 1 renter households, the existing stock of apartments by value groupings (High, Medium and Low) are used to derive the TZ-to-TZ Cluster shares for allocating the TZ Cluster renter households to the TZs within that cluster. This method of allocation assumes that BRAC households within a cluster are as likely to consume units that turnover from sales as from new construction and that all TZs within a cluster are of the same relative attractiveness. Map F shows the number of BRAC households allocated to the TZs based on this method.

E.4 Residential Buildout Capacity

Development Capacity Analyses information is essentially a land use build-out analysis. It stems from a Governor’s Task Force, implementing MOUs, an Executive Order, and cooperation between the State and local governments. The estimates are based on current zoning, land use and parcel data, plans and policies, and related information. This analysis uses a GIS-based land use model developed by MDP 12 years ago, and modified over time.

While it gives a reasonable picture of buildout from a land use perspective, it does not account for infrastructure capacity (e.g., transportation, water supply and wastewater, schools, etc.). Another important caveat is that current assumptions about development

densities, infill and redevelopment rates, etc. can change and therefore increase or decrease the development capacity of an area. For example, as a jurisdiction approaches its estimated buildout, it may extend the PFA, up zone parcels for development, etc. Of course the opposite can also happen.

For this report, residential buildout capacities were developed by the Maryland Department of Planning for all but Harford County, which comes from the County Planning Office. Capacity is an estimate of what the residential buildout capacity would be starting in 2009 (the probable starting point for BRAC relocations), assuming that the local projections for the 2005 to 2010 period come to fruition through 2009.

For more information on MDP's Development Capacity Analysis, the Task Force, methodology, etc., please see:
http://www.mdp.state.md.us/develop_cap.htm

Map E - BRAC TZ Clusters - BRAC Household Demand as a Percent of Expected Total Housing Units (New and For Sale) Available to In-Migrants, 2009 - 2015

Legend

Jurisdictions

- Jurisdictions In Maryland (White outline)
- Jurisdictions Outside Maryland (Yellow background)

TZ Commute Sheds around APG and Ft. Meade Study Area

- APG 45-Minute Commute (Red outline)
- BOTH 45-Minute Commute, APG & FTM (Orange outline)
- FTM 45-Minute Commute (Blue outline)

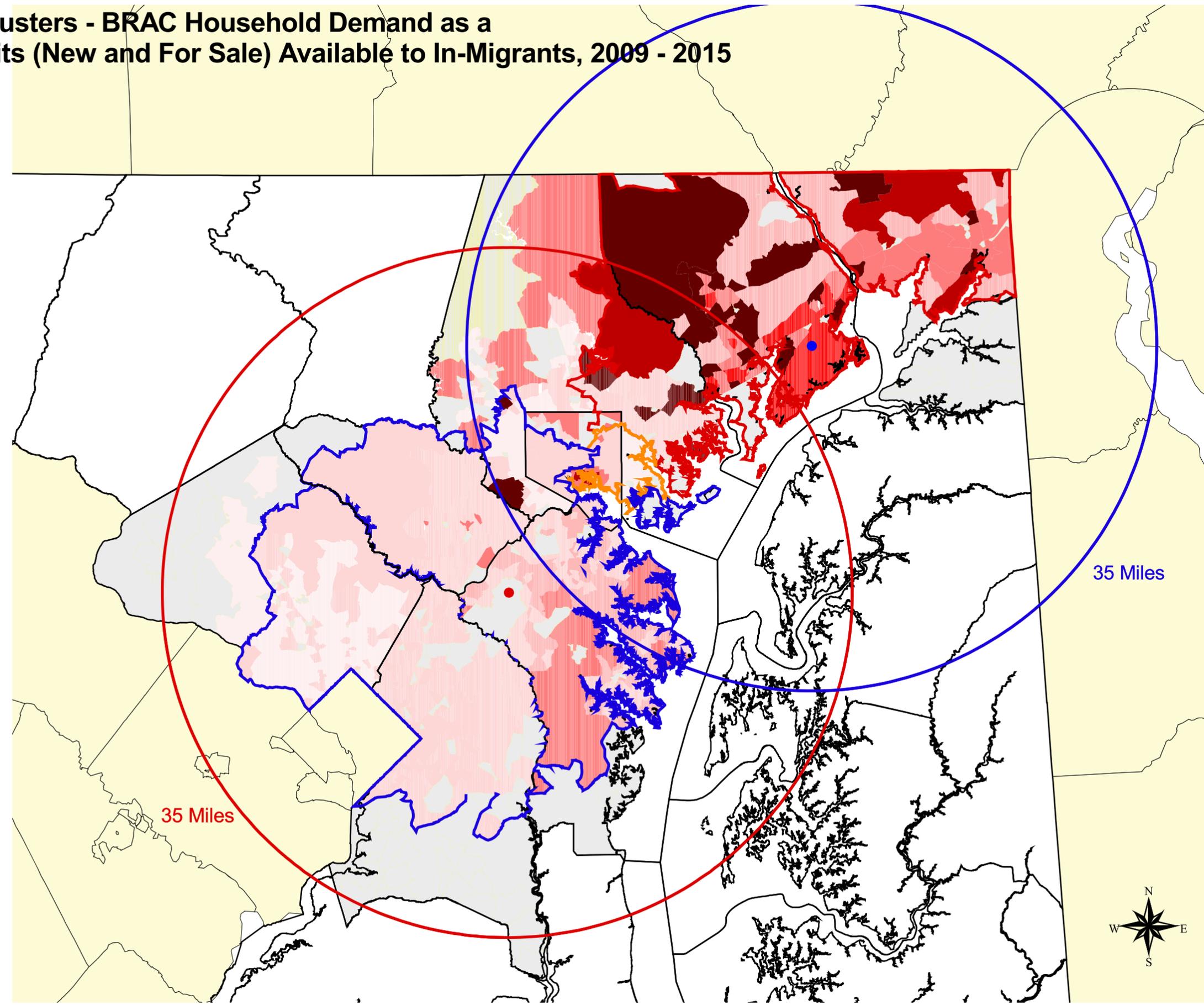
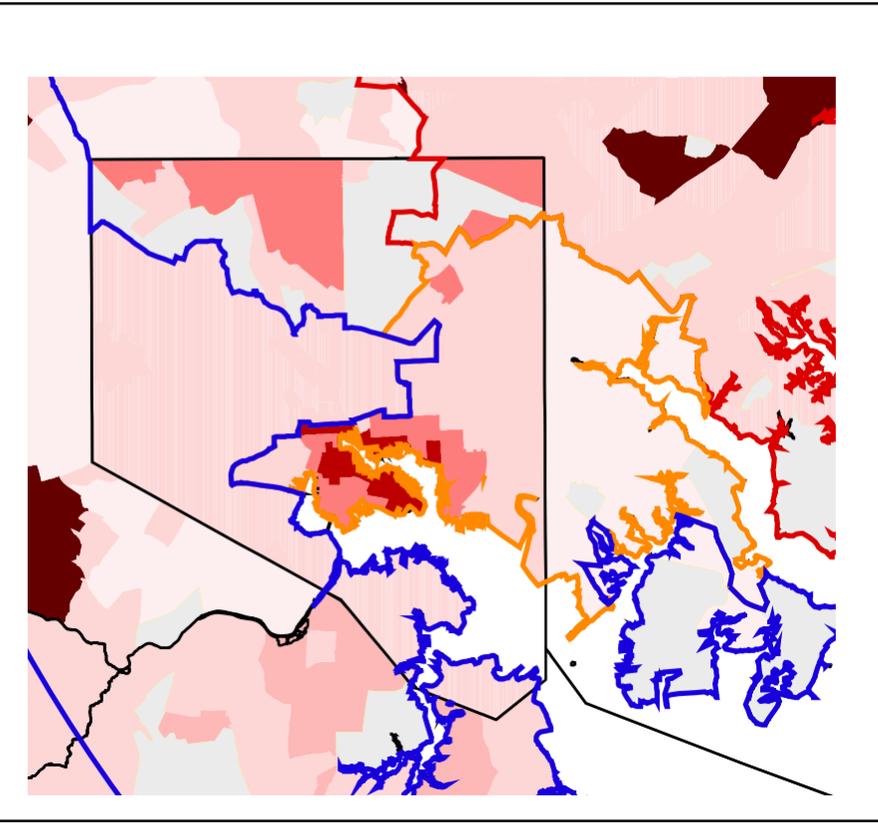
BRAC Installations

- Aberdeen Proving Ground (APG) and 35 Mile Distance Ring (Blue dot and circle)
- Ft Meade (FTM) and 35 Mile Distance Ring (Red dot and circle)

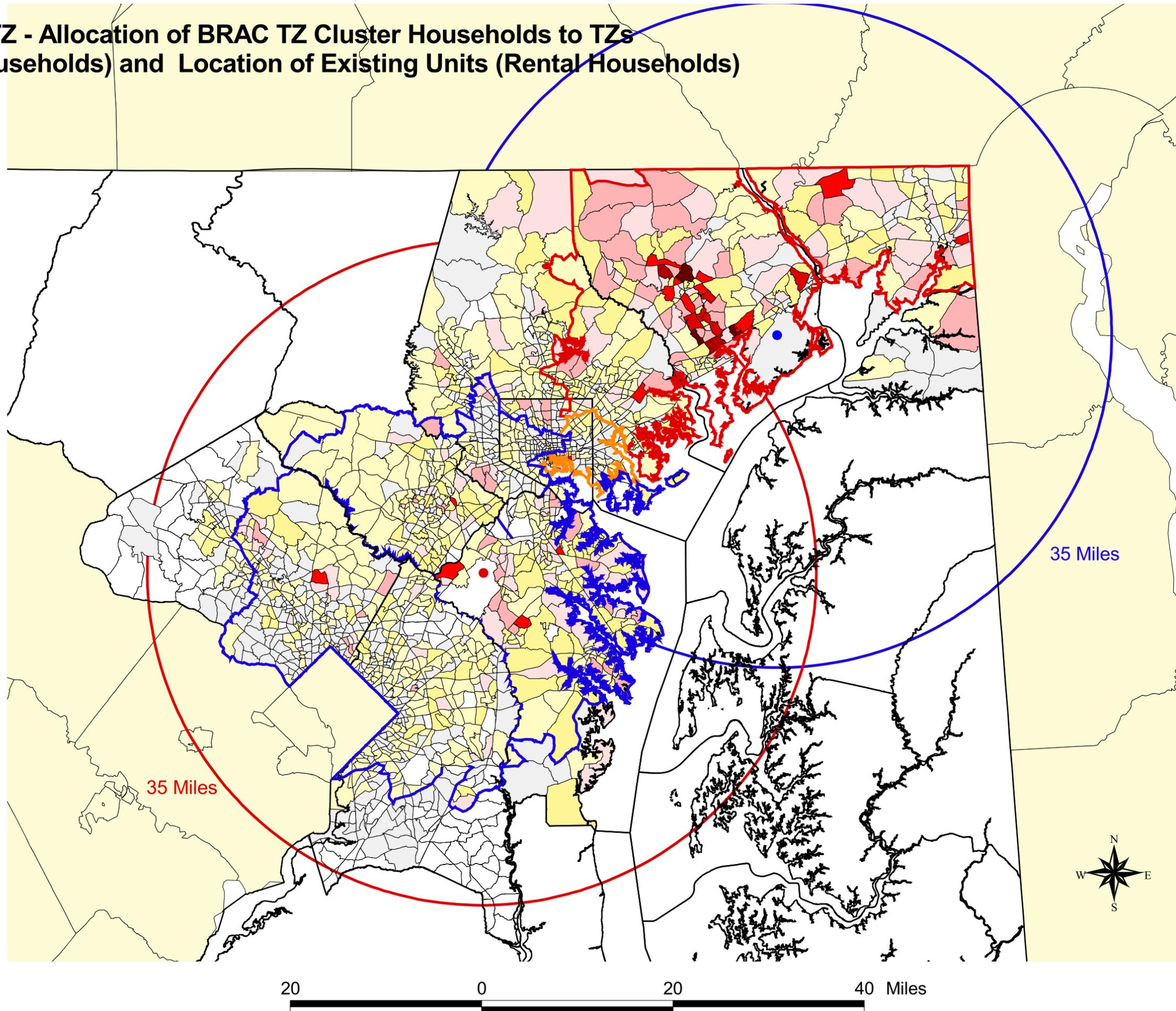
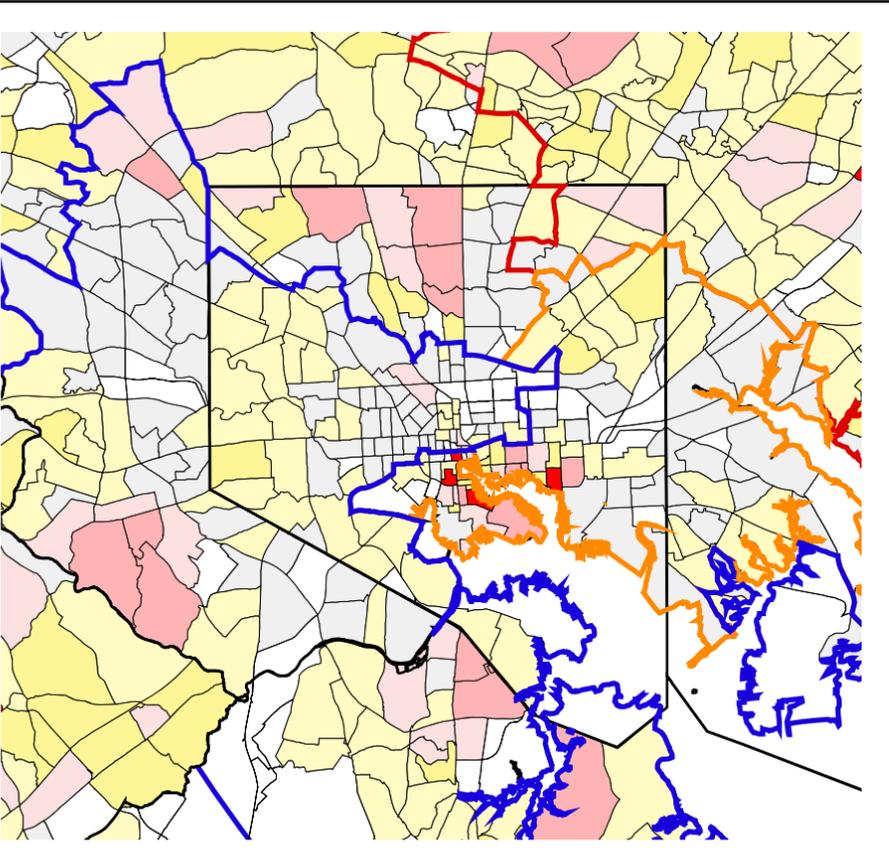
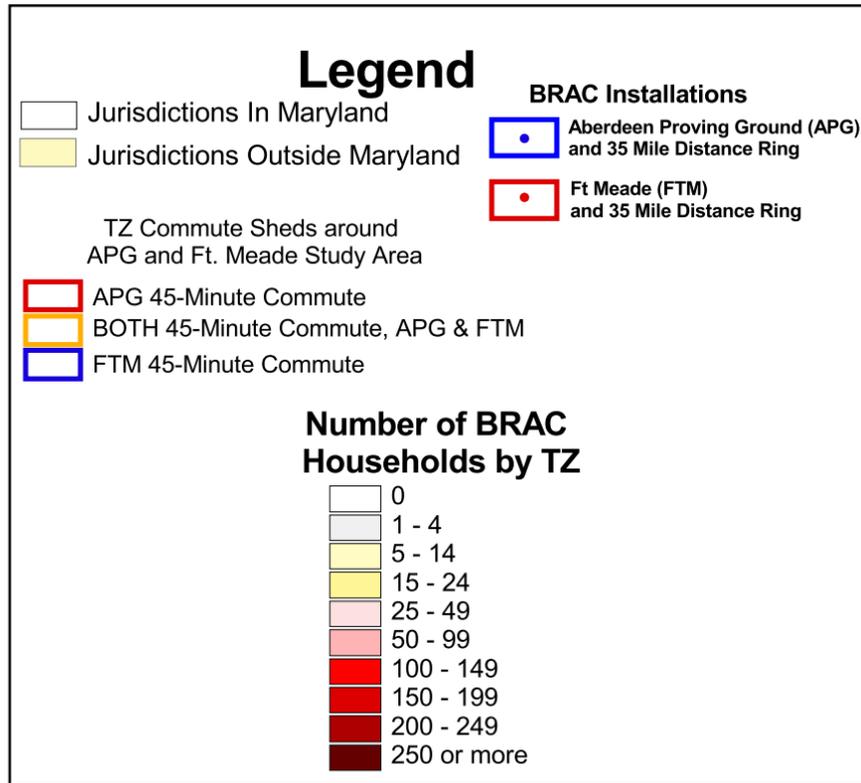
BRAC Household Demand as a Percent of Expected Total Housing Units (both New and for Sale) Available to In-Migrants, 2009 - 2015

- 1.24 - 4.99% (Lightest pink)
- 5 - 12.49% (Light pink)
- 12.5 - 19.99% (Medium-light pink)
- 20 - 27.49% (Medium pink)
- 27.5 - 34.99% (Dark pink)
- 35 - 49.99% (Red)
- 50 - 67% (Darkest red)

Grey area: TZ Cluster with less than 75 BRAC Households



Map F - BRAC Households by TZ - Allocation of BRAC TZ Cluster Households to TZs based on Share of Turnover (Owner Households) and Location of Existing Units (Rental Households)



IV. WATER AND WASTEWATER

A. Introduction and Summary of Recommendations

A.1 Introduction

The Water and Wastewater section is a survey scale review of water supply and wastewater treatment capacity in the county and municipal jurisdictions expected to be most impacted by the increase in projected households attributable to BRAC. As such, it is intended to focus attention where there are, or may be, capacity shortages to support the increased populations, including those attributable to BRAC.

This report is only intended to flag potential water resource and related infrastructure issues. The recommendations reflect that broad perspective and should not be interpreted to mean that any specific facility of any particular size be constructed before more detailed evaluations take place through existing planning processes, in particular, through local comprehensive planning and the County Water and Sewerage planning processes. These processes are the appropriate means for open public discussion and local decisions that are well established through existing State and local laws. They are also the appropriate vehicles for refining the issues identified in this report and are further described in Section D.

In addition to summarizing water and wastewater capacity issues by jurisdiction (Section G), this report addresses the following programmatic issues related to planning, land use, water related regulations, and implementation issues that bear importantly on provision of adequate water and wastewater service:

- Local planning issues and requirements including Comprehensive and Water and Sewerage Planning requirements
- Water resources issues including water quality regulations including total maximum daily loads (TMDLs) and stormwater management
- Financing for planning and capital facilities

It should be noted that the anticipated 7,500 increase in employment and its impacts at the National Security Agency (NSA) near Fort Meade is not part of this analysis.

A.2. Summary of Key Recommendations

- **All BRAC impacted local jurisdictions should promptly review and update Local Comprehensive Plans and County Water and Sewerage Plans to reflect the impacts of and needs from BRAC.**

- **For those jurisdictions facing early BRAC related capacity shortages (particularly Harford and Cecil Counties and municipalities), planning should be started or accelerated promptly. Local Comprehensive Plans and County Water and Sewerage Plans should be updated in accord with new planning and regulatory requirements including those in HB 1141 to include facilities required to meet BRAC needs.**
- **State technical and financial assistance for planning should be promptly provided where needed to assist local jurisdictions.**
- **The federal role and responsibility for providing assistance to communities for planning, design, and construction of new facilities attributable to the BRAC related increase should be identified and appropriate federal financial assistance should be provided.**
- **Counties should review and make improvements to their rural preservation programs to assure their effectiveness in protecting rural areas from increased development pressure related to BRAC. This is particularly important in Harford and Cecil Counties.**
- **Current regulatory requirements and limits must be fully integrated into the review and updating of local Comprehensive Plans and County Water and Sewerage Plans**

B. Methodology

This report is only intended to flag potential issues. The recommendations reflect that perspective and should not be interpreted to mean that any specific facility of any particular size be constructed before more detailed evaluations take place through existing planning processes, in particular, through local comprehensive planning and the County Water and Sewerage Plans. These are open public planning processes that are well established through existing State and local laws and are the appropriate vehicles for refining the issues identified in this report. These planning programs are briefly described in Section D.

The Maryland Department of Planning (MDP) enlisted the assistance of the Maryland Department of the Environment (MDE) and local governments to provide basic data on capacities and flows in water and wastewater treatment systems in the study area, and to obtain guidance on stormwater management. We appreciate their responsiveness and support in helping to prepare this report. [Appendix E](#) lists contributing staff.

A simple methodology appropriate to this survey scale analysis was applied. The analyses focused on water and wastewater system treatment capacity at the relevant water and sewerage systems and on significant resource and regulatory limitations related to

those systems. Evaluation of sewage collection and water distribution components are beyond the scope of this report.

For water and wastewater facilities, available capacity was compared to estimated demands from projected household growth, including projected BRAC household growth. It is useful to think of the increased demand from BRAC as an acceleration of projected growth. For purposes of capital project planning, this may mean that the time frames for planning, design, and construction of capacity increases may need to be accelerated.

The basic data components used are:

Population and Household projections provided by MDP's Planning Data Services

Inside/Outside Priority Funding Area (PFA) apportionment provided from modeling by MDP's GIS and Planning Data Services.

Water supply data was provided by MDE and modified, in some cases, by information from local governments. MDE compared average day demand plus a 10.0 percent drought factor to the more restrictive of appropriation permit limitations or treatment plant capacities to determine overall system capacity. For a more detailed overall capacity determination, at least the following should be evaluated: drought year capability of sources, maximum day and maximum month demands, storage capacity, pumping and transmission restrictions, fire protection capability, and the number of connections approved but not yet constructed.

Wastewater treatment capacity information was provided by MDE.

Capacity available to support additional residential development was estimated by subtracting existing flows and commitments from permitted treatment capacities as provided by MDE and local jurisdictions. Capacities are expressed in terms of million of gallons per day (MGD). Per capita and per household use of capacity was based on 100 gallons per day (GPD) per person and 250 GPD per household, coefficients that are recommended for planning purposes by MDE.

There are other simplifying assumptions that apply to the analysis and the flow data used throughout the report. First, flow projections are based solely on projections of residential demand. Commercial and industrial flows were not integrated into the calculations as a result of time and data limitations. Water and wastewater capacity demands from these uses, particularly from certain industrial uses have the potential to be significant. Large industrial demands also are difficult to predict. Second, the flow numbers used reflect average daily use. Detailed planning and engineering must take into account peak use based on certain engineering standards and practices.

Of equal importance to the system capacity vs. projected growth analysis, are potential system limitations related to federal/State water quality regulations, water supply

resource availability, and land use patterns. These are the issues that are intended to be addressed in the new Water Resource Element in local comprehensive plans enacted as part of HB 1141 which is discussed further below. This new element is due to be in place by October 1, 2009.

Some jurisdictions will be limited in their ability to provide wastewater treatment capacity as a result of limitations imposed by their discharge permits which, in turn, must consider State documented water quality impairments and, where necessary, established Total Maximum Daily Loads (TMDLs) discussed in sections E.3 and [Appendix D](#). In addition, Maryland's Chesapeake Bay Tributary Strategies may require nonpoint source controls in some jurisdictions that are more stringent than required by the State's current regulatory program in order to restore and protect the Bay's water quality. Such controls may become mandatory after EPA develops a Chesapeake Bay TMDL as planned by 2010. Some jurisdictions have found it difficult for various reasons to find and develop adequate raw water supply sources. Resolution of these types of issues is typically complex and protracted. In some cases, they may be very costly to resolve.

Water and wastewater treatment facilities can always be constructed, but where resource and regulatory issues are limiting factors, the level of difficulty and cost can rise dramatically and, in the extreme, prohibitively. Jurisdictions that are facing difficulty finding adequate water supplies or providing wastewater treatment capacity within regulatory limitations will have to limit their growth in certain planned development areas, unless extraordinary steps are taken. This will have the adverse impact of either forcing development into other areas that have capacity or into rural areas using individual well and septic systems. Large amounts of low-density rural residential development is generally contrary to State Smart Growth policies. It is also inconsistent with virtually all local comprehensive plans that espouse concentrating development where services can be provided and protecting rural areas from types of development that will compromise rural economic, aesthetic, and environmental values.

C. Summary of Findings By Jurisdiction

Table 6 summarizes the findings by jurisdiction. These findings are qualitative and as discussed elsewhere, must be subjected to more detailed evaluation and planning by local governments. See Section G in this chapter for a more detailed discussion of each jurisdiction.

Table 6 Summary of Water and Wastewater Planning Needs and Issues

COUNTY	Municipalities/ Others	Sewage Treatment Capacity Status	Water Treatment Capacity Status	County/Mun. Comprehensive Plan Current/Due	County Water and Sewerage Plan Current/Due	Rural Protection Program – MDP Rating
Cecil		Adequate for BRAC Accelerate long term Planning	Inadequate	1997/2003	2004/2007	Least Protective
	Elkton	Adequate for BRAC Accelerate long term Planning	Limited			
	Perryville	Limited Accelerate Planning	Limited Accelerate Construction			
	Port Deposit	Inadequate Accelerate Planning	Inadequate Accelerate Planning			
	Rising Sun	Limited Accelerate Planning	Limited Accelerate Planning			
	North East	Adequate Served by County	Adequate Accelerate Planning			
	Charlestown	Adequate Served by County	Limited Accelerate Planning			
Harford		Adequate for BRAC Accelerate Planning for longer term	Limited Susquehanna Discussions	2004/2010	2005/2008	Least Protective
	Havre de Grace	Adequate for BRAC Accelerate Planning for longer term	Adequate for BRAC Accelerate Planning for longer term			
	Aberdeen	Adequate for BRAC Accelerate Planning for longer term	Limited Need to Accelerate Development of New Capacity			
	Bel Air	Adequate Served by County	Inadequate Need to Develop New Capacity			
	APG (Army)	Unknown				
	Edgewood (Army)	Unknown				

Table 6 Summary of Water and Wastewater Planning Needs and Issues (Continued)

COUNTY	Municipalities/ Others	Sewage Treatment Capacity Status	Water Treatment Capacity Status	County/Mun. Comprehensive Plan Current/Due	County Water and Sewerage Plan Current/Due	Rural Protection Program – MDP Rating
Baltimore County		Adequate	Adequate Served by Baltimore City	2000/2006	2004/2007	Most Protective
Baltimore City		Adequate	Adequate Susquehanna Discussions for long term needs	1973/2006 Nearing Adoption	1995/1998 Nearing Adoption	
Anne Arundel		Adequate for BRAC Accelerate Planning for longer term	Adequate Partial service from Baltimore. City	1997/ 2003	2003/2006	Moderately Protective – Improvements Pending
	Ft. Meade Army	Unknown				
Howard		Limited in Patuxent Adequate in Patapsco	Adequate Served by Baltimore City/ WSSC	2000/2006	2004/2007	Least Protective
Prince George's		Adequate	Adequate	2000/2006	2001/ 2004	Least Protective
	Bowie	Adequate	Limited			
Montgomery		Adequate	Adequate	1993 + Sector Plans	2003/2007	Most Protective

The highest priority for assistance should go to Harford and Cecil Counties and their municipalities. They will experience the largest impact from BRAC and they have the most complex, numerous, and significant capacity issues. Cecil County and its municipalities have fewer staff resources than the other jurisdictions and will therefore need the most assistance. Harford and Cecil counties need the most urgent attention to ensure that there will be adequate water supply, and water and wastewater treatment capacity to accommodate BRAC. These counties and most of their municipalities are pursuing various solutions to address their needs. However, wastewater treatment plant capacity expansions in Harford and Cecil Counties could be limited by discharge permit requirements. While state-of-the-art enhanced nutrient removal (ENR) is programmed for the region's major facilities, water quality impairments ([Appendix D](#)) in specific areas place added pressure on local efforts to ensure that water quality standards can be met. Creative local management of both point and nonpoint pollution sources is necessary to achieve success.

Additional water supply for Cecil/Harford will depend, in some cases, on approval by the Susquehanna River Basin Commission (SRBC). Additional support and assistance from the State and federal government can help to ensure that the current efforts stay on track, and that the necessary prerequisite planning and regulatory requirements are met in a timely manner.

The next priority should be focused on those three jurisdictions that discharge some of their wastewater to the Patuxent River – i.e., Anne Arundel, Howard, and Prince George's counties. This area is the focus of the Fort Meade and Andrews Air Force Base BRAC household increase. There are several treatment plants in the region that will likely absorb most of the BRAC impacts. Expansion of wastewater treatment plant capacity for plants that discharge to the Patuxent River could be limited by discharge permit requirements. Similar to Harford and Cecil counties, water quality impairments ([Appendix D](#)) and pollutant load limits are expected to present challenges to long-term growth accommodation.

The City of Baltimore, and Baltimore, Montgomery Counties, and the parts of Prince George's County in the Blue Plains service area are all served by large regional public water and sewer utilities that will experience little or no difficulty absorbing increased demand from BRAC.

D. Local Planning Issues and Requirements

D.1 General

Responsibility for detailed comprehensive and facility planning related to the general needs identified in this report is delegated by law to local governments. They have been delegated the land use powers to direct where and how growth and development should occur, to enact land use regulations to implement their comprehensive plans, and to plan for adequate water and wastewater facilities to serve their populations.

Local governments are responsible under State law for writing and maintaining the County Water and Sewerage Plans that must show the “where, when, how much, and who pays” of community water and sewer service in a manner consistent with the Comprehensive Plan. County Water and Sewerage Plans are enforceably tied to adequate capacity requirements and the issuance of permits for facility construction, and local development and construction permits.

Therefore, it is both proper and legally necessary that these established planning programs and processes be the primary means to refine the preliminary findings of this report. Failure to update these Plans to reflect BRAC needs and projects could cause delays in funding, permitting, and constructing necessary projects to meet BRAC induced needs. The water and sewer section of this report describes the status of each county’s Comprehensive Plan and Water and Sewerage Plan.

Each county and municipality must take the initiative to review and update its own plans. It is vital for counties and municipalities to cooperate in updating their respective Comprehensive Plans and the County Water and Sewerage Plans to assure their consistency and avoid delays in implementing critical projects.

State and federal governments must be prepared to provide necessary guidance and technical and financial assistance to local jurisdictions. The cost of federal or State financial assistance to help local governments update their plans in a timely manner would represent a tiny fraction of the billions in anticipated capital investments related to BRAC. This small investment in sound planning would pay for itself many times over.

The 2006 session of the Maryland General Assembly created a new law which directly affects local planning related to water resources and water and sewerage facilities issues. House Bill 1141 mandates that by 2009, every county and municipality must include a Water Resources Element as part of their Comprehensive Plan. This element must address the relationship of planned growth to water resources for both wastewater and drinking water. The bill also establishes a process for municipalities to establish and plan for future annexation areas. These new planning requirements have the potential to assure improved provision of water and wastewater services in local jurisdictions.

The following recommendations are offered for consideration.

- **All BRAC impacted local jurisdictions should promptly review and update Local Comprehensive Plans and County Water and Sewerage Plans to reflect the impacts of and needs from BRAC.**
- **For those jurisdictions facing early BRAC related capacity shortages (particularly Harford and Cecil Counties and municipalities), planning should be started or accelerated promptly. Local Comprehensive Plans and County Water and Sewerage Plans should be updated in accord with new**

planning and regulatory requirements including those in HB 1141 to include facilities required to meet BRAC needs.

- **State technical and financial assistance for planning should be promptly provided where needed to assist local jurisdictions.**
- **The federal role and responsibility for providing assistance to communities for planning, design, and construction of new facilities attributable to the BRAC related increase should be identified and appropriate federal financial assistance should be provided.**

D.2 Local Comprehensive Plans

Article 66B of the Annotated Code of Maryland outlines the required and optional elements for county and municipal comprehensive plans. The various Plan elements set out the development policies and land use patterns envisioned by the jurisdiction for the following 20 to 30 years. They cover a broad range of interdependent topics including demographics, land use, environmental factors, inter-jurisdictional relations, redevelopment, community character, community services, rural preservation, economic development, and public infrastructure. The Plan presents each jurisdiction's vision for the future, and serves as the blue print for zoning and other land use and development regulations. The law requires that these Plans be updated every six years.

The 2006 session of the Maryland General Assembly enacted House Bill 1141 that was signed into law by the Governor. This law requires, among other things, that two significant new elements be added to comprehensive plans by 2009: 1) a Water Resources element, and 2) for municipalities with zoning authority, a Municipal Growth element. These elements have significant potential to improve the planning foundation on which County Water and Sewerage Plans depend.

The new Water Resources element requires local governments to identify drinking water and other resources, and suitable receiving waters and land areas for stormwater management and wastewater treatment and disposal, in order to meet the needs of existing and future developments as proposed in the land use element of the comprehensive plan. This element requires local governments to give greater consideration earlier in the planning process to the basic environmental constraints related to drinking water availability and wastewater discharge that could affect where and how development occurs. MDE is to provide available data and review the element for consistency with the Department's programs and goals as stated in Environment Article 5-203, which describes the Department's general powers, duties, and responsibilities, including responsibilities for long term Statewide water resources planning and management

The Municipal Growth element will help county and municipal governments cooperatively address the provision of water and sewer services in the growth areas

around municipalities. It includes a mechanism for resolution in cases where agreements cannot be reached.

D.3 Rural Preservation

Certain related planning issues are impacted by the availability of water and sewer capacity. The rural protection programs of the affected counties are important because experience has shown that the combination of adequate water and sewer capacity (or other infrastructure) in planned growth areas combined with an effective rural protection program is the best formula for achieving smart growth policies. Inappropriate or excessive rural development is not desirable because it interferes with rural economic, environmental, and cultural values.

Harford and Cecil counties, which are the jurisdictions identified as having the largest development pressure due to BRAC, are facing the greatest challenges to provide sufficient water and sewer infrastructure capacity. This coincides with both counties having rural protection programs rated by MDP as “Least Protective.” For that reason, the following recommendation is also made:

Counties should review and make improvements to their rural preservation programs to assure their effectiveness in protecting rural areas from increased development pressure related to BRAC. This is particularly important in Harford and Cecil Counties.

D.4 County Water and Sewerage Plans

Environment Article Title 9-Subtitle 5 requires the county governing bodies to prepare and adopt County Water and Sewerage Plans that are subject to MDE approval. Counties are responsible for including in these Plans the subsidiary plans of municipalities and other entities that own water or sewerage systems. Regulations (COMAR 26.03.01) elaborate on the content and procedures for the Plans.

The basic purpose of the County Water and Sewerage Plans is to ensure the provision of safe and adequate water and wastewater systems to meet existing and future demands in a manner that is consistent with county and municipal comprehensive plans. The local planning authority must certify that the Plan or any revision or amendment is consistent with the county comprehensive plan. In accordance with the law, MDE also seeks the advice of MDP on the consistency of the proposal with the local comprehensive plan and other appropriate planning matters. The Maryland Departments of Natural Resources and Agriculture are also consulted.

In conformance with the law, the regulations governing County Water and Sewerage Plan content require the inclusion of information in the Water and Sewerage Plans about existing and future projected populations, service areas staged in increments up to at least 10 years, existing and planned water and wastewater facilities that are adequate to serve

existing and planned service areas, compliance with State effluent limitations and protection of water uses, the water and wastewater system processes, levels and types of treatment, operation and maintenance costs, and means of financing improvements.

The law requires local governments to review the County Water and Sewerage Plans annually and provide a report of this review or an updated Plan to MDE once every three years. The County shall adopt and submit to MDE a revision or amendment if the governing body deems a revision or amendment necessary or if MDE requires a revision or amendment. The County may amend the Plan at any time.

In addition, Environment Article §9-512 states that water and sewer system construction, and other development permits may only be issued if water and sewerage systems are adequate. County Water and Sewerage Plans must show that there is adequate existing or planned capacity in any system to support the development being proposed. The law and these Plans are powerful tools to protect the public and environmental health and safety in a way that supports economic development and fulfills the visions of local comprehensive plans. This explains why the recommendations of this Report to bring these Plans up to date are critical to ensuring that they reflect all of the BRAC induced needs. Quality up-to-date Plans will help to ensure that there will be no delays in issuing permits and obtaining financial assistance for BRAC related water and wastewater projects.

MDE requires that their permits be consistent with the County Water and Sewerage Plan. Therefore, any proposals to expand a water or wastewater facility must undergo a local public process to adopt the Plan for new or expanded facilities. Projects must also be consistent with Water and Sewerage Plans to receive State financial assistance.

Section G discusses the status of each County Water and Sewerage Plan in the BRAC impacted counties. The quality and currency of these Plans varies among the BRAC counties. Most of the counties have very good Plans, sound programs to keep their Plans up to date, and a system that uses these plans as an effective management tool.

Those BRAC counties where these plans are not current or need improvement in various ways are noted in Section G.

Since these plans must be adopted by the counties but also reflect municipal plans and systems, inter-jurisdictional disagreements sometimes surface over a variety of interrelated annexation and service provision issues. In the long term, HB 1141, as described above, can help to address these situations. In the meantime, the State should continue or accelerate any efforts to assist in the resolution of any issues that may create a barrier to providing adequate water and sewer service to support the projected BRAC related growth. In some cases, additional planning resources may be necessary to help local jurisdictions to properly meet the requirements of this law.

It is recommended that State and/or federal funds be provided to assist jurisdictions that need additional resources to carry out the mandated water and sewer, and other planning necessary to support BRAC.

E. Water Resource Issues

E.1 General

The ability of local governments to accommodate new growth may be strongly influenced or limited by sources of drinking water and/or by the ability of receiving streams or local soils to assimilate treated wastewater effluent.

Sources for drinking water may simply be limited by the available resource in some locations. Where this occurs, solutions to this limitation are often very expensive.

Wastewater effluent loading caps are currently in place resulting from the Chesapeake Bay Tributary Strategies and from local water quality impairments for nutrients. The Enhanced Nutrient Removal (ENR) Program requires wastewater treatment plants to implement state-of-the-art nutrient removal in keeping with a program and schedule established by MDE. The Bay Restoration Fund (BRF) provides funding to upgrade significant treatment plants to ENR, but does not pay for growth above the capacity already established by MDE and the Tributary Strategies and does not pay for other non-ENR upgrades that may be needed. Any wastewater treatment plants affected by BRAC must address the loading caps and any required capital improvements needed to attain and maintain these caps.

These regulatory requirements and limits must also be integrated into the review and updating of local Comprehensive Plans and County Water and Sewerage Plans

E.2 Rural Development on Wells and Septic Systems

Development Patterns: The table below represents the percent of BRAC growth in each county that is likely to locate inside and outside of Priority Funding Areas (PFAs) and existing or planned water and sewer service areas. This data is generally reflective of each jurisdiction's development pattern history. For Montgomery, Prince George's, Anne Arundel and Howard counties it is estimated that between 1.0 percent and 12.0 percent of BRAC households will settle in rural areas, typically on individual systems (wells and septic systems), while for Baltimore and Harford counties, the share outside PFA/sewer areas are estimated to be 19.0 and 23.0 percent respectively. Cecil County is estimated to have the highest rate of rural development at over 35.0 percent. Rural development densities greater than 1 unit per 20 acres have been documented to consume large amounts of rural land and damage the rural agricultural economy and other rural values.

<i>County</i>	<i>Percent Development Outside PFA/Sewer</i>	<i>Percent Development Inside PFA/Sewer</i>
<i>Anne Arundel</i>	<i>5.5%</i>	<i>94.5%</i>
<i>Baltimore County</i>	<i>16.4%</i>	<i>83.6%</i>
<i>Cecil</i>	<i>36.7%</i>	<i>63.3%</i>
<i>Harford</i>	<i>23.8%</i>	<i>76.2%</i>
<i>Howard</i>	<i>19.0%</i>	<i>81.0%</i>
<i>Montgomery</i>	<i>7.4%</i>	<i>92.6%</i>
<i>Prince George's</i>	<i>3.7%</i>	<i>96.3%</i>
<i>Baltimore City</i>	<i>0.0%</i>	<i>100.0%</i>

The relevance of this information to BRAC is addressed briefly for each county in Section G and [Appendix C](#). As a matter of State statute and policy, which is based on economic, fiscal, and environmental considerations, it is preferable for more development to take place in designated growth areas where infrastructure and services can be efficiently provided and to protect rural areas and economies from encroachment and fragmentation by incompatible development.

Virtually every local comprehensive plan in Maryland, including the counties impacted by BRAC, contain policies that support “the concentration of development in and near existing centers” and “protect rural values by limiting development outside of growth areas.” However, the effectiveness of the tools employed by counties in support of these policies varies widely throughout the State. MDP has evaluated the rural protection and preservation programs in each county with the purpose of identifying weaknesses and recommending improvements. A brief summary of these evaluations is contained in [Appendix C](#).

Well and Septic System Regulation: In addition to the regulation of large water and wastewater systems, MDE also regulates the siting, design, and construction of wells and septic systems serving individual properties, or in some cases single systems serving more than one property. These systems are permitted in areas designated “No Planned Service” in the County Water and Sewerage Plans. This regulatory program is implemented at the local level through the delegation of authority from MDE to the local approving authority. A delegation agreement is in place with each local approving authority, giving the local health department or environmental agency the authority to approve the siting, testing, inspection and replacement of on-site wells and septic systems. Such activities are further regulated through the State’s Board of Licensed Well Drillers, Registered Environmental Sanitarians, and other licensed professionals, such as plumbers, who are qualified to perform the testing and installation work for these systems. MDE has on staff Regional Consultants who provide technical support to the local environmental health staff where issues arise regarding matters related to on-site systems.

E.3 Total Maximum Daily Loads (TMDLs)

General: In general terms, a “total maximum daily load” (TMDL) establishes the maximum amount of a pollutant (e.g. a nutrient, sediment, harmful bacteria, or toxic substance) that a water body can assimilate and still be expected to meet State water quality standards. TMDLs are not required for every water body in the State; rather they are intended to address known, chronic water quality problems. Under the federal Clean Water Act, such problems are referred to as “impairments.”

An impairment occurs when State waters cannot support specific desirable uses as defined in the joint federal/state standards-setting process. For example, a concentration of failing septic systems within a community may lead to bacterial contamination of nearby receiving waters. If the degree of pollution is serious enough to make the water unfit for swimming or fishing, a bacterial impairment is said to exist. To restore water quality, and therefore the desired use(s), remedial action may be necessary. In an example, a TMDL for bacteria becomes the numerical basis for guiding remedial action (i.e. elimination or replacement of failing systems) so that the water can again be used for public benefit. Viewed in this context, the TMDL serves to define the “carrying capacity” of a particular water body for a particular pollutant.

Every two years, Maryland, as well as the other states, is required by Section 303(d) of the federal Clean Water Act to identify waters where designated uses are unsupported, thus identifying all known or suspected impairments. Water quality and biological monitoring as well as special studies are important tools used to help determine if a suspected impairment actually exists. Only a subset of impairments is required to be addressed by TMDLs. If a ready solution to the problem exists (e.g. fixing a broken sewer pipe), then a TMDL is not needed and all that’s required is that the solution be implemented in a timely manner by the responsible party (or parties).

TMDLs are critical within a land use planning context because a TMDL may be allocated among existing as well as future pollution contributors. This is done through a partitioning of the total load into a “wasteload allocation” for point sources in the watershed and “load allocation” for nonpoint sources in the watershed. The wasteload allocation is implemented through discharge permit decisions that MDE has federally delegated authority to make. In contrast, the load allocation is an estimate of the contribution that may come from nonpoint pollutant contributors.

For example, the community wastewater treatment plant would be assigned a wasteload allocation while farmland and other nonpoint sources would be assigned a load allocation. Thus, a TMDL can become a factor behind a State decision to permit a new or increased point source discharge. In certain cases, treatment plant expansions may not be permitted unless other measures, such as reducing contributions from urban or agricultural runoff, are taken to reduce the targeted pollutant from the water body. Thus creative local land use planning and management of both point and nonpoint pollution sources is needed with State oversight.

In support of BRAC planning, MDE maintains on its website information about impairments and TMDLs that may impact State permitting, thereby affecting local land use decisions in and around military bases, see:

http://www.mde.state.md.us/ResearchCenter/Data/mi_data/mi_datahome/index.asp

(to view details and appropriate agency contacts, select a military base community and scroll to *Map 4: Impaired Watersheds and Water Quality Monitoring Stations*).

A listing of known water quality impairments and TMDL development status for each BRAC impacted region is presented in [Appendix D](#). Impairment data are taken from Maryland's final 2006 List of Impaired Waters (i.e. Section 303(d) List) which the Maryland Department of the Environment (MDE) recently submitted to the U.S. Environmental Protection Agency for federal approval. TMDL development status is drawn from current MDE files.

Watersheds are listed at the Maryland 8-digit scale, with sub-basins (or smaller segments) within each basin listed at the 12-digit scale. This allows specific portions of a stream or river and its tributaries to be identified and, if impaired, targeted for possible TMDL development. The table in [Appendix D](#) shows: 1) the original listing year for each basin or sub-basin that requires or may require a TMDL; 2) the type of water body (*e.g.*, tidal, non-tidal); 3) the category of the impairing substance or pollutant (nutrients, bacteria, *etc.*); and 4) the general source of the impairment if known. Point sources are specific discharge sites such as pipes; nonpoint sources are diffuse, like agricultural runoff. The impairments are also prioritized from low to medium to high, according to the severity of the impact on the water quality and designated uses of each water body.

Impairments within each military community are briefly summarized below:

National Naval Medical Center: The National Naval Medical Center in Bethesda lies within the Rock Creek watershed, in Montgomery County. The Rock Creek watershed has multiple listings for water quality impairments. Impairments are the result of pollution associated with excess nutrients, sediment, and bacteria as well as other factors that have led to biological degradation.

Fort Meade: Fort Meade is situated in the Coastal Plain within Anne Arundel County. The Army's significant influence extends to surrounding jurisdictions including Prince George's and Howard Counties. The post and associated land uses lie within the Little Patuxent and Severn River watersheds. Each of these basins has multiple listings for water quality impairments. Impairments are the result of pollution associated with excess nutrients, sediment, metals, and bacteria or other factors that have led to biological degradation.

Aberdeen Proving Ground: The Aberdeen Proving Ground (APG) facility lies in four different 8-digit basins: Aberdeen Proving Ground, Swan Creek, Bush River and Gunpowder Falls. These four watersheds have multiple listings for water quality impairments including those for nutrients, sediment, and toxics or other factors that have led to biological degradation.

Andrews Air Force Base: Andrews Air Force Base (AFB) lies within three different 8-digit basins: Piscataway Creek, Potomac River Upper Tidal, and Western Branch. All three watersheds have multiple listings for water quality impairments including those for nutrients, sediment, and metals or other factors that have led to biological degradation.

E.4 Stormwater Management

The State's stormwater management program is a regulatory program that applies Statewide but is also implemented project by project at the local level. Proper stormwater management is a requirement of all new development in Maryland. The State's stormwater management regulations are flexible and encourage creative ways to meet water quality and quantity requirements. The stormwater management configurations and costs for direct and secondary BRAC projects cannot be projected in any reasonable manner within the scope of this report. A brief description of the program follows.

Maryland is a leader in the management of stormwater runoff from new development, redevelopment, and retrofitting existing developed areas to improve water quality. The State's stormwater authority is found in the Environment Article Title 4, Subtitle 2, Annotated Code of Maryland. In addition, the U.S. Environmental Protection Agency has regulated municipal storm drainage systems since the early 1990s under the National Pollutant Discharge Elimination System (NPDES) program. The State works with NPDES designated counties and municipalities to implement plans that address the objectives of the Clean Water Act.

New development projects require Water Quality and Recharge Volume Treatment (rainfall depth of 1 inch) and Water Quantity Volume Management including, Channel Protection Volume (1 year storm event) and Overbank Flood Protection Volume (10 year storm event). Redevelopment projects require a 20.0 percent reduction of impervious area or, in lieu of the reduction, Water Quality and Recharge Volume Treatment for an equivalent 20.0 percent impervious area. The program is administered by The Maryland Department of the Environment for all State and federal Applicants (Reference the Maryland Stormwater Management Guidelines for State and Federal Projects, July 2001). For private development, the program has been delegated to local jurisdictions.

MDE's 2000 Maryland Stormwater Design Manual (Design Manual) has many concepts, approaches, and design criteria that maximize water quality benefits, sound engineering principles, and aesthetics. The Stormwater Management Program and its many techniques may help local governments and developers meet pollutant reduction goals.

In some cases, the greater use of environmentally sensitive designs found in the Design Manual elicit concerns from designers and local approving authorities regarding things such as road widths, use of curb and gutter, and other engineering practices. More

discussion is needed to fully understand these issues so that more sustainable methods of stormwater management can be used without compromising public safety.

The complexity of stormwater management implementation varies depending on the extent and nature of local development. In addition to the Design Manual, MDE has produced a Model Stormwater Management Ordinance that provides assistance to municipalities that are developing new, local stormwater management codes. Local ordinances are approved by MDE and may be crafted to reflect local conditions and development activities.

Stormwater management in areas constructed prior to 1975 often requires retrofits in existing open space, modifications to inlet structures, and other costlier techniques. Funding for these types of projects is limited.

F. Facility Financing

During the 1970s and early 1980s, large amounts of federal and State grant funds were provided to finance sewage conveyance and treatment upgrades and expansions. The grants often covered as much as 87.5 percent of the cost of capital projects. There was far less grant support for water supply systems that relied mostly on various charges or the private sector to pay for capital, operating, and maintenance costs.

As the grant programs diminished and disappeared, capital costs were increasingly shifted to both ratepayers and to the private sector. A federal/State capitalized loan subsidy program replaced the federal grants program. A limited amount of State and federal grant assistance is still available to assist with affordability in lower income areas or smaller communities for both sewerage and water projects. MDE can provide additional information and guidance related to current financial assistance programs.

It is beyond the scope of this report to identify specific county and municipal capital projects that will be required to accommodate the BRAC related growth. That work must be carried out by each jurisdiction that is impacted through existing planning and funding programs. Detailed facilities planning is expensive, complex, and time consuming.

Maryland has a variety of grant and loan programs to assist local governments with water and wastewater infrastructure. The highest priority is given to projects needed to address existing public health and water quality problems. Projects for growth are not eligible for grants. Growth must be consistent with local Comprehensive Plans and County Water and Sewerage Plans.

Part of the detailed planning must be to determine how any required facilities will be financed. The most common approach is to pass on or recover on the costs through various mechanisms such as impact fees, capital charges, developer agreements, or private construction and dedication of facilities. Federal or State financial assistance can

be applied for as deemed necessary through current programs administered by MDE or others. Federal installations may be treated in the same manner as other system users and charged appropriately.

For those jurisdictions facing possible BRAC related capacity limitations identified in Section G, it is recommended that planning be started or accelerated promptly. Local governments should contact MDE and acquire the appropriate planning and engineering expertise to prepare a Plan update. County Water and Sewerage Plans should be updated and amended to reflect the changing needs resulting from BRAC and any facilities required to meet those needs.

Federal responsibility for providing assistance to communities to plan for, design, and construct new or expanded facilities to serve BRAC related growth should be determined.

G. BRAC Water and Sewer Issues by Jurisdiction

The following section discusses water and sewer issues for each of the eight-jurisdictions in the study area, including any relevant municipalities within each jurisdiction. This analysis only addresses the residential impact on water and sewer demand since hard data on non-residential demand was not available.

For each jurisdiction, the following topics are addressed:

- County Comprehensive Plan Status
- County Water and Sewerage Plan Status
- Population and flow increases
- Wastewater, and
- Water supply

G.1 Cecil County

G.1.1 County Comprehensive Plan Status

Cecil County's Comprehensive Plan was adopted in 1997. The County's two rural areas are split by the development envelope that generally surrounds the I-95 corridor.

Cecil County has eight incorporated municipalities, each with its own Comprehensive Plan and planning and zoning authority, the most of any BRAC impacted county: Six of towns are within reasonable commuting distance of APG: Elkton, North East, Rising Sun, Charlestown, Perryville, and Port Deposit. All of the towns, except North East and Charlestown, own their own water and wastewater facilities. North East and Charlestown share in a wastewater facility owned by the County. Municipalities will seldom extend service to areas outside of their town boundaries.

Cecil County's rural protection program, which is categorized by MDP as "Least Protective," is summarized in [Appendix C](#).

G.1.2 County Water and Sewerage Plan Status

The most recent Cecil County Water and Sewerage Plan was adopted by the County in August 2004 and approved by the State in March of 2005. The next update is due in August of 2007. MDP made recommendations for important improvements to the Plan in the next update. Since Cecil County will be significantly impacted by BRAC, the next Plan should reflect a thorough analysis of the BRAC impacts, and identify measures to address them.

Cecil County and its municipalities have had difficulty finding and developing adequate long term future water supplies and sewage capacity due to a variety of factors. In response to these difficulties, the Board of County Commissioners established a Task Force to study water and sewer issues. Their report, issued in April of 2005, documented many of the problems and made recommendations for managing these systems. The Towns in Cecil County were not unanimous in support of these recommendations.

G.1.3 Population and Flow Increases

Cecil County's location along the I-95 corridor and within reasonable commuting distance of APG will likely result in attracting a significant portion of the APG BRAC related growth, although the commute requires crossing one of the two Susquehanna River toll bridges. Cecil County's population and household increase for the 11-year period from 2005 through 2015 are projected to be 24,400 and 10,375 respectively, inclusive of BRAC. As discussed further below, Cecil County is facing some water supply capacity limitations. The municipalities own most water and sewer systems and they usually require annexation as a condition of service expansion. The municipalities have annexed large areas in recent years. The designated municipal and County growth areas are largely within the Susquehanna River watershed where surface water withdrawals are subject to regulation by the Susquehanna River Basin Commission (SRBC).

These population and household increases represent an additional demand for water and wastewater capacity of approximately 2.5 mgd. The proportion of this development in Cecil County that may locate on individual systems (36.7% of 24,400) equals about 0.9 mgd, resulting in an increased demand for 1.6 mgd on the regional water and sewer systems.

G.1.4 Wastewater

It appears that Cecil County as a whole will have adequate wastewater treatment capacity to accommodate growth in projected residential demand through at least 2015, although the location of available capacity varies among municipalities and service areas. However, since the flow projections do not take into account any increase in commercial

or industrial demand, some systems in the County may actually have very limited capacity after 2015.

It also appears that there will also be enough treatment capacity to support much of the development that is going into rural areas to the extent that the County's new rural protection measures succeed in reducing its 36.7 percent rural development. However, as discussed in the water section below, water supply may be the limiting growth factor in the County.

Cecil County and its municipalities currently operate wastewater treatment plants that have a total permitted capacity of 7.5 mgd, with 2.8 mgd currently remaining available. The additional 1.6 mgd needed to absorb new residential growth by 2015, inclusive of BRAC, would result in remaining available capacity of 1.2 mgd after 2015. This would support roughly 12,000 additional people or 4,800 more dwelling units.

Additional capacity is in the planning stages, including construction of either 2.0 mgd or 4.0 mgd of additional capacity at its North East plant. Depending on that decision, total capacity of all treatment plants would increase to 9.6 or 11.6 mgd. This would leave 3.2 or 5.2 mgd still available for future growth after 2015 and would be sufficient to support an additional 30,000 to 50,000 people after 2015, enough to support both future projected growth and a reduction in rural development rates. In addition, more capacity expansions are in early stages of study by the municipalities as described in the individual system discussions below.

One consideration related to sewage treatment capacity should be noted: Water supply capacity must match the amount of sewage capacity in order for sewage capacity to be of use. This sounds obvious, but given the possible limitations on water supply discussed in the next section, it is worth noting.

It is recommended that:

- **Cecil County review and continue to make improvements to its rural preservation program to assure it is effective in protecting these areas from the increased development pressure related to BRAC.**
- **Priority be given to updating the County Water and Sewerage Plan to address how the BRAC impacts will affect the County and what measures will be needed to address them.**
- **Any capacity constraints from wastewater treatment plant loading "caps" imposed under the Bay Tributary Strategies effort, or as a result of TMDL requirements, should be explored as soon as possible.**

North East River – A County owned wastewater treatment plant serves the towns of North East and Charlestown: This 2.0 mgd plant serves the towns of North East and Charlestown, as well as a variety of other public facilities and County residential,

commercial, and industrial areas. It discharges to the North East river and has a remaining available capacity is 0.5 mgd. The County plans to expand the plant by either 2.0 or 4.0 mgd with the exact size of the increase still under study. MDE reported that the town has requested a discharge permit evaluation for staged expansions to 5.5 and 8.0 mgd.

Town of Elkton: The Town of Elkton owns the largest treatment plant in the County and reports that it has a current capacity of 2.7 mgd and a remaining available capacity of 0.4 mgd. Construction will begin in the near future to expand capacity of this facility to 3.2 mgd and is scheduled for completion in 2008. This will raise available capacity to 0.9 mgd. This increase will position Elkton to accommodate a share of the growth related to BRAC. However, the Town soon should start to evaluate its needs after 2015. MDE reported that the town has requested a discharge permit evaluation for construction of a new Elkton West treatment facility of 3.0 mgd.

Town of Perryville: Perryville is the closest town in Cecil County to Harford County and the Susquehanna River bridges. The Town owns a 1.65 mgd treatment plant that has a remaining capacity of less than 0.9 mgd. However, the County Water and Sewerage Plan states that the plant “has reached its effective capacity.” Perryville is moving forward on an upgrade to its wastewater plant that would allow the plant to operate at the stated 1.65 mgd capacity with completion scheduled for 2009. The Town is also investigating reducing system leaks in the collection system in order to reduce flows and gain treatment capacity.

It is recommended that Perryville move forward promptly to increase their treatment capacity in order to be positioned to support a portion of the influx resulting from job growth at APG. Potential expansion constraints from wastewater treatment plant loading caps should be explored in a timely manner.

Town of Port Deposit: Port Deposit is also located close to the Susquehanna River bridges. The main part of the Town is built out and its growth constrained by steep topography. However, Port Deposit has annexed areas on the bluff above the Town and is central to plans to redevelop the Bainbridge Naval Training Center. It is planning an expansion to accommodate that project. Port Deposit currently has a small plant rated at 0.15 mgd that is currently at capacity and under consent order. Efforts are underway to repair leaks to recapture some capacity. The Town reports that they have plans to build a new 0.275 mgd plant with the ability for a further expansion to 0.516 mgd. MDE reported that the town has requested a discharge permit evaluation for an expansion to 0.98 mgd.

The status or schedule for these plans is not known at this writing. However, the County Water and Sewerage Plan references a Plan for a new 1.0 mgd plant, which differs from the information provided by the Port Deposit for this report.

It is recommended that Port Deposit move forward promptly to increase their treatment capacity, in order to be positioned to support a portion of the influx

resulting from job growth at APG. Potential expansion constraints from wastewater treatment plant loading caps should be explored in a timely manner.

Town of Rising Sun: Rising Sun has a small 0.28 mgd treatment plant with remaining available capacity of only 0.06 mgd. The Town is also pursuing repairing system leaks to recapture some treatment capacity, and is investigating moving its outfall to a location that would permit additional flows to be treated. These measures could reportedly increase capacity by about 0.8 mgd and would be sufficient to absorb some additional growth. We have no current information on the status or results of these measures. The Town is currently considering a wastewater treatment capacity increase.

G.1.5 Water Supply

Cecil County does not currently have sufficient water supply capacity to support projected growth. Planned increases must be completed to support planned growth including BRAC and additional longer-term supplies must be developed for use beyond 2015. In addition, the fact that the flow projections do not take into account any increase in commercial or industrial demand, increases the urgency for the County and the municipalities to work together to develop additional supply capacity.

Cecil County has a total annual water supply capacity of about 4.0 mgd for the six northern municipalities plus Perry Point. Only 1.25 mgd of this amount remains available. **This is not sufficient to support the projected population increase through 2015** of 17,000 people inside the PFA or the 26,700 total increase. Various plans for capacity increases of about 3.5 mgd to a total of 7.5 mgd are at various stages of planning, development, and implementation. These increases must be realized to support projected population and household growth including BRAC.

If the visions and policies of the local comprehensive plans to support growth in existing growth areas and protect rural areas are to be met, it is critical to continue to find and develop additional community water supplies to support growth.

It is recommended that Cecil County and its municipalities work cooperatively together to find and implement solutions to the water supply limitations in order to support planned growth and development in existing communities and growth areas and to reduce development pressure in rural areas.

Town of Perryville: Perryville is supplied by the Susquehanna River and is permitted to withdraw 2.0 mgd. However, the current treatment plant is limited to 0.8 mgd. A new plant with a capacity of 2.0 mgd is scheduled for completion in 2008. This 1.2 mgd increase is a critical addition to the County's capacity, and in particular for BRAC, since this Town is one of the closest (along with Port Deposit) to APG.

It is recommended that Perryville move forward quickly with plans for further expansion of water treatment capacity.

Town of Port Deposit: Port Deposit derives its water from the Susquehanna River. Permit limitations constrain capacity to 0.4 mgd. The Town is planning upgrades and expansions to serve the Bainbridge Naval Training Center with capacity expansion to 1.0 mgd by 2013. **This would be too late to support the initial impact of BRAC.** We have no current information on the status of any applications for appropriation permit expansion. An increase in withdrawal from the Susquehanna will require approvals from MDE and SRBC.

It is recommended that the Port Deposit accelerate its planning and development of new water sources and expansion of water treatment capacity.

Town of Elkton: Elkton's water system has used a combination of wells and Big Elk Creek with appropriations of 1.5 mgd. In 2007, when the appropriation permit is renewed, a flow-by restriction will be included. During drought periods, the Big Elk Creek may not be used and only the wells can be used for supply. During this period the system demand will exceed the safe yield of its combined source. The Town has been seeking new water sources.

Elkton has recently investigated the viability of obtaining additional water supply with new wells located in the southwest portion of the incorporated limits of the Town. The wells appear to be viable, and Elkton is in the process of obtaining an appropriation permit from the Maryland Department of the Environment. If adequate, the additional water supply from the new wells will provide water for buildout within the existing corporate limits of Elkton, provide redundancy in the water supply system and serve as a backup system for the surface water treatment plant in the event of a severe drought.

Elkton has recently agreed to buy water from the Artesian Water Company in Delaware on five-year renewable terms. The five-year renewable provision is not ideal to the extent that it may affect the long-term viability of a source that the Town does not control. Nevertheless, this is an important addition to the limited capacity in the County. Artesian will sell water through a new interconnection to Elkton at a minimum daily rate of 0.05 mgd and Artesian will make available up to 0.2 mgd at the Town's request. Elkton may request to increase the available supply through the interconnection to as much as 1.0 mgd with 60 days notice. This new supply should be sufficient for Elkton to support a share of the increase from BRAC at APG.

It is recommended that Elkton continue to pursue additional, reliable long-term sources of water supply.

Town of North East: North East draws water from the riverine part of North East Creek and has plans to withdraw from the tidal part of that River in the future. Plant designs currently limit capacity to 1.3 mgd. A treatment plant expansion of 1.0 mgd should be completed in 2008. This is a critical increase in the overall capacity to support projected growth in the County.

Town of Rising Sun: The current wells limit capacity to 0.26 mgd and the Town is under a self-imposed water moratorium until additional wells are on line. Two additional wells to increase source capacity to 0.3 mgd are expected to be on line in 2007. Rising Sun is currently going through the approval process with SRBC. They are also considering the purchase of water from the Chester Water Authority in Pennsylvania.

Town of Charlestown: Charlestown has a very small system based on wells with 0.21 mgd capacity with less than 0.1 mgd remaining. A developer is planning to provide a new well with a subdivision of about 200 new homes. Charlestown could accommodate a small amount of the BRAC-related growth.

G.2 Harford County

G.2.1 County Comprehensive Plan Status

The current Harford County Comprehensive Plan was adopted in 2004. The Plan delineates a clear development envelope that defines the limits of water and sewer service. This development area generally surrounds the I-95 corridor and State Route 24 from I-95 to the Bel Air area. There are three municipalities in Harford County which have their own planning and zoning authority: Aberdeen, Havre de Grace, and Bel Air.

Harford County's rural protection program, which is categorized by MDP as "Least Protective," is summarized in [Appendix C](#).

G.2.2 County Water and Sewerage Plan Status

The most recent Harford County Water and Sewerage Plan was adopted by the County in 2005 and approved by the State in October 2005. The next complete update is due in June 2008, although the County maintains the Plan in a manner that keeps it up to date. However, as noted below, the County is facing some growth challenges that will be accelerated by BRAC. As the County with the largest BRAC impact, it is important that the next Plan update reflect a thorough review of the BRAC impacts and identifies measures to address them.

It is recommended that the next County Water and Sewerage Plan update address how the BRAC impacts will affect the County and what measures may be needed to address them. In particular, potential water supply issues should be addressed and resolved.

G.2.3 Population and Flow Increases

Harford County's population and household increase for the 11-year period from 2005 through 2015 are projected to be 36,000 and 18,275 respectively, inclusive of BRAC. It is expected that the County will be the most heavily and directly impacted of all counties in Maryland from BRAC. The total population and household increases represent an

additional demand for water and wastewater capacity of approximately 3.6 mgd. The proportion of this development in Harford County that may locate on individual systems (23.8% of 36,000) equals about 0.9 mgd, resulting in an increased demand for 2.7 mgd on the regional water and sewer systems.

G.2.4 Wastewater

It appears that Harford County as a whole will have adequate wastewater treatment capacity to accommodate projected growth through at least 2015, although the location of available capacity varies among municipalities and service areas. However, since the flow projections do not take into account any increase in commercial or industrial demand, some systems in the County may actually have very limited capacity after 2015.

Harford County streams flow into the upper Chesapeake Bay and to the Susquehanna River. APG is located directly along the shores of the upper Chesapeake Bay. The two Harford County and two municipal (Havre de Grace and Aberdeen) public wastewater treatment plants in this area have a permitted capacity of 27.2 mgd. Seven and one half (7.5) mgd of this is available for new development. It should be noted at this writing, however, that information on the status of the two APG on base treatment plants was not available.

If all of the County's projected population were served by community systems, it would use about 3.6 mgd of the available capacity, leaving a balance of 3.9 mgd for additional development after 2015. Subtracting the 23.8 percent, or 0.9 mgd, attributable to rural development on individual systems, results in a balance of 4.8 mgd remaining available for future growth after 2015. It therefore appears that the County would have sufficient wastewater treatment capacity to support much of the development that is going into rural areas if it can succeed in reducing its 24 percent rural development component. While there is sufficient wastewater treatment capacity to absorb projected growth including BRAC, the County should start to evaluate the need for additional capacity in the post 2015 period.

Any limitations on growth in existing and planned County and municipal sewerage service areas due to wastewater treatment capacity limitations will likely have the effect of forcing more of the development pressure out of the Harford County development envelope and into other areas that have wastewater capacity. It would also increase pressure on rural areas in Harford and adjacent counties to develop on individual systems. Rural development pressure would be further increased by the fact that the closest adjacent County to APG, Cecil County, is also facing capacity limitations related to water supply. Increased rural development pressure would be an undesirable outcome based on both State smart growth principles and on the policies of all the Harford and adjacent county and municipal comprehensive plans.

It is recommended that Harford County review and make improvements to its rural preservation programs to assure that they are effective in protecting these areas from the increased development pressure related to BRAC.

One other facet related to sewage treatment capacity should be noted: Water supply capacity must match the amount of sewage capacity in order for sewage capacity to be of use. This sounds obvious, but given the possible limitations on water supply discussed in the next section, it is worth stating explicitly.

County System - Sod Run: The County's Sod Run Plant discharges to the Bush River estuary and serves several watersheds in the County, including the Town of Bel Air. At the present time, Bush River is not scheduled for preparation of TMDLs, although the tidal portion does have listed impairments for nutrients, sediments, and toxics. The plant has available uncommitted capacity of approximately 4.5 mgd. The County Water and Sewerage Plan states that Sod Run should have adequate capacity to serve the County for the next 20 years. However, the BRAC-related household growth could use a significant portion or this balance if it is in addition to already projected growth. It may be difficult to expand Sod Run above 20.0 mgd as the State completes any future required TMDL development work associated with listed impairments (addressed in more detail in Section E above and in [Appendix D](#)). Additionally, as enhanced nutrient removal (ENR) comes on line, added pressure is placed on reducing nonpoint source contributions.

It is recommended, therefore, that the County promptly evaluate the need to create additional treatment capacity after 2015 at Sod Run or at another location. A review of the parts of its collection system likely to be affected by BRAC should also be evaluated to assure adequate capacity. Potential expansion challenges and constraints from wastewater loading caps should be evaluated.

Joppatown: The County's Joppatown plant is fully committed and there are no plans for its expansion. Therefore, little new growth will be able to locate in the area served by this plant.

The City of Havre de Grace: The 1.9 mgd Havre de Grace wastewater treatment plant discharges into the Chesapeake Bay. The plant is approaching capacity limitations with 0.3 mgd currently available. The City is in the process of constructing an interim expansion to 2.3 mgd that is expected to be completed in December 2007. Havre de Grace currently has engineers under contract to design a capacity increase to 3.3 mgd, which is the maximum flow that can be supported after ENR treatment levels are constructed. Bay TMDLs for nutrients and sediment are due to be completed in 2010. This issue is discussed further in Section E and [Appendix D](#).

Havre de Grace has annexed significant areas in recent years and is in a strong position to attract APG employees and spinoff business and commercial development. However, if the Town's population is to grow beyond the capacity of this plant after 2015, it will have to explore other options for treating wastewater in concert with requiring adequate stormwater management.

It is recommended that Havre de Grace promptly review its sewage treatment needs in the light of potential BRAC demands. Potential expansion challenges and constraints from wastewater loading caps should be evaluated.

The City of Aberdeen: The City of Aberdeen has a 4.0 mgd plant that discharges to Swan Creek, which is listed as impaired for nutrients, sediments, and toxics. A TMDL for nutrients was completed in 2001 as discussed further in Section E and [Appendix D](#). The plant has over 2 mgd of available capacity today. Aberdeen is the gateway to APG and has also annexed significant areas recently. It is not clear from the current level of analysis whether Aberdeen will have sufficient treatment capacity for both planned growth and a BRAC influx.

It is recommended that Aberdeen promptly evaluate its situation carefully to assure that their portion of the BRAC increase can be accommodated. Any increase in capacity at the present site will have to take into consideration the nutrient TMDL for Swan Creek and potential future loading caps.

Aberdeen and Edgewood: There are two treatment plants that serve the Aberdeen and Edgewood Areas of APG respectively. The City of Aberdeen owns the APG Aberdeen Area plant. Each of these plants has about 2.0 mgd of remaining available capacity. The projected flows at these plants will be directly affected by the new on base facilities planned at these bases. At this writing, we have no information on plans or projected flows for them.

G.2.5 Water Supply

There are some questions regarding whether Harford County as a whole will have adequate water capacity to accommodate projected growth through 2015 and beyond, although efforts are underway to try to address shortages in some areas. In addition, since the flow projections do not take into account any increase in commercial or industrial demand, some systems in the County may actually have very limited capacity after 2015.

The systems in Harford County use a combination of ground and surface water sources. The Harford County, municipal, and Army water supply systems have numerous capacity sharing agreements and interconnections which provide for increased safety and flexibility. These arrangements are useful and in some cases can add to the bottom line of available, reliable water supply, but they do not directly create “new” water supply. The three largest sources for water in the County are ground water, the Susquehanna River, and Loch Raven Reservoir. There is an additional layer of regulation for use of Susquehanna River water, in addition to State regulation. The federal/interstate Susquehanna River Basin Commission (SRBC) must approve all withdrawals from that River Basin. This adds to the complexity of water supply system management in Harford County. As discussed further below, the County and its municipalities are facing challenges to provide adequate water supply for currently planned growth. The BRAC related growth adds urgency to the need to develop additional water supplies in time for the relocation.

It is recommended that Harford County and its municipalities, in cooperation with the Army, the State, and SRBC, continue with its accelerated efforts to identify and provide additional water supplies in order to accommodate the BRAC influx on existing community water supply systems.

County System: The County has appropriation permits for 8.0 mgd (11.25 mgd maximum day) total, 4.0 mgd for its Susquehanna plant in Havre de Grace plant and 4.25 mgd from the Perryman wells. The County has agreements to purchase up to 20.0 mgd of raw water from Baltimore City, which is treated at the Abingdon plant. Expansion of this plant from 10.0 mgd to 20.0 mgd is currently under design.

Harford County also has agreements to purchase an additional 1.6 mgd from the Town of Havre de Grace and to sell 1.5 mgd to Aberdeen/APG, 0.5 mgd to Aberdeen, and 0.5 mgd to Bel Air. The County has approximately 2.8 mgd currently remaining available (before accounting for any outstanding commitments) to meet future needs. This is likely to be adequate to meet the County system's share of increased demand from BRAC. Capacity for continued growth on the County system will be available after the Abingdon plant expansion from 10.0 to 20.0 MGD. Discussions are underway among Baltimore City, SRBC, and MDE to explore additional allocations from the Susquehanna River. If these succeed, substantial additional raw water would be available from this source for Harford County and the County would expand the Abingdon plant to a future ultimate capacity of 40.0 mgd.

It is recommended that Harford County continue with its accelerated pace to expand the Abingdon water treatment plant.

The Town of Bel Air: The private Maryland-American Water Company uses 1.0 mgd from Winters Run and 0.26 mgd from wells to supply the Town of Bel Air and limited County areas. The Town can also purchase 0.5 mgd from the County. During drought periods, flowby restrictions prevent withdrawal from Winters Run. With current use at or near system capacity, Bel Air has no meaningful capacity to absorb any increases attributable to BRAC. During drought periods, flowby restrictions prevent withdrawal from Winters Run. With current use at or near system capacity, Bel Air has no meaningful capacity to absorb any increases attributable to BRAC.

The City of Aberdeen/APG: The City of Aberdeen, which also operates APG's water system, uses both ground and surface water sources. It uses a well field near the boundary with APG but three wells are currently out of use because of contamination. The City purchased the APG water plant on Deer Creek and is responsible for continuing to provide water to APG. Deer Creek is a Susquehanna tributary, and therefore subject to regulation by the SRBC. The amount of capacity that Deer Creek can provide is still under review among the State, City, and the SRBC but will be limited during drought periods. The City can purchase up to 0.5 mgd from the County for its municipal use. As part of the same agreement Aberdeen can also purchase up to 1.5 mgd as a drought backup for Deer Creek to meet back up requirements during Deer Creek low flow

periods. The City has plans for all remaining capacity. A new 6.0 mgd intake in the upper Bay and with a desalinization treatment plant is being evaluated for completion by 2011. This is later than the estimated 2009 date when the relocation peak is scheduled to occur. This plant will be critical to any BRAC influx.

Since the City system does not currently have capacity to support any BRAC related growth, it is recommended that development of new water supply sources be promptly accelerated.

The City of Havre de Grace: Havre de Grace has its own 4.0 mgd treatment plant on the Susquehanna River and is permitted to withdraw up to 4.0 mgd from the Susquehanna River. It also has an agreement through 2020 to sell 1.6 mgd to Harford County, but is gradually buying that back from the County. There appears to be sufficient capacity to absorb a portion of APG related growth if they buy all of the 1.6 mgd from the County. However, the City should monitor use closely during the next 10 years and seek an additional appropriation and treatment capacity later in this time frame.

Edgewood Area of APG: The water source for this plant is Winters Run and the Base has a 2.1 mgd appropriation permit from that stream. However, because of flowby restrictions this source is not counted toward safe yield during draught periods. Edgewood has infrastructure in place to purchase water from the County, although a formal agreement is not in place. Therefore, the minimum capacity is zero, occurring when the water treatment plant is shutdown because of flowby requirements. The Army is pursuing privatization of their water and wastewater facilities, but no details are available at this time.

G.3 Baltimore County and City of Baltimore

For purposes of sewerage and water facilities, Baltimore City and Baltimore County will be addressed together since they share common regional Baltimore City owned water and sewerage systems.

G.3.1 County Comprehensive Plan Status

Baltimore County's Comprehensive Plan was adopted in 2000. The Plan draws a clear boundary, called the Urban Rural Demarcation Line, between its development area and its rural areas. The boundary defines the limit of community water and sewer service. Baltimore County has no municipalities.

The City of Baltimore adopted a new Comprehensive Master Plan in 2006.

Baltimore County's rural protection program, which is categorized by MDP as "Most Protective," is summarized in [Appendix B](#).

G.3.2 County Water and Sewerage Plan Status

The most recent Baltimore County Water and Sewerage Plan was adopted by the County in January 2004 and approved by the State in August 2005. The next update is due in January 2007. The Plan is generally well maintained and updated regularly and well integrated with the County Comprehensive Plan and development processes. Some technical and mapping improvements are needed which should be addressed in the next Plan update currently under preparation.

It is recommended that the next update of the Baltimore County Water and Sewerage Plan update address how the BRAC impacts will affect the County and what measures may be needed to address them.

The most recent Baltimore City Water and Sewerage Plan is completing the local adoption process at this writing and is expected to be submitted to the State for approval in early 2007.

G.3.3 Population and Flow Increases

Both jurisdictions are about midway between Aberdeen and Fort Meade and within the impact spheres of both bases. Both jurisdictions have qualities that would attract segments of the populations that will relocate. The combined Baltimore City and County projections, inclusive of BRAC, indicate that for the 11-year period from 2005 through 2015 there will be an additional 35,000 households, and nearly 68,000 people,

These population and household increases represent an additional demand for water and wastewater capacity of approximately 7.0 mgd. The proportion of this development in Baltimore County that may locate on individual systems (16.4% of 54,000) equals about 1.1 mgd, resulting in an increase in demand of 6.0 mgd demand on the regional water and sewer systems.

G.3.4 Wastewater

The Baltimore regional system will have adequate wastewater treatment capacity to accommodate projected growth through at least 2015.

Baltimore City and Baltimore County are served entirely by the two large treatment plants owned by the City. The Back River and Patapsco plants are currently permitted at 180.0 mgd and 73.0 mgd respectively and are scheduled to be upgraded to ENR in fiscal years 2013 and 2011 respectively. At the present time, they have available unutilized capacity of about 40.0 mgd combined, 30.6 mgd at Back River and 9.4 mgd at Patapsco. The 5.9 mgd of additional flow is clearly within the capability of these treatment systems, although it should be noted that Howard and Anne Arundel Counties have rights to some of the remaining capacity at the Patapsco plant.

G.3.5 Water Supply

The Baltimore regional system will have adequate water treatment capacity to accommodate projected growth through at least 2015.

The City uses multiple surface water sources to supply its system: 1) Loch Raven and Prettyboy Reservoirs in the Gunpowder Falls Watershed with its drainage in Baltimore and Carroll Counties and southern Pennsylvania; 2) Liberty Reservoir on the Baltimore-Carroll County boundary in the Patapsco River Watershed with drainage which is also in Baltimore and Carroll Counties and Pennsylvania; and 3) a large pipeline from the Conowingo Dam impoundment on the Susquehanna River.

Current treatment capacity is 340.0 mgd with all plants fully operational. Treatment capacity increases are under development to 415.0 mgd by 2010 with rehabilitation of the Montebello Water Treatment Plant, and to 605.0 mgd by 2015 with the addition of the planned Fullerton Water treatment Plant in Baltimore County. However, safe yield of the three reservoirs and Susquehanna River is limited to approximately 392.0 mgd, of which up to 27.0 mgd will be used by Carroll and Harford Counties. City officials indicate that at times demand approaches plant capacities during winter (main breaks), and in early summer.

This regional Baltimore City system will have adequate capacity to absorb the estimated additional 5.9 mgd of increased flow from growth inclusive of BRAC. The City is evaluating long-term solutions to improve its capacity to withstand future long-term droughts. Discussions are underway among Baltimore City, SRBC, and MDE to explore additional allocations from the Susquehanna. If these discussions succeed, an additional substantial quantity of raw water would be available from this source for the City. The City is also a signatory, with Carroll County and the State, to the Baltimore Regional Reservoir Watersheds Agreement and Action Strategy that is directed toward improving the protection of water quality in the Gunpowder and Patapsco River watersheds.

G.4 Anne Arundel County

G.4.1 County Comprehensive Plan Status

The Anne Arundel County Comprehensive Plan was adopted in 1997. Generally, the development envelope encompasses most of the Northern half of the County. Most of South County, as it is called, is designated for rural uses. Annapolis is the only sizeable municipality in the County, has its own Comprehensive Plan and planning and zoning authority.

The County's rural protection program, which is categorized by MDP as "Moderately Protective," is summarized in [Appendix B](#).

G.4.2 County Water and Sewerage Plan Status

The most recent Anne Arundel County Water and Sewerage Plan was adopted by the County in October 2003 and approved by the State in June 2004. Work on the next update, due in October 2006, is currently being initiated. The Plan is generally well maintained and updated regularly. It is also well integrated with the County Comprehensive Plan and local development process.

It is recommended that the next Anne Arundel County Water and Sewerage Plan update address how the BRAC impacts will affect the County and what measures may be needed to address them.

G.4.3 Population and Flow Increases

Fort Meade is located in northwestern Anne Arundel County in the Patuxent River watershed. It is adjacent to Howard County and within reasonable commuting distance from parts of Baltimore City and Baltimore, Prince George's, and Queen Anne's Counties. The total position transfers plus related business for Fort Meade will mean over 10,000 new jobs countywide. However, since over two-thirds of the incoming positions originate from the Washington D.C. area, the size of the total BRAC related household growth will likely be somewhat smaller and perhaps more gradual. That is, it is likely that many of those who choose to follow their jobs from their current locations to Fort Meade will commute, at least initially. For the County as a whole, it is estimated that for the 11-year period from 2005 through 2015, 20,800 additional households and 38,800 additional people will be added to Anne Arundel County inclusive of BRAC expansions.

The estimated total flow increase from all new population growth for the entire County would be approximately 3.9 mgd. It is estimated that 5.5 percent of this growth will be on individual systems, leaving a balance of about 3.7 mgd connecting to community systems in existing and planned community service areas.

G.4.4 Wastewater

Anne Arundel County will have adequate wastewater treatment capacity to accommodate projected growth through at least 2015. However, implementation of TMDLs in the Patuxent River may constrain further expansion of wastewater discharges into that watershed. In addition, the fact that the flow projections do not take into account any increase in commercial or industrial demand, suggests that the County should accelerate planning for capacity increases after 2015.

The estimated 3.7 mgd of water and sewer demand increases from all residential growth including BRAC will be spread among several treatment plant service areas. The total available capacity for all major plants that serve general County development is currently about 15.0 mgd. This includes a pending 3.0 mgd expansion for Annapolis. The County is also planning a 3.0 mgd capacity expansion of the Broadneck Plant by 2011 that serves

communities north of Annapolis along Chesapeake Bay. This would bring the countywide availability balance to 18 mgd.

The 2003 Anne Arundel County Water and Sewerage Plan projects that by 2015 these same plants will have 7.5 mgd of remaining available capacity. Subtracting the 3.7 mgd that would be used through 2015 leaves 3.8 mgd, sufficient for 38,000 more people after 2015. The County may need to accelerate planning for additional capacity for the longer term.

The Anne Arundel plants that are closest to Fort Meade are in the Patuxent watershed (Patuxent, Maryland City, and Piney Orchard). These plants have a current available capacity of approximately 4.4 mgd. There are no known plans to expand these plants. Depending on the distribution of new growth, expansion of the Patuxent River plants may be constrained by TMDL limitations. The County should initiate the necessary studies to make this determination.

The above discussion does not address the plant owned by the federal government that serves Fort Meade itself. This plant will have to support the new facilities that will be relocated to the base. This plant also discharges to the Patuxent watershed and has a nominal capacity of 4.5mgd with 2.6 mgd remaining available. However, information provided by base staff has indicated that due to operating issues, no additional flows can be supported at this time. At this writing, we have no information on plans or projected flows for this plant. Plans for major expansion and/or upgrading of this plant would also need to take into account any TMDLs for the Patuxent River and Chesapeake Bay that are developed in coming years.

G.4.5 Water Supply

Anne Arundel County will have adequate water supply and treatment capacity to accommodate projected growth through at least 2015.

Anne Arundel County water supply is mostly from ground water, with the exception of a portion of the northern County that, through agreement with Baltimore City, can purchase up to 22.5 mgd of treated water. Anne Arundel County's wells and treatment plants are distributed around the county and are not always interconnected. The County has an active program to evaluate the quality and availability of the groundwater sources in the light of future needs.

In order to meet future growth and reduce reliance on purchasing water from Baltimore City, Anne Arundel County plans to increase its capacity by an additional 24.5 mgd over the next several years. Much of the County's excess capacity is due to reducing its take from Baltimore City. There are areas of the County where this excess capacity cannot be utilized and, as a result, the location and amount of the 3.7 mgd increase, inclusive of BRAC, should be in concert with planned County Growth Areas.

G.5 Howard County

G.5.1 County Comprehensive Plan Status

Howard County's Comprehensive Plan was adopted in 2000. The eastern one-third of the County is the designated growth area, and the western two-thirds is designated for rural development and agriculture. There is a clear demarcation line between the two areas that defines, among other things, the limits of community sewer and water service. The County will be approaching build out in less than 20 years under current zoning. There are no municipalities in the County.

The County's rural protection program, which is categorized by MDP as "Least Protective," is summarized in [Appendix B](#). Much of the rural area has already been fragmented by low-density residential development.

G.5.2 County Water and Sewerage Plan Status

The most recent Howard County Water and Sewerage Plan was adopted by the County in January 2004 and approved by the State in April 2004. The next update is due in January 2007. The Plan is generally well maintained and updated regularly. It is also well integrated with the County Comprehensive Plan and development process.

It is recommended that the next update of the County Water and Sewerage Plan update address how the BRAC impacts will affect the County and what measures may be needed to address them.

G.5.3 Population and Flow Increases

No BRAC facilities are located in Howard County. However, the County is located adjacent to Fort Meade, and is within reasonable commuting distance of both the National Naval Medical Center (NNMC) and Andrews Air Force Base (AAFB). It is estimated that over the 11-year period from 2005 through 2015, 19,300 additional households and nearly 43,000 additional people will be added to Howard County, inclusive of BRAC.

Based on the additional population and households, including BRAC, the estimated total flow increase for the entire County is approximately 4.3 mgd. Nineteen percent (19%) of this is estimated to be on individual systems, with the balance of 3.5 mgd connecting to community systems in existing and planned community service areas.

G.5.4 Wastewater

It is unclear whether Howard County will have adequate wastewater treatment capacity to accommodate projected growth through at least 2015. The County should carefully evaluate its options in light of the additional growth pressure generated by BRAC. In addition, the fact that the flow projections do not take into account any increase in

commercial or industrial demand, suggests that the County should accelerate planning for capacity increases after 2015.

Howard County is served by two wastewater treatment facilities. The County owns the Little Patuxent Plant that serves the majority of the developed area of the County. It also owns 10.0 mgd capacity in Baltimore City's Patapsco WWTP that serves the northeastern part of the County in the Patapsco watershed. Capacity is currently available in both systems. An expansion is planned for the Little Patuxent Plant by the end of the decade. Nevertheless, County staff have indicated that most of the currently available and planned capacity, although not formally committed, will be required for planned development already in the pipeline, exclusive of any increases due to BRAC. Therefore, it is not clear whether the increased demand from BRAC can be accommodated in the County's Little Patuxent treatment plant expansions beyond the one that is planned because it may be constrained in the future as additional TMDLs are developed, including the Chesapeake Bay TMDL anticipated by 2010. However, additional capacity in the City's Patapsco wastewater treatment plant could conceivably be negotiated and flows diverted from Little Patuxent to Patapsco. There are no current plans to do so but those options would need to be explored in more detail when and if the need becomes clear.

G.5.5 Water Supply

Howard County will have adequate water supply and treatment capacity to accommodate projected growth through at least 2015.

Howard County depends entirely on the wholesale purchases of treated water from Baltimore City and WSSC. It owns and operates its own water distribution system. Agreements with Baltimore City and WSSC are for purchase of up to for 38.5 mgd and 3.0 mgd respectively. With Countywide demand projected to increase from 24 mgd currently, to about 30 mgd by 2015, there is clearly adequate supply to support growth including any BRAC related impact.

G.6 Prince George's County

G.6.1 County Comprehensive Plan Status

Prince George's County adopted its current Comprehensive Plan in 2000. Most of the County is designated for development, with some conservation areas, primarily in the Patuxent watershed and in southern areas of the County.

There are numerous municipalities in Prince George's County. Only Laurel exercises its own planning and zoning authority. The others municipalities are subject to land use regulation by the County.

The County's rural protection program, which is categorized by MDP as "Least Protective," is summarized in [Appendix B](#).

G.6.2 County Water and Sewerage Status

The most recent Prince George's County Water and Sewerage Plan was adopted by the County in November 2001 and approved by the State in August of 2002. The next update was due in August of 2004. A draft is under review at this writing. The Plan is generally well maintained and updated regularly. It is also well integrated with the County Comprehensive Plan and development process.

It is recommended that the County promptly complete its Water and Sewerage Plan update. The update should address how the BRAC impacts will affect the County and what measures may be needed to address them.

G.6.3 Population and Flow Increases

Prince George's County would be directly impacted by relocations to Andrews Air Force Base (AAFB). AAFB is located in the Piscataway River watershed that flows into the Potomac River. Most of Prince George's County is within reasonable automobile commuting distance of Fort Meade. Therefore, the County could receive a portion of the Fort Meade increase. Over the 11-year period from 2005 through 2015 it is estimated that 30,100 households and 51,000 people will be added to Prince George's County, inclusive of BRAC.

The estimated total flow increase for the entire County over this time period is about 5.0 mgd. Only a minimal amount, 3.7%, or 0.2 mgd, of this is estimated to be on individual systems.

G.6.4 Wastewater

Prince George's County will have adequate water supply and treatment capacity to accommodate projected growth through at least 2015.

AAFB is in the Piscataway treatment plant service area. This plant currently has nearly 8.0 mgd of available capacity and should be adequate to absorb the increased flows from any increases at that Base.

In addition to those plants that discharge in the Potomac Watershed, Prince George's County has other wastewater treatment plants that discharge into the Patuxent River: the WSSC owned Western Branch and Parkway plants, and the Town of Bowie plant. All three plants currently have available capacity and should be able to handle any increases from BRAC relocations. To the extent that significant BRAC growth locates in areas served by plants discharging to the Little Patuxent or Severn River watersheds, specific TMDL limitations may need to be addressed. Water quality impairments and TMDL development status are addressed in more detail in Section E and [Appendix D](#).

G.6.5 Water Supply

Prince George's County will have adequate water supply and treatment capacity to accommodate projected growth through at least 2015

AAFB and surrounding areas are mostly within the WSSC service areas. Therefore the local water supply infrastructure issues are similar to those for NNMC. The nearest non-WSSC system belongs to the Town of Bowie, which is a well-based system. Because the Town may receive additional pressure from the BRAC relocations, they should monitor their situation carefully and be prepared to seek more capacity if needed.

G.7 Montgomery County

G.7.1 County Comprehensive Plan Status

Montgomery County's latest countywide plan was adopted in 1993. However, this Plan is only the framework for numerous sub regional and sector plans that are updated on a regular cycle. These smaller area plans are considered individually and together as parts of the County Comprehensive Plan. The Plan shows well-defined development and rural protection areas.

There are four municipalities in the County that have their own Comprehensive Plans and zoning authority: Poolesville, Gaithersburg, Rockville, and Takoma Park.

The County's rural protection program, which is categorized by MDP as "Most Protective," is summarized in [Appendix B](#).

G.7.2 County Water and Sewerage Plan Status

The most recent Montgomery County Water and Sewerage Plan was adopted by the County in November 2003 and approved by the State in August 2005. The next update is due in August of 2007. The County has been responsive to addressing State comments for Plan improvement. The Plan is well maintained by the County, is updated regularly in accord with rigorous policies and procedures, and is well integrated with the Comprehensive Plan and local development process.

Among the Towns, Poolesville operates its own water and sewerage system and Rockville manages its own water system. The Washington Suburban Sanitary Commission (WSSC) provides sewer service for Rockville, and water and sewer service for Gaithersburg, and Takoma Park.

It is recommended that the next update of the County Water and Sewerage Plan update address how BRAC impacts will affect the County and what measures may be needed to address them.

G.7.3 Population and Flow Increases

There is an estimated shift of about 1,200 jobs and related patient load from Walter Reed Army Medical Center (WRAMC) in Washington, D.C. to the National Naval Medical Center (NNMC) in Bethesda. Since these two facilities are only six miles apart, there is not expected to be a gain in households from this move. Additional increases in staff at the NNMC are expected to be offset, in the aggregate, by the reductions at the National Geospatial Intelligence Agency (NGIA) elsewhere in Montgomery County. The BRAC household gain to Montgomery County (nearly 2,300) is the result of BRAC job gains to other facilities as well as the secondary and tertiary rounds of job gains stimulated by all of the BRAC job movements. Overall, it is estimated that 47,500 households and 114,700 people will be added to Montgomery County over the 11-year time period from 2005 through 2015, inclusive of BRAC.

The BRAC relocations and increases will primarily result in changes in commuting patterns, mass transit use, and traffic in the vicinity of NNMC. These issues are addressed in the transportation section (Section VI.).

We have no data currently available on the water and wastewater use at WRAMC, or what might be expected to be used at its new facilities at NNMC. The Washington Suburban Sanitary Commission (WSSC) will need to assure that local distribution and collection systems around and downstream from NNMC can handle any additional flows. WSSC and the County will also have to determine if any significant new utility work is needed specifically attributable to the increases at the NNMC campus and, if so, what that would cost and how it would be funded.

The estimated total flow increase for the entire County would be approximately 11.5 mgd. About 7.4% or about 0.9 mgd, of this is estimated to be on individual systems.

G.7.4 Wastewater

Montgomery County will have adequate water supply and treatment capacity to accommodate projected growth through at least 2015.

Sewage from WRAMC, and NNMC is treated at Blue Plains (BP) treatment plant owned by the District of Columbia which discharges to the Potomac River near the mouth of the Anacostia River. There should be no net change in flows at BP from this relocation. The move will result in shifting flows associated with WRAMC from Washington D.C.'s BP apportionment to Maryland's BP apportionment. There is ample treatment capacity currently available in BP for Maryland of over 32.0 mgd.

G.7.5 Water Supply

Montgomery County will have adequate water supply and treatment capacity to accommodate projected growth through at least 2015.

Any change in water demand from WRAMC will be shifted from the DC system operated by the Corps of Engineers to WSSC, both of which draw their primary supplies from the Potomac River. As with sewage, there are ample treated supplies available in Montgomery County to serve the relocated facilities and any other influx related to the other BRAC relocations. Also as with sewerage facilities, increased needs related to local or regional distribution facilities will have to be evaluated by WSSC, and be addressed accordingly.

Water supply in the D.C. metropolitan area is being evaluated every five years. The latest study by Interstate Commission on the Potomac River Basin (ICPRB) suggests that resources are adequate for meeting the demand at least up to year 2025. Nevertheless, it would be desirable if WRAMC facilities built at NNMC maximized use of the latest water conservation and green building techniques.

V. COMPREHENSIVE AND GENERAL PLAN REVIEW AND POWER AND FIBER OPTIC CAPACITY

A. Plan Reviews

The following Comprehensive and General Plans were reviewed in light of the upcoming federal installation expansions due to BRAC.

Two issues should be noted upfront.

1. The review did not include municipal land use plans except for Baltimore City, for several reasons. The municipalities are already located within a Priority Funding Area (PFA) and are eligible for State growth related assistance. The issues related to whether a municipality is able to grow due to the influx of new BRAC related employees are not land use or zoning related but are typically infrastructure issues that are being addressed elsewhere in this report.
2. At the time that Local Capital Improvement Programs were reviewed there were no CIP requests that were specifically BRAC related. However, there may be CIP requests that will impact those living and working around Maryland's military bases. These requests were typically transportation related or water and sewer issues. Similar to the growth related issues mentioned in number one above, transportation improvements as well as water and sewer issues are being addressed within other sections of this report. **It is recommended that future local Capital Improvement Program requests include a section highlighting requests that are intended to support the State's military bases.**

A.1 Cecil County

The 2003 County Land Use Plan directs development towards their Development District. The purpose of the Development District is to encourage intense residential development in and around the Towns of Elkton, North East, Perryville and Port Deposit. Development is encouraged in this district because it can be most effectively served by public investment in roads, water supply and public sewer. All of these communities have relatively easy access to I-95 and are within reasonable commuting distance to APG. Therefore, these areas may be significantly impacted by the incoming jobs to APG.

Cecil County is not planning any changes to its Land Use Plan as a result of the BRAC decisions as they relate to APG. However, as is discussed in Section IV of this report, there are some water and sewer issues that may impact the ability of the communities within the County Development District to expand and provide new housing that is hooked up to public water and sewer. However, the County is working with the State and

local municipalities to address these issues and to ensure that adequate public facilities are available to meet the housing and related needs of those who may be moving into these communities.

A.2 Harford County

The 2004 Harford County Master Plan continues to support the existing boundaries of their primary growth area entitled the Development Envelope. Most of the lands around the Aberdeen Proving Ground (APG) are located within the County Development Envelope and support a variety of land uses including general commercial, medium to high-density residential, as well as industrial uses.

The U.S. Route 40 Corridor is one of the primary roads serving the Aberdeen area. In order to maintain or improve the quality of life along the Route 40 Corridor, the County has targeted this area for revitalization and redevelopment. Several mixed-use projects are ongoing or proposed for this area. Recent developments in this area include new streetscape improvements, additions to the Edgewood Library, redevelopment of the Bata Shoe Factory into the Waters Edge community and the Villages at Lakeside. Other mixed-use developments are in the planning stage.

The Perryman area is located north of APG and is an area where significant growth is occurring or being planned. This area also contains significant amounts of mixed commercial and industrial uses. Future development within this area is to be guided by the report “Vision Planning for the Perryman Area”.

A.3 Baltimore County

Baltimore County has not proposed any changes to the 2000 Master Plan due to the potential impact of BRAC related jobs coming to the Aberdeen/Edgewood Area. As in Harford County, Baltimore County has focused a number of revitalization efforts in areas located east of Interstate 95 and along US 40. There are several Community Plans that exists in this area of the County and all support increased employment opportunities as well as a mix of residential and commercial uses. The County is reviewing it’s area Plans to ensure that both adequate residential opportunities exist for those moving to this area as a result of BRAC decisions and that employment areas are available to attract new businesses that support the local military base.

A.4 Baltimore City

Baltimore recently adopted a new City Master Plan. The City, which is located between Aberdeen Proving Ground and Fort Meade, is not proposing any specific changes to its Master Plan or Community Plans at this time as a result of BRAC decisions. Numerous areas within the City have gone through revitalization in recent years and new construction is on going throughout the City. The City plans to continue to support a variety of housing types and housing prices while promoting employment opportunities including those that need to have easy access to I-95.

A.5 Anne Arundel County Comprehensive Plan

The 1997 Comprehensive was amended in November of 2003 in order to create the Odenton Town Center. The County has developed a Town Center District in order to accommodate a mix of residential, retail and office uses including but not limited to high tech business parks. The County is promoting this area to prospective businesses that will be coming to the area as a result of BRAC related decisions. Current land use designations as well as planned infrastructure improvements in and around the Fort Meade region will generally allow for adequate growth to support the influx of new employees to the area. See the Water and Wastewater (Section IV) and Transportation (Section VI) discussions for more detail on those subjects. Land around the Odenton MARC Train Station is currently being proposed for a mixed-use commercial and high-density residential development. Another key site within this area is the Odenton Town Center property. This site has recently received final approval by the Army Corp of Engineers and could support office development.

A.6 Howard County General Plan

The 2000 Howard County General Plan targets all land east of I-95 as a revitalization area. This includes the entire Route 1 Corridor. Significant opportunities for new development and redevelopment exist including high tech office and warehousing, as well as medium to high-density residential and commercial opportunities.

Those coming to the area to work at Fort Meade may also impact the Columbia Town Center. Several areas in and around the Columbia's Central Business District (Mall Area) are being developed or redeveloped with high-density residential towers, which according to current promotional information, will be marketed to those in higher income brackets. The Columbia area in general has seen a significant amount of commercial and office development in the past few years and opportunities exist for off-site contractors and other Fort. Meade related support businesses to locate there.

A.7 Prince George's County

Andrews Air Force Base (AAFB) lies just south of the Westphalia Planning Area. This is also part of Planning Area 78 within Prince George's County. The major goal of the new Westphalia Area Plan, currently in draft form, is to create an updated vision; coordination and detailed guidance for several major developments that have begun to create a long planned Westphalia Community Center. New development in this area will include 12,000 to 14,000 new residential units, over 4 million square feet of employment space and 600,000 to 700,000 square feet of retail space.

At this time, the projected number of new jobs moving to Andrews AAFB as a result of BRAC decisions is less than 500.

A.8 Montgomery County

The National Naval Medical Center (NNMC) is located within the Bethesda–Chevy Chase Planning Area (BCCPA). This Sector Plan was adopted in 1990 and has had no significant amendments since its adoption. The BCCPA supports the expansion of the National Naval Medical Center in that it promotes a mix of high-density residential uses, as well as commercial and medical office development and redevelopment along Wisconsin Avenue. There are numerous support businesses, many of which are within walking distance to the NNMC.

At this time there are no planned or proposed land use related changes due to the BRAC related decisions in Maryland. However, Montgomery County is updating the Bethesda – Chevy Chase Sector Plan and has created a draft amendment entitled the Woodmont Triangle. The Woodmont Triangle is located just to the south of NNMC. This plan is a comprehensive examination of housing for a variety of income levels, retail revitalization, improved pedestrian access as well as streetscapes and promoting an Arts and Entertainment District. The recommended improvements to Battery Park are designed to improve bicycle and pedestrian access to the NNMC and the nearby National Institutes of Health (NIH).

B. Power Capacity

The Maryland Department of Planning met with representatives of BGE. The utility company plans and budgets for an annual growth rate of approximately 2%. Residential growth related to the expected influx of new employees to Fort Meade, APG, Andrews Air Force Base and the National Naval Medical Center does not concern the utility. Most of the residential development has been planned for with or without the new influx of families.

Business utility users are more of a concern. Representatives indicated that BGE, though actively marketing the Baltimore Region to base related businesses, it is behind in their planning for additional business growth capacity. They are in the process of addressing their anticipated business utility needs and will be prepared for any influx of new businesses associated with Maryland's military bases.

BGE also indicated that all areas around each of the three military bases that it serves (APG, Fort Meade and NNMC in Bethesda) are adequately served and capacity is not an issue for the foreseeable future. However, because of the expected upsurge in high tech business needs, BGE is currently evaluating its existing capacities in and around each of the three bases.

C. Cable and Fiber Optics

Representatives from the major cable companies that provide cable and internet service in and around central Maryland were asked about the potential impact that the BRAC related jobs relocating to central Maryland could have on their ability to serve the community. All companies indicated that they are fully prepared to provide or continue to provide service to all impacted communities. No companies are changing their growth or expansion plans due to the influx of new employees to any of the Maryland military bases.

Verizon is currently going through a multi million-dollar fiber optic expansion throughout Maryland. The decisions made by BRAC have not had any impact on Verizon's plan to expand fiber optic service or its plans to expand into alternative voice communications or cable television.

Comcast, which is the largest provider of cable and internet services in central Maryland, indicated that they already serve the majority of communities that will be impacted and are not planning specific changes due to BRAC related impacts. Like other similar companies, Comcast budgets in part based on an anticipated annual growth rate. The impact of those moving to this area due to BRAC decisions will not require them to deviate from their annual growth plan. Again, this is in part due to the fact that they already serve such a large area within central Maryland.

Military Bases

The MDP also interviewed representatives at all four military bases regarding fiber optics and general Internet communications. Though no detailed information could be provided due to security reasons, all bases were able to confirm that they have adequate worldwide Internet access and are continually upgrading their general computer communication capabilities

VI. TRANSPORTATION

A. Introduction

The Maryland Department of Planning performed an update of a previous analysis conducted in May 2006 of possible regional transportation impacts that are projected to occur resulting from employment and household increases associated with the BRAC realignments at four military installations in Maryland.

This transportation report provides a preliminary list of transportation facilities or areas of need where additional study may be indicated. This report is not to be construed as a comprehensive list of transportation investments to meet employment and household relocations associated with BRAC.

It should be noted that MDOT does not have all the financial resources to construct all of the investments that are indicated in this report. Partnering with local governments, developers, and other innovative strategies will be required to implement most of the studies and projects that are described herein.

Many of the recommended transportation studies and investments would most likely be needed with or without BRAC. The necessity and feasibility of individual projects should be determined through additional study. Also, it will be vitally important for Maryland to identify additional funding sources, such as Defense Access Funds, to assist in the planning and construction of BRAC-related transportation facilities.

This report does not supersede MDOT's own analyses of BRAC related transportation impacts as well as funding priorities and financial estimates for recommended facilities.

With regard to recommendations to improve MARC Train Service for both APG and Fort Meade, MDOT faces challenges and constraints in providing increased service. High capital costs in acquiring new and/or refurbished rolling stock, as well as issues with track rights-of-way, the capacity of MARC to maintain and store the equipment, and the status of existing stations and ADA compliance are all issues that will need to be addressed in order to provide additional commuter rail service to serve projected needs.

It is recommended that MDOT prioritize BRAC related transportation infrastructure in accordance with Maryland certified Priority Funding Areas (PFAs)/Sewer Areas. In accordance with Maryland growth regulations, proximity to PFAS should be a factor in determination of transportation infrastructure priorities and funding.

B. Analysis Framework

This report focuses on a range of macro level transportation impacts that may accompany increases in employment, households and commuter travel in areas near to the following four military installations in Maryland: Aberdeen Proving Ground (APG) in Harford

County, Fort Meade in Anne Arundel County, Andrews Air Force Base in Prince George's County, and the National Naval Medical Center in Montgomery County

The primary focus of this report is not on micro-scale traffic operational and impact analyses at intersections and roadway segments, or even specific bus line services. Rather the report, based on employment forecasts, housing projections and housing distributions, focuses on macro-level impacts on major transportation facilities that serve the four installations. In some cases, specific interchanges or intersections are referred for additional study.

Aberdeen Proving Ground and Fort Meade are projected to experience considerable employment growth associated with this round of BRAC relocations. For these two military installations, the Transportation Planning Division of the Baltimore Metropolitan Council (BMC) was subcontracted to conduct regional travel demand analyses through use of the Baltimore Region Travel Demand Model. The model utilizes a transportation analysis zone (TAZ) structure consisting of all counties in the Baltimore region and the Washington region to the Potomac River. Analysis of the Cecil County highway network related to BRAC was completed using the Upper Eastern Shore Model (UESM) that is maintained by MDOT and used in the conformity determination of plans and programs. The USEM is a traditional 4-step model.

The model highway network includes all freeways, major arterials, minor arterials and collectors. The model transit network is comprised of all fixed transit lines (MARC, Metro, Light Rail) in the Baltimore Region as well as bus lines with fixed routes including local county service. The area of focus for BMC included the entire metropolitan Baltimore Region, Cecil County, and the immediate jurisdictions to the south and north (external to the region) of Fort Meade and Aberdeen Proving Ground. Information on BMC's four-step travel demand model and their methodology are included in this report's [Appendix F](#).

Andrews Air Force Base and the National Naval Medical Center in Bethesda are forecasted to receive relatively modest increases in employment associated with the current round of BRAC relocations. The analysis focused on localized transportation impacts, assessments of current highway construction projects, existing project planning studies, existing transit accessibility and Transportation Demand Management (TDM) to meet projected BRAC travel demand.

This report utilizes travel demand models, commutation studies, traffic impact analyses of the areas near to the respective installations and is based upon employment projections and allocations that have been prepared as part of this analysis. The report provides a list of recommended road and transit improvements that should be examined as a result of BRAC employment and household projections. The report also includes recommendations to improve travel demand management tools and strategies at the installations and to reduce vehicle congestion during peak periods, including transit, shuttles, non-motorized modes, flex time and telecommuting.

C. BRAC Transportation Findings and Recommendations

C.1 Andrews Air Force Base

- Andrews Air Force Base should explore a process with the Prince George's County Planning Board and the Maryland-National Capital Park and Planning Commission to establish various approaches to reducing vehicular trip generation and parking demands to the base facility associated with the current BRAC relocations. A variety of Transportation Demand Management (TDM) and transit enhancement concepts could be considered and incorporated in the Transportation Management Plan for the Air Force Base facility. Consideration should be given to establishing a Vehicle Rates Per Peak Hour Cap to reduce vehicle congestion during peak periods.
- A Memorandum of Understanding (MOU) should be considered at Andrews Air Force Base designed to reduce the rate of vehicular trip generation per employee with the Prince George's County Planning Board and the National Capital Planning Commission. Goals should include: 1) a reduction of single occupant auto driver mode split; 2) A reduction of employee parking demand; and 3) An increase in average passenger occupancy (APO) at the installation.
- As part of the MOU, it is recommended that goals and incentives be set for employees to increase the use of non-motorized access to/from Andrews Air Force Base by means of bicycling and walking.
- Use of Shuttle Bus Service at regular intervals to/from the Branch Avenue Metrorail Station and Andrews Air Force Base should be encouraged to increased use of Metrorail transit service by employees and contractors at the Air Force Base facility.
- The operational characteristics of the intersections along Allentown Road/MD 337 as well as the MD 5/Allentown Road interchange should be studied to accommodate peak period travel demand. This should include examination of existing turning movements and signalization optimization along Allentown Road/MD 337 and an examination of signalized intersections to accommodate increased levels of pedestrian use, including medians and installation of ADA compatible timed pedestrian signal heads at intersections.
- Completion of sidewalks should be considered along the east side of Allentown Road/MD 337 from MD 5 to Forestville Road.
- Move forward with the feasibility studies and constructions planning projects that are currently underway or under study by MDOT in the vicinity of Andrews Air Force Base, these facilities include:
 - MD 4 Interchange at Suitland Parkway;
 - MD 4 from MD 223 to I-95/I-495
 - I-95/I-495: Woodrow Wilson Bridge Improvement Project;
 - I-95/I-495 at MD 5/Branch Avenue Phases 1 and 2

C.2 National Naval Medical Center

- A feasibility study of bus transit in the vicinity of the National Naval Medical Center in Bethesda should be conducted with particular emphasis on expansion of the number of bus transit bays at the Medical Center Metrorail Station or at a nearby location.
- Signalized intersections along MD 355 should be studied to accommodate increased levels of pedestrian use, including effective medians and installation of ADA compatible timed pedestrian signal heads at intersections.
- Operational characteristics of Jones Bridge Road should be examined to facilitate increased vehicular, bicycle and pedestrian usage at the existing Jones Bridge Road gate.
- A Memorandum of Understanding is recommended at the National Naval Medical Center with the overall goal of reducing the rate of vehicular trip generation per employee. Consideration should be given to setting a Vehicle Rates Per Peak Hour Cap to reduce vehicle congestion during peak periods. The MOU should be coordinated with the Montgomery County Planning Board and the National Capital Planning Commission. Specific goals should include: 1) A reduction of single occupant auto driver mode split; 2) A reduction of employee parking demand; and 3) An increase in average passenger occupancy (APO) at the installation.
- A feasibility study should be considered in regard to the future use of a grade-separated interchange at MD 355 and Cedar Lane.
- The M-NCPPC 2006 Mobility Report identified four intersections near the National Naval Medical Center in as priority targets for near term congestion relief. Operational improvements to the following three intersections should be studied to relieve congestion associated with BRAC relocations, including examination of existing turning movements and signalization optimization at:
 - MD 355 at South Drive/Wood Road
 - Connecticut Avenue (MD 195) at Jones Bridge Road
 - MD 355 at Pooks Hill Road
- The Bi-County Transitway Study (former Purple Line) should include an analysis of opportunities and constraints of the proposed Jones Bridge Road alignment as it relates to the BRAC employee relocations at the National Naval Medical Center in Bethesda. This analysis should be coordinated with the Montgomery County Planning Board and Maryland-National Capital Park and Planning Commission and with the Washington Metropolitan Area Transit Authority.

C.3 Aberdeen Proving Ground

C.3.1 APG Regional Highway Recommendations

- The feasibility of value pricing options and transportation demand management should be continually studied for I-95. Ensure interchange improvements to accommodate BRAC-related increased travel demand.
- Re-examine the current Perryman Access study to provide improved access from the Perryman Peninsula to the state road network and to APG. For instance, a connection from MD 175 to Woodley Road would improve access to the planned growth area in the Perryman Peninsula and to APG.
- Monitor traffic operations and safety issues on major highways leading to APG as the effects of BRAC-related demand continue to be realized; and initiate feasibility or project planning studies as warrants dictate. MD 7, MD 22, MD 543, MD 152, MD 715, and MD 155, which provide major access to APG, are forecasted to be impacted by the BRAC-related growth in 2015 or 2020. Future needs for improvements for these highways should be addressed by following the established MDOT project delivery process. Any positive or adverse land development effects of future highway projects should also be fully addressed in the studies.
- Along with potential highway improvement projects, accommodation of bicycle and pedestrian access should be fully considered.

C.3.2 APG Regional Transit Recommendations

- Develop proximate and efficient transfer to base grounds from the existing or relocated Aberdeen MARC Station. Explore a base shuttle system with and within APG to utilize coordination and technologies in order to reduce dwell times.
- Improve regional bus and/or rail service between Baltimore and existing/new Aberdeen MARC station and Edgewood MARC station to accommodate commutation to APG as the need arises. With one trip northbound from Baltimore during the morning peak, and one trip southbound to Baltimore during the evening peak, commuting from the south via regional rail is now feasible, but limited. Increase peak period and mid-day service and explore operational limitation to providing improved MARC service.
- Investigate the proposed relocated Aberdeen multi-modal station as a center for a Harford Transit and MTA operations as well as a rail maintenance and storage facility.
- Explore the feasibility of expanded commuter rail service into Cecil County. This would extend into the Philadelphia region through inter-regional coordination with Wilmington Area Planning Council (WILMAPCO) in ongoing studies regarding Track A Extension.

- Explore the feasibility of expanded MARC service in conjunction with development of a Middle River multi-modal station to serve existing and planned development in Middle River and Dundalk.
- Explore the feasibility of expanded local bus service on the US 40 corridor. Communities such as Edgewood provide a combination of affordable housing and a connection to Harford Transit routes. Utilize a combination of current Harford Transit Route 6 and the proposed Harford Transit Route 8 to serve stops between Edgewood and Havre de Grace with one hour weekday and non-peak headways.
- Explore an extension of proposed Harford Transit Route 8 into Cecil County to Elkton. This would provide an efficient, toll-free transfer to points north, including a connection with the Delaware Department of Transportation (DelDOT) DART Bus 65 service, and a subsequent connection to the Southeastern Pennsylvania Transportation Authority (SEPTA) regional commuter rail service.
- Improve bicycle and pedestrian access at the existing/relocated Aberdeen MARC Station, between the MARC station and the base, and at the secure transfer point to the on-base circulator to reduce dwell times.

C.3.3 APG Transportation Demand Management (TDM) and Transportation System Management (TSM) Recommendations

- Operational improvements to local thoroughfares in Aberdeen should be fully studied. This includes intersection operational improvement studies along MD 22 and MD 715 in Aberdeen. Special attention should be given to turning movements and signalization optimization on all major thoroughfares throughout Aberdeen.
- Aberdeen Proving Ground should explore a process with the Harford County to establish measures for reducing vehicular trip generation and parking demands to the base facility associated with the current round of BRAC relocations. A variety of Transportation Demand Management (TDM) techniques should be fully considered and incorporated in the Transportation Management Plan for APG. Consideration should be given to setting a Vehicle Rates Per Peak Hour Cap to reduce vehicle congestion during peak periods at APG gates.
- Sidewalks should be fully considered along MD 22 from Old Post Road and from MD 715 from Old Philadelphia Road to the APG gates to encourage local walking trips to the base by locally residing APG employees.
- Explore the feasibility of regular shuttle bus service to/from the existing/relocated MARC Station to APG to encourage increased use of MARC and AMTRAK service by employees and contractors at APG.

C.4 FORT MEADE

C.4.1 Fort Meade Regional Highway Recommendations

- Complete project planning and seek construction of the current MD 198 project between MD 295 and MD 32 in Anne Arundel County. This investment will improve congestion to an acceptable level of service in 2015 in response to BRAC-related traffic increases.
- Continue the current project planning study and seek construction of the MD 3 project. Explore the feasibility of widening MD 3 from four (4) to six (6) lanes between the Prince George's County/Anne Arundel County line and MD 32. This investment will improve congestion in 2015 to an acceptable level for most sections of MD 3. Participate with the Washington region in planning activities to improve MD 3 capacity south of the Prince George's County/Anne Arundel County line
- Continue project planning and seek construction of the current MD 175 project from MD 170 to I-295/Baltimore Washington Parkway. Sidewalks and bicycle facilities should be included to accommodate pedestrian and bicycle travel along MD 175. Improvements at signalized intersections should be designed to accommodate increased levels of pedestrian use. This includes effective medians and installation of ADA compatible timed pedestrian signal heads at intersections near to base entrances and bus transit stops.
- Re-examine the current planning study for US 1 in Howard County in relation to potential BRAC-related residential and non-residential development proximate to Fort Meade.
- Consider the feasibility of a multi-modal project planning study for the I-95 corridor from the Prince George's County/Howard County line to I-695. Forecasted volumes exceed capacities in multiple sections in 2015 even without BRAC-related loads. In coordination with transportation and planning agencies in the Baltimore and Washington Regions, this corridor study would examine highway capacity improvements as well as various Transportation Demand Management strategies including transit and value pricing options as an attempt to mitigate increasing single-occupancy travel demand in the Baltimore-Washington Corridor.
- Study Transportation Demand Management options for the MD 32 Corridor in Anne Arundel, Howard and Carroll Counties and monitor traffic operations in sections of MD 32 for improvement considerations. MD 32 is considered a gateway to Fort Meade and many areas along the corridor are potential housing locations for NSA/Fort Meade employees. For instance, with BRAC-related traffic increases, the congestion level indicates that the section of MD 32 between MD 198 and I-97 is in need of mitigation.
- Consider the feasibility of improvements to MD 175 between US 1 and MD 295 as a warrant dictates in the future. BRAC-related traffic is projected to increase congestion levels by 2015.

- Consider the feasibility of improvements to MD 170 between MD 175 and MD 100 as a warrant dictates in the future. BRAC-related traffic is projected to increase congestion levels by 2015.
- Initiate feasibility or project planning for MD 713 between MD 175 and MD 100 as a warrant dictates. BRAC-related traffic increases are forecasted to increase congestion levels by 2015.
- Along with potential highway improvement projects listed above, accommodation of bicycle and pedestrian access should be fully considered.

C.4.2 Fort Meade Regional Transit Recommendations

- Seek to improve regional bus and rail service to serve commuters to Fort Meade from the Washington and Baltimore areas. Consider improvement of headways to serve commuters from the Washington region utilizing existing services, such as the WMATA Greenbelt / BWI Express bus line, MARC Penn and/or Camden line service via Odenton and/or Savage MARC Stations. Study the feasibility of expanding MARC service by addressing institutional and operational limitations that are currently preventing increased frequency of service to Odenton.
- Coordinate with WMATA, Fort Meade, and other entities to develop proximate and efficient shuttle transfers to base grounds from the Odenton and Savage MARC Stations, the proposed Central Maryland Transit Operations Center, and the Greenbelt Metrorail Station. Explore a secure shuttle distribution service with and within the base utilizing coordination and technologies as needed to reduce dwell times.
- Continue to develop local bus service to connect communities and the proposed Central Maryland Transit Operations Center and Fort Meade. Communities such as Glen Burnie, Brooklyn Park and Linthicum in Northern Anne Arundel County, Baltimore City, Columbia in Howard County and the City of Laurel provide a combination of affordable housing stock with connections to transit service. Coordinate Corridor Transportation Corporation (CTC) operated Howard County bus service and Howard Transit's Connect-A-Ride service to provide transit connections between Columbia and Fort Meade, and Laurel and Fort Meade. Seek to implement the Fort Meade/BWI and Glen Burnie bus routes, as proposed in the City of Annapolis/Anne Arundel County Transportation Development Plan, to connect Glen Burnie, Linthicum and Brooklyn Park with Fort Meade via MTA Central Light Rail.
- As a long-term horizon transit project, conduct a feasibility study of an extension of the WMATA Green Line to Fort Meade and possibly BWI/Marshall Airport. Coordination with Prince George's County, WMATA and the MWCOG Transportation Planning Board should be a priority in conducting planning feasibility studies related to Green line extension.

C.4.3 Fort Meade TDM Recommendations

- A Memorandum of Understanding is recommended at Fort Meade with the overall goal of reducing the rate of vehicular trip generation per employee. Consideration should be given to setting a Vehicle Rates Per Peak Hour Cap to reduce vehicle congestion during peak periods. This should be coordinated with the Anne Arundel County Office of Planning and Zoning, the Baltimore Metropolitan Council, and the Maryland Department of Transportation. A variety of Transportation Demand Management (TDM) techniques should be fully considered and incorporated in the Transportation Management Plan for APG. Specific goals should include: 1) A reduction of single occupant auto driver mode split; 2) A reduction of employee parking demand; and 3) An increase in Average Passenger Occupancy (APO) at the installation.
- On MD 175, special consideration should be given to extension of sidewalks from Morgan Road/Odenton MARC Station to the Reese Road gate at Fort Meade. This is to encourage local walking trips to the base by locally residing employees and contractors at Fort Meade.
- Establish shuttle bus service at regular intervals to/from the Odenton MARC Station and the proposed Central Maryland Transit Operations Center for the use of employees and contractors at Fort Meade.
- Improve and/or provide bicycle and pedestrian access between Fort Meade, the Odenton MARC Station and the proposed Central Maryland Transit Operations Center.

D. Methodology

In order to generate transportation investment recommendations in the vicinity of the four Maryland military installation sites, MDP gathered data and sub-allocated employment and housing data in order to determine employment and housing location scenarios at each of the installations. Inventories of existing and planned highways, transit, park & ride, and non-motorized facilities providing major access to and from the installations were prepared. Data gathering also included all programmed and planned improvements to the regional transportation network from the 2006-2011 Consolidated Transportation Plan (CTP)

Two of the bases are forecasted to receive upwards of 5,000 direct positions and 18,000 or more indirect and induced positions associated with the current round of BRAC relocations. These are Aberdeen Proving Ground (APG) and Fort Meade. Two other installations are forecasted to receive less than 5,000 direct, indirect and induced positions. These are Andrews Air Force Base and the National Naval Medical Center in Bethesda.

This report considered existing traffic studies; traffic counts on arterials and adjacent collectors; bus transit routes and headways, rail service operations and frequency;

Development and Evaluation and Construction Projects in MDOT's FY2006-2011 Consolidated Transportation Program (CTP); census commutation analyses; and proposed local transportation projects in the study areas for the four installations.

The levels of BRAC employment related growth impacts differ for each military installation. This necessitated use of two different methodological approaches to examine transportation impacts. Installations that are projected to receive relatively large numbers of relocated jobs when compared with existing employment at or near the installation (i.e., facilities exceeding 10,000 direct, indirect and induced jobs) were examined through use of regional travel demand models and scenario testing with infrastructure investments. Aberdeen Proving Ground and Fort Meade were the two BRAC installations that were examined through this methodological approach. Installations that are projected to receive employment growth that did not exceed 5,000 direct, indirect or induced jobs were studied through an analysis of operational characteristics on major thoroughfares and nearby transit facilities based on employment projections and housing forecasts. The transportation networks serving these installations, including Andrews Air Force Base and the National Naval Medical Center, were analyzed in terms of operational characteristics. Recommendations are provided for a range of transportation modes at and near these installations.

While BRAC employment relocations are forecasted over a several year span up to 2015, this report does not recommend staging scenarios for identified transportation projects. This report identifies areas of potential transportation need in and near the BRAC installations and provides recommendations for accelerated study for consideration by local governments and by the Maryland Department of Transportation to address areas of potential transportation need.

D.1 Overview of the Baltimore Region Travel Demand Model

The Baltimore Region Travel Demand Model is used to perform various technical analyses and provide decision-makers with the information needed to determine transportation investments. The model consists of the Baltimore region and Washington region to the Potomac River. The Baltimore Regional Travel and Demand Model was recently upgraded to Version 3.3 and was used for this study. It is more sensitive to input variables from trip generation through trip assignment and provides more explainable and detailed simulation results than the version used for the May 2006 BRAC regional analysis.

The model utilizes the transportation analysis zone (TAZ) structure developed by BMC in 2004 consisting of 1,151 zones. TAZ's are census block group combinations that nest within BMC's Regional Planning District geographies.

The model network includes all major roads in the modeled region, including freeways, major arterials, minor arterials and collectors. The model transit network is comprised of all fixed transit lines (MARC, METRO and Central Light Rail) in the Baltimore Region as well as bus lines with fixed route service.

BMC's model is designed to produce a general sense of travel demand, both highway and transit, on a regional or corridor basis, but is not designed to produce facility/intersection-specific results. Further refinement and additional tools are needed to provide a more suitable estimation of facility/intersection-level volumes.

BMC's model uses a traditional four-step method to forecast travel in the region; the four steps are trip generation, trip distribution, mode choice, and trip assignment.

For **Trip Generation**, both motorized and nonmotorized non-truck trips are generated and classified into seven trip purposes. The model also classifies household size, income and density codes. Trip attractions are identified only for motorized trips.

The **Trip Distribution** model links trip attraction and productions between zones. It uses a gravity model calibrated using barrier penalties. Following distribution, home-based work, home-based shop, and home-based other trips area stratified by income.

The **Mode Choice** model takes data on the number of persons traveling between zones and computes the number of single-occupant automobile drivers, multiple-occupant automobile users, and transit riders. The process is repeated for different trip types. Automobile trips are then converted to the vehicle trip table.

Finally, the **Trip Assignment** phase assigns vehicle trip table to the regional network, producing a simulation of link volumes, vehicle miles traveled, and volume to capacity ratios. From the final assignment of four time periods: morning peak (6:30 to 9:30 a.m.), midday (9:30 to 3:30 p.m.), afternoon peak (3:30 to 6:30 p.m.) and night (6:30 p.m. to 6:30 .am), a 24 hour simulated volume is provided for each link in the region.

To ensure these techniques result in valid output requires periodic checking of the models and the data on which the models are based. This checking is called a validation. A validation for the year 2000 was performed in 2004.

Additional information on BMC's travel demand model methodology is included in the [Appendix F](#), "Regional Transportation Implications of Base Realignment and Closure."

E. BRAC Base Descriptions and Transportation Impact Analysis

E.1 Andrews Air Force Base Description

Andrews Air Force Base is located east of I-95/I-495/the Capital Beltway in Prince George's County. Andrews is bounded on the south and west by MD 5/Branch Avenue and Old Alexandria Ferry Road and on the north and east by MD 4/Pennsylvania Avenue and Dower House Road. The Main Gate is located along Allentown Road across from

Suitland Road near the Morningside community. Other gates are located at Suitland Parkway, Old Alexandria Ferry Road and Dower House Road.

Andrews Air Force Base is located approximately 1.5 miles from the Branch Avenue Metrorail Station on WMATA's Metrorail Green Line.

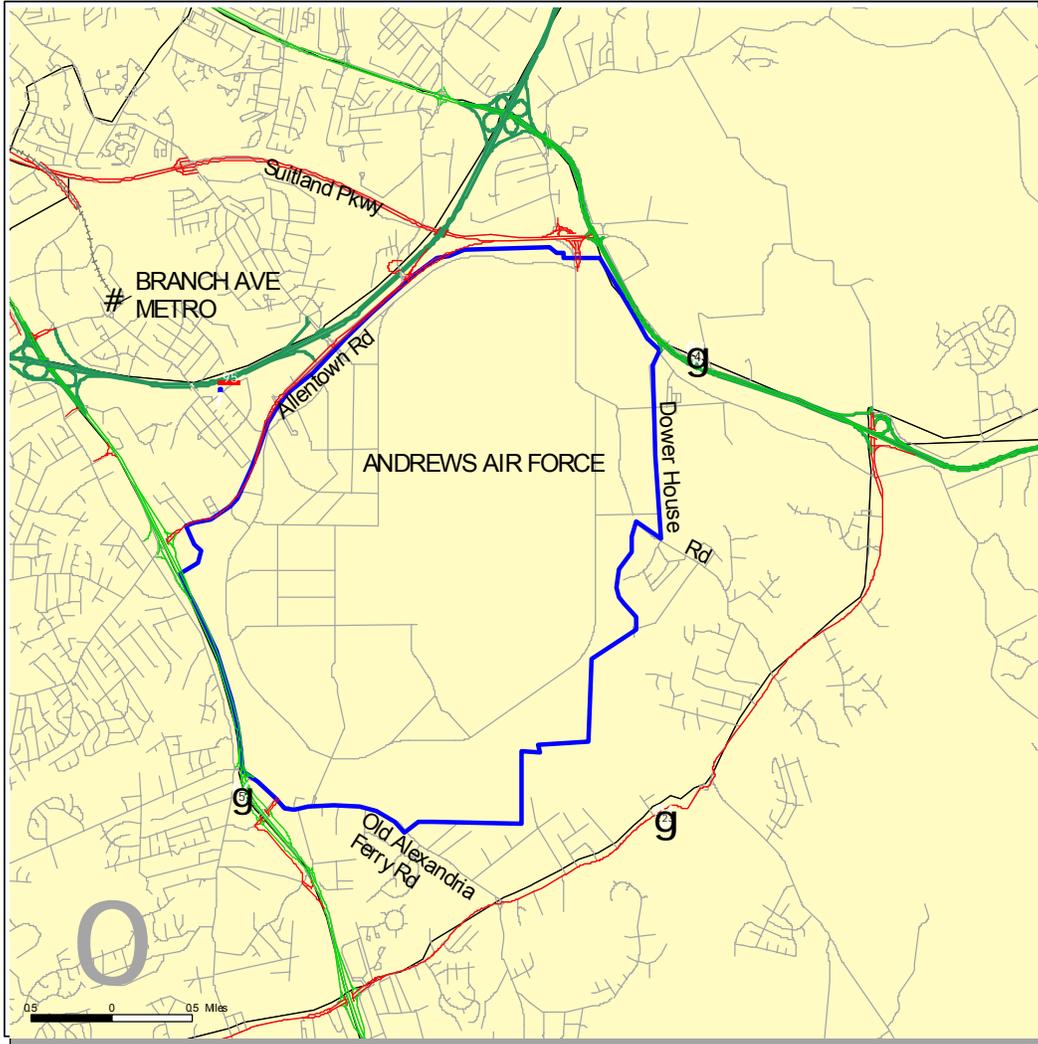
The Main Gate along Allentown Road is served by WMATA's Metro Bus system. Metro Bus provides connections to both the Suitland and Branch Avenue Metrorail Stations and to the Oxon Hill area.

Interstate Access

Andrews is served primarily by three Capital Beltway/I-95/I-495 interchanges: MD 5/Branch Avenue and MD 4/Pennsylvania Avenue.

Major Thoroughfares

Immediate access to the base complex is provided by two major highways: Allentown Road/MD 337 and by Suitland Parkway/MD 218.



Map
ANDREWS AIR FORCE

Compiled by
 Maryland Department of Planning
 Transportation Unit

- KEY**
-  Site
 - Roads**
 -  Interstate Highways
 -  State Primary Highways
 -  State Secondary Highways
 -  Railroads/Piers
 -  Roads
 -  TAZs

Transit Service

Andrews Air Force Base is located 1.5 miles from the Branch Avenue Metrorail Station on the Metrorail Green Line. See Metrorail System Map.

Metro Bus routes K11, K12, D13 and D14 currently serve the Main Gate on Allentown Road. Metro Bus service to the Main Gate is available at both the Branch Avenue Metrorail Stations and the Suitland Metrorail Station. Bicycle racks and lockers are available at both Metrorail Stations.

Bicycle Access

Bicycle racks and lockers are available at the Branch Avenue Metrorail Station. WMATA recently conducted a Bicycle Locker and Rack Survey. Bicycle rack and use is estimated to be between 50 percent and 100 percent at the Branch Avenue Metrorail Station indicating high levels of use. WMATA is considering replacement and upgrading of existing racks and exploring options to enhance bicycle security at stations throughout the system.



E.1.1 Andrews Air Force Base Transportation Impact Analysis

Estimations of BRAC transportation impacts are derived from the net job changes associated with the current round of BRAC job relocations including the 400 direct jobs projected for Andrews Air Force Base. In addition, the indirect and induced jobs projected for Prince George’s County from all of the BRAC job relocations are included.

Trip Generation

Trip generation analysis of the additional net increase of 400 positions at Andrews Air Force Base indicates that they will generate an additional 2,811 trips on weekdays, 50 percent entering and 50 percent exiting the base. At peak hour, the new positions are estimated to generate an additional 91 trips in the AM Peak Hour and 262 trips during the PM Peak Hour on weekdays among the gate entrances to the base facility.

The trip generation estimate represents minor operational transportation impacts to the existing road network as a result of the BRAC relocations at Andrews Air Force Base. While increased levels of peak period vehicle queuing can be expected at base facility gates, no major impacts to the local road network are indicated in the current round of BRAC relocations.

Vehicular counts along Allentown Road/MD 337 indicated in the table below show an increase of 875 vehicles per day between 2001 and 2005. It is estimated that trips along Allentown Road/MD 337 will increase no more than 1,500 to 3,000 average daily trips associated with the current BRAC employment projections.

**Table 7
Andrews Air Force Base Vicinity Traffic Count**

AADT Facility	Year				
	2001	2002	2003	2004	2005
MD 337, east MD 5	29,700	29,875	30,250	30,625	30,575
MD 337, west MD 458	27,025	27,975	28,350	28,625	29,075
MD 5, from MD 337 to MD 223	105,075	108,250	109,325	107,675	105,550
MD 5, north MD 223	88,575	91,250	92,225	98,675	96,750
MD 223, east MD 5	18,875	19,450	19,625	19,875	19,550
MD 233 from MD 5 to MD 4	19,075	19,650	19,825	19,175	18,850
MD 233, south MD 4	15,175	15,650	15,825	16,875	16,550
MD 4, west MD 233	52,475	54,050	54,625	54,775	53,750
MD 4 from I-495 to MD 233	74,875	77,150	77,925	75,575	74,150

Source: 2001 – 2005, Traffic Volume Map, State Highway Administration

A primary goal at Andrews Air Force Base should be to reduce the rate of vehicular trip generation per employee such that growth in employment does not generate increases in peak hour vehicular traffic. An important strategy to accomplish this goal is to encourage an increase in multiple occupant vehicles (carpools, vanpools, base shuttles) and an increase in the use of bus transit and shuttles to/from the Branch Avenue Metrorail Station by base employees. It is recommended that Transportation Demand Management (TDM) tools and incentives along with a program to increase use of transit as well as base shuttle service access be included in a Transportation Management Plan for Andrews Air Force Base. A Memorandum of Understanding (MOU) is recommended between Andrews Air Force Base and the Prince George's County Planning Board, Maryland-National Capital Park and Planning Commission that seeks to increase Average Passenger Occupancy (APO) for auto trips and increase the Non-Auto driver mode split for the base facility.

The following transportation projects related to Air Force Base are included in MDOT's FY2007-2012 CTP:

C	\$92.3 million	MD 4 Interchange – Construct new interchange at Suitland Parkway – Construction to begin Spring 2008
D&E	\$180-200 million	MD 4 Improvements – MD 223 to I-95/I-495 – Funded for planning only
D&E	\$125-135 million	MD 5 Improvements – US 301 to north of I-95/I-495 Improvement Study – Funded for planning, partial funding for engineering and right of way
C	\$2.4 billion	Construct replacement Woodrow Wilson Bridge – Under Construction
C	\$53 million	Interchange at Branch Avenue and I-95/I-495 – Under Construction
D&E	\$50-60 million	Interchange at Branch Avenue, Second Phase – Funded for engineering and right of way only
D&E	\$2.9-3.1 billion	I-95/I-495 Improvements – American Legion Bridge to the Woodrow Wilson Bridge – Funded for planning only

Key

C = Construction funding programmed in current CTP

(Note: Dollar figure attached to C items represent actual funding allocated for all phases, including final construction.)

D&E = Development and Evaluation funding programmed in current CTP

(Note: D&E represents funding for a variety of pre-construction phases including planning, design, engineering, right of way acquisition.)

(Note dollar figure attached to D&E items represent projected total build out of project.)

Table 8
Andrews Air Force Base Vicinity Park and Ride Locations

Oxon Hill Fringe Parking	Oxon Hill Road at Route 210 (Bike Lockers)
ABC Drive-In Fringe Parking	Indian Head Highway on Service Road at Indian Head Manor
Clinton Fringe Parking	Route 5 & Woodyard Road on Stuart Lane

E.2 National Naval Medical Center Description

The National Naval Medical Center in Bethesda (sometimes called the National Naval Hospital) is located at the southern end of the I-270 Corridor along Wisconsin Avenue/MD 355. The Naval Hospital campus is located one mile south of I-495, the Capital Beltway. It is bounded on the west by Wisconsin Avenue/MD 355 and on the south by Jones Bridge Road. The campus is located south of Cedar Lane and abuts the Capital Beltway/I-495 between Cedar Lane and Connecticut Avenue/MD 185. The National Naval Medical Center is located adjacent to Washington's Metrorail Red Line. The Medical Center Metrorail Station is located on the west side of MD 355 directly across from an entrance to the National Naval Hospital and provides service from Shady Grove to Glenmont at 3 to 10-minute intervals. The Naval Hospital is also served by WMATA's Metrobus and Montgomery County's Ride-On bus transit service, providing bus transit service throughout Montgomery County and the Washington metropolitan area. Main gates to the National Naval Hospital access are located on MD 355 with secondary access along Jones Bridge Road.

Interstate Access

The Naval Hospital is served primarily by three Capital Beltway/I-495 interchanges: Old Georgetown Road, Wisconsin Avenue/ MD 355, and Connecticut Avenue/MD 185.

Major Thoroughfares

Wisconsin Avenue/ MD 355 provides primary north-south access to the District of Columbia and to Rockville. This facility is also served by Jones Bridge Roads as well as by the nearby routes of Old Georgetown Road/MD 187 and Connecticut Avenue/MD 185.

Transit Service

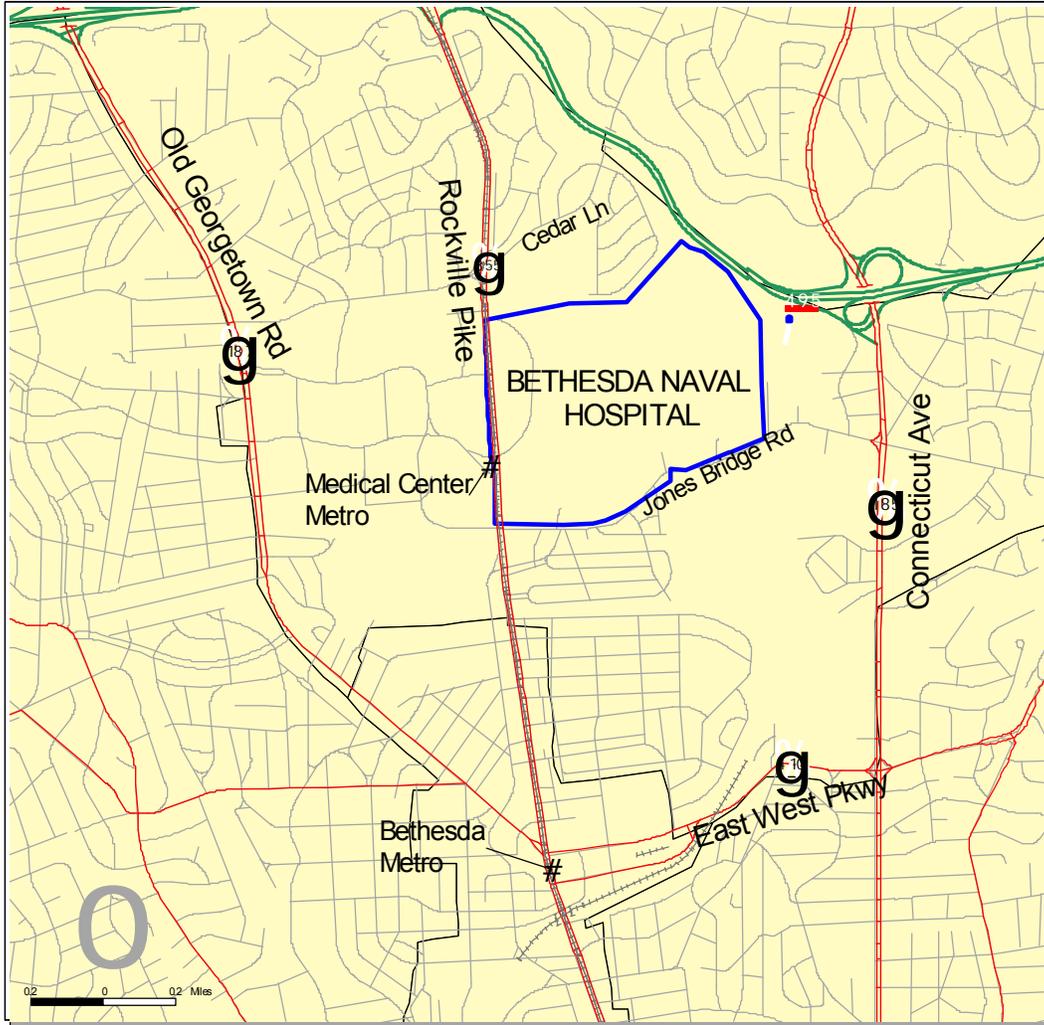
Metrorail Service

The National Naval Medical Center in Bethesda is located in the service area of two Metrorail stations. WMATA's Medical Center Metrorail Station is immediately adjacent to the National Naval Hospital facility. It is located on the west side of MD 355 directly across from an entrance to the National Naval Hospital at the National Institutes of Health. The Medical Center Metrorail Station provides heavy rail service from Shady Grove to Glenmont at 3 to 10-minute intervals. The system operates from 5:00 am on weekdays and 7:00 am on weekends and closes at midnight on Sundays through Thursdays and 3:00 am on Friday and Saturday nights. Holiday hours vary.

WMATA's Bethesda Metrorail Station is located two miles south of the National Naval Hospital at Wisconsin Avenue and Montgomery Lane in the Bethesda central business district.

Bi-County Transitway

The Bi-County Transitway (former Purple Line) is a project planning study currently underway by the Maryland Transit Administration/Maryland Department of Transportation of a Transitway between the Bethesda and New Carrollton Metrorail stations.



Map
BETHESDA NAVAL HOSPITAL

Compiled by
 Maryland Department of Planning
 Transportation Unit

- KEY**
-  Site
 - Roads**
 -  Interstate Highways
 -  State Primary Highways
 -  State Secondary Highways
 -  Railroads/Piers
 -  Roads
 -  TAZs



Bus Transit Service

The Naval Hospital is served by WMATA's Metrobus and Montgomery County's Ride-On bus transit service, which provide bus transit servicethroughout Montgomery County and the Washington metropolitan area. Bus transit can be accessed both at the Medical Center Metrorail Station and at the Bethesda Metrorail Station.

The existing numbers of bus bays are limited at the Medical Center Metrorail Station. It is recommended that a study of bus transit in the vicinity of National Naval Hospital be conducted with particular emphasis on expansion of the number of bus transit bays either at the Medical Center Metrorail Station or at a nearby location.

Current Medical Center Metro Station: Bus Service

[Route 30](#) To Bethesda Metro Station

[Route 33](#) To Kensington, Bethesda and Layhill

[Route 34](#) To Bethesda, Wheaton Metro Stations/Aspen Hill

[Route 42](#) To Bethesda, Friendship Heights Metro Stations

[Route 46](#) To Rockville Montgomery College

[Route 70 Express](#) To Bethesda Station and Milestone Park and Ride

Metro Bus Routes: [J1, J2, J3](#) (Bethesda - Silver Spring Line)

Bethesda Metro Station: Bus Service

[Route 29](#) To Friendship Heights via Glen Echo

[Route 30](#) To Medical Center Metro Station

[Route 32](#) To Naval Ship Research and Development Center

Route 33 To Kensington and Layhill

[Route 34](#) To Wheaton Metro Station / Aspen Hill

[Route 36](#) To Potomac (Connelly School of the Holy Child)-Bradley Blvd
Hillandale Rd (limited service)

[Route 42](#) To Friendship Heights Metro Station and Medical Center Metro Station

[Route 47](#) To Montgomery Mall and Rockville

[Route 70](#) Express- To Milestone Center

[Route 92](#) Bethesda 8-Bethesda Central Business District Shuttle-FREE

Metro Bus Routes: [J2](#), [J3](#), [J4](#) (J4: College Park-Bethesda Line)

Hours of Service is in most of case 6:00AM to 9:00PM Monday-Friday. It has approximately 30 minutes frequency Monday-Friday.

Bicycle Access

Bicycle racks and lockers are available at the Medical Center Metrorail Station. WMATA recently conducted a Bicycle Locker and Rack Survey. Bicycle rack and use is estimated to be between 50 percent and 100 percent at the Medical Center Station indicating high levels of use. WMATA is considering replacement and upgrading of existing racks and exploring options to enhance bicycle security.

E.2.1 National Naval Medical Center Transportation Impact Analysis

Estimations of BRAC transportation impacts for the National Naval Medical Center in Bethesda must take into account the net increase in employment at the installation, additional patients that will be accommodated at the facility, and by estimates of the increase in visitors to the hospital complex associated with increased patients under care.

Transfer positions will be moved from the nearby Walter Reed Army Medical Center. It is assumed that a majority of these employees live locally in the Washington, D.C metropolitan area. It can also be assumed that many local employees will opt to use Metrorail for their work commutes.

Trip Generation

Trip generation analysis of the additional net increase of 2,797 positions at the National Naval Medical Center is expected to generate an additional average of 15,869 trips on weekdays, 50 percent entering and 50 percent exiting the hospital facility.

At peak hour, the new positions are estimated to generate an additional 1,225 trips in the AM Peak Hour and 1,342 trips during the PM Peak Hour on weekdays among the gate entrances to the hospital complex.

The trip generation estimate indicates operational transportation impacts to the local road network as a result of the BRAC relocations at Bethesda. This will include additional congestion on major thoroughfares during peak periods and increased vehicle queuing can be expected at gate entrances to the Bethesda complex.

Additional factors at Bethesda include additional patients associated with the consolidation with Walter Reed as well as increased visitor travel to the hospital facility. Best estimates presently available indicate that between 250 and 350 patients may be relocated to the National Naval Medical Center in Bethesda from Walter Reed. There are presently no reliable estimates regarding increases in visitation that will accompany the consolidation at Bethesda. This report does not include future hospital visitation in the above trip generation estimate.

Vehicular traffic counts along nearby highways are indicated in the table below. Vehicular travel on Wisconsin Avenue/MD 355 and other nearby thoroughfares has remained relatively constant between 2001 and 2005. A traffic count anomaly is indicated for East West Highway/MD 410 due to opening of separate east and west alignments in 2003/2004. Also, Connecticut Avenue/MD185 experienced a rise and then a decline of over 5,000 average trips per day from 2001 to 2005. The reasons for this are not clear and make be the result of count device irregularities.

**Table 9
National Naval Medical Center Vicinity Traffic Count**

AADT Facility	Year				
	2001	2002	2003	2004	2005
MD 355, south I-495	58,550	60,325	59,475	60,150	58,925
MD 355, Naval Medical Center	-	-	-	-	52,075
MD 355, north East West Highway	33,850	34,925	31,975	32,350	31,725
MD 410 East West Highway, east MD 355	36,400	31,375	31,750	16,275	17,175
MD 410 East West Highway (Below), east MD 355	-	-	-	14,075	16,375
East West Highway, west MD 185	38,125	31,075	31,450	31,825	29,375
Connecticut Ave/MD 185, south I-495	78,575	80,950	81,825	74,575	73,150

Source: 2001 – 2005, Traffic Volume Map, State Highway Administration

Given the extensive transit options, sidewalk access and bicycle facilities in the area of the National Naval Medical Center, only operational improvements to local thoroughfares would be recommended at this time. This would include operational improvements primarily to MD 355 although nearby thoroughfares should be studied independently by MNCPPC and SHA to determine impacts.

Transportation Demand Management

Transportation Demand Management (TDM) measures have been implemented in the greater Bethesda and Woodmont Triangle areas. The success of TDM strategies in these areas can be attributed to the extensive transit and non-motorized travel options available in Bethesda, including Metrorail, Metro Bus, Montgomery County Ride-On bus service and an extensive bicycle transportation network that encourages increased pedestrian access throughout this area. These are the result of the effective planning efforts of the Montgomery County Planning Board and the Maryland National Capital Park and Planning Commission. For example, the National Institutes of Health (NIH) has instituted a comprehensive Transportation Management Plan with the objective of reducing peak hour vehicular traffic through encouraging NIH employees to commute by public transportation, ride share and by alternative modes, including bicycling. Maintaining the Transportation Management Plan is ensured through a Memorandum of Understanding signed by NIH, the Montgomery County Planning Board, and the National Capital Planning Commission. Through this process, NIH will continue to explore and implement approaches to reducing vehicular trip generation and parking demand at the NIH complex.

Reduction of vehicular trips and parking demand will also be issues for consideration at the National Naval Medical Center resulting from the BRAC related consolidation with Walter Reed. It is recommended that a Memorandum of Understanding designed to reduce the rate of vehicular trip generation per employee with the Montgomery County Planning Board and the National Capital Planning Commission be considered at the National Naval Medical Center complex. Goals should include 1) reduction of single occupant auto driver mode split; 2) reduction of employee parking demand; and 3) an increase in Average Passenger Occupancy (APO) at the installation.

The Bi-County Transitway

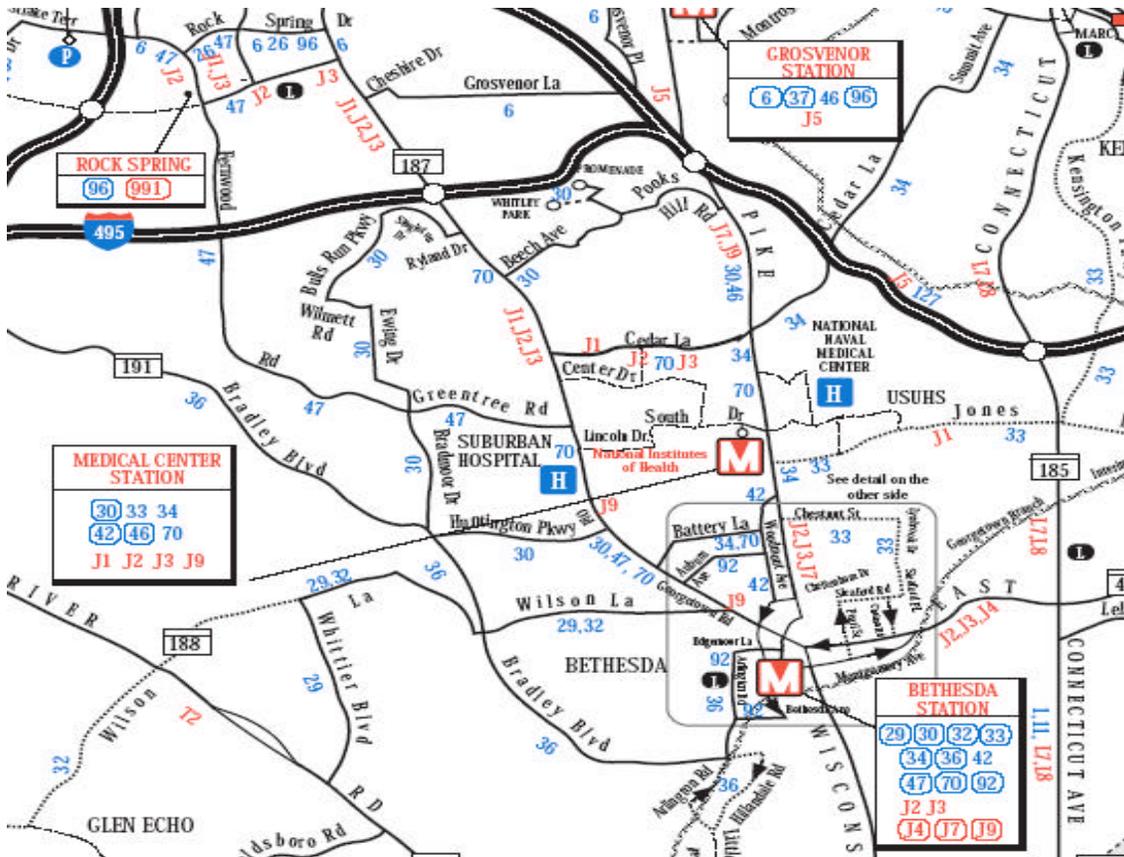
The Maryland Department of Transportation is currently conducting the project planning study of the Bi-County Transitway (former Purple Line). This planning study is examining alignments and modes for a Transitway between the Bethesda and New Carrollton Metrorail stations. Currently, the planning study is considering both Bus Rapid Transit (BRT) and Light Rail Transit (LRT) modal options in the corridor. Alignments under consideration include the Georgetown Branch and Jones Bridge Road from Bethesda to Silver Spring.

Jones Bridge Road abuts the National Naval Medical Center and consideration of this corridor is an option under consideration in the Bi-County Transitway planning study.

Montgomery County continues to endorse the use of the Georgetown Branch Line for the Transitway as opposed to the Jones Bridge Road option. This report recognizes advantages to both Transitway alignments under consideration, although no study has been conducted of potential benefits and impacts as they apply to the National Naval Medical Center has yet been conducted.

Map L -

Montgomery County Bethesda Transit Map



The following transportation projects related to the National Naval Medical Center are included in MDOT's FY2007-2012 CTP:

- | | | |
|-----|-------------------|---|
| D&E | \$680-1.7 billion | Bi-County Transitway Study – Planning Study of Transitway between New Carrollton and Bethesda Metrorail Stations - MTA |
| C | \$2.45 billion | Intercounty Connector – New managed lane highway between I-270 and I-95/US 1 – Construction to begin 2006 |

**Table 10
National Naval Medical Center Vicinity Park & Ride Facilities**

Corridor	Lot Name	Location	Spaces	Bus Routes Serving Lots	Metro Stations
I-270	Lakeforest Mall	<u>Gaithersburg</u> Lost Knife Road & Odendhal Avenue	300	54 , 55 , 56 , 57 , 58 , 59 , 61 , J9 , J7	Shady Grove, Rockville, Bethesda
I-270	Montrose Rd/MD 355 (\$75/month)	<u>North Bethesda</u> Rockville Pike & Montrose Road	650	5 , 26 38 , 46	Silver Spring, Wheaton, Rockville, Twinbrook, White Flint, Grosvenor, Medical Center
I-270	Milestone Shopping Center	Germantown Milestone SC off of Shakespeare Blvd.	175	55 , 70 , 75 , 79 , 83 , 90	Rockville, Shady Grove, Bethesda
I-270	<u>Westfield Shoppingtown Montgomery (Montgomery Mall)</u>	Bethesda Off Westlake Dr near I-270 Spur	200	6 , 26 , 38 , 47 , 96 , J1 , J2 , J3	Rockville, Grosvenor, Wheaton, Glenmont, White Flint, Medical Center, Twinbrook, Bethesda, Shady Grove

E.3 Aberdeen Proving Ground Description

Aberdeen Proving Ground is located east of I-95 along the US 40 corridor at Aberdeen and Edgewood in Harford County. The Aberdeen base complex is accessed through the City of Aberdeen. The main entrance gates at Aberdeen are the northern MD 22 Gate and the southern MD 715 Gate.

The MD 22 Gate is located 1.8 miles from the Aberdeen AMTRAK/MARC Station, which provides rail transit service on AMTRAK's Northeast Corridor and to Baltimore and Washington along MARC's Penn Line.

E.3.1 Aberdeen Proving Ground Transportation Impact Analysis

The Baltimore Metropolitan council was engaged as a sub-contractor to assess the regional transportation implications of the BRAC relocations at Aberdeen. The area of focus included the entire metropolitan Baltimore region and immediate jurisdictions to the south and north (external to the region) of APG.

The macro-level analysis conducted by BMC utilized the Region Travel Demand Model and considered the region's transportation network, local socio-economic projections and planned network improvements as programmed in the 2006-2011 Maryland Consolidated

Transportation Program (CTP) and as scheduled for operation by 2020 in the 2004 Baltimore Region Transportation Plan. This analysis culminated in recommendations for further transportation investment studies associated with BRAC-related employment and household growth. These recommendations are listed in Section C.3 above and in [Appendix F](#).

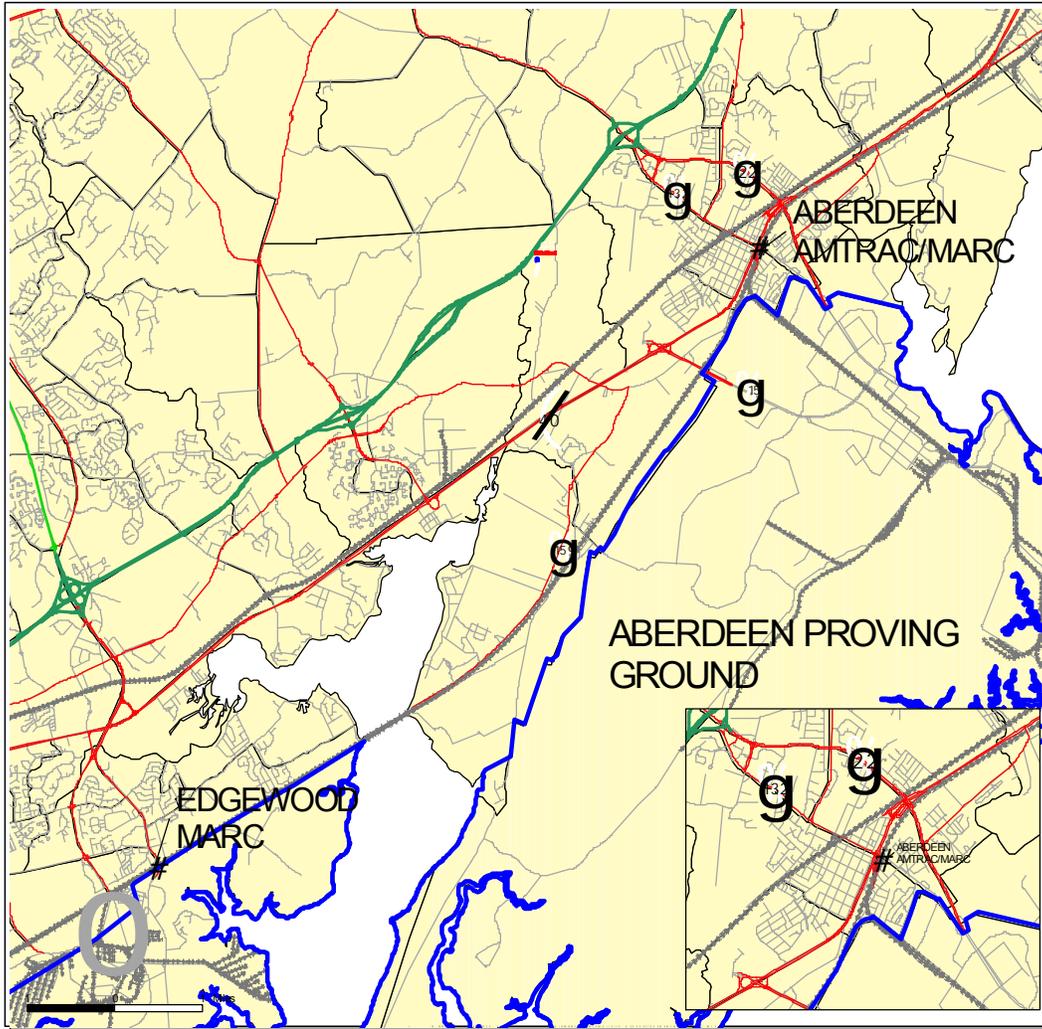
E.3.2 Cecil County Analysis

Analysis of the Cecil County highway network related to BRAC was completed using the Upper Eastern Shore Model (UESM).

MDP and BMC staff developed an estimate of households and employment related to BRAC at the TAZ level for a near term and 2015-2020 horizon.

The near term analysis added an additional 1,800 motorized vehicle trips to the network, or a 1.0 percent increase in trips in Cecil County. The 2015-2020 horizon year added 6,400 trips, or a 3.0 percent increase in trips within Cecil County.

The assumed allocation in households and employment resulting in an increase in motorized vehicles does not adversely change the level of service on facilities on a regional basis using the UESM. This includes I-95, US 40, MD 222, MD 272, US 1 and MD 213. This is not to say that the assumed allocation of growth related to BRAC could not be adversely impacting local facilities and/or intersections resulting in unacceptable levels of service. This type of analysis is beyond the scope of a regional macro level travel demand model. A more refined set of tools and assumptions would be needed to evaluate these smaller scale impacts.



**Map
ABERDEEN PROVING GROUND**

Compiled by
MDP Maryland Department of Planning
 Transportation Unit

- KEY**
-  Site
 - Roads**
 -  Interstate Highways
 -  State Primary Highways
 -  State Secondary Highways
 -  Railroads/Piers
 -  Roads
 -  TAZs

MARC and AMTRAK Service

Service Frequency

Aberdeen MARC Station

MARC

Northbound: Monday through Friday

Morning: 1 train (8:22 am)

Afternoon: 3 trains (1:58 pm, 5:50 pm and 6:50 pm)

Evening: 2 trains (7:36 pm and 10:08 pm)

Note: All these trains stop discharge passengers

Southbound: Monday through Friday

Morning: 4 trains (4:58 am, 5:53 am, 6:38 am and 9:02 am)

Note: These morning trains are more oriented to serve the Baltimore and Washington areas than to serve Aberdeen.

Afternoon: 1 train (3:08 pm)

AMTRAK

Note: The Amtrak trains serving Aberdeen Station are the east coast trains running between NY or Boston and DC.

Northbound: Monday through Friday

Morning: 2 trains (3:58 am and 6:20 am)

Afternoon: 1 train (4:09 pm)

Evening: 2 trains (8:14 pm and 9:35 pm)

Southbound: Monday through Friday

Morning: 2 trains (6:56 am and 8:35 am)

Afternoon: 2 train (3:03 pm and 5:15 pm)

Evening: 2 trains (6:38 pm and 7:47 pm)

Northbound: Saturday and Sunday

Morning: 4 trains (3:58 am, 7:25 am, 9:25 am, and 11:25 am)

Evening: 3 trains (6:25 pm, 7:25 pm, and 9:35 pm)

Southbound: Saturday and Sunday

Morning: 1 train (9:01 am)

Afternoon: 2 trains (4:21 pm and 5:20 pm)

Evening: 1 train (8:22 pm)

Edgewood MARC Station

Note: Edgewood Station has the same MARC service frequency as Aberdeen Station.

MARC: Monday through Friday

Northbound:

Morning: 1 train (8:14 am)
Afternoon: 3 trains (1:46 pm, 5:35 pm and 6:34 pm)
Evening: 2 trains (7:26 pm and 9:59 pm)
Note: All these trains stop discharge passengers

Southbound:

Morning: 4 trains (5:05 am, 6:03 am, 6:48 am and 9:11 am)
Note: These morning trains are more oriented to serve the Baltimore and Washington areas than to serve Aberdeen.
Afternoon: 1 train (3:16 pm)

MARC Ridership
Aberdeen MARC Station

MARC

115 Average Daily Ridership (2005); ridership increased 126% since 1996

AMTRAK

185 Average Daily Ridership (2005); ridership increased 10% compared to 2004

Edgewood MARC Station

224 Average Daily Ridership (2005); ridership increased 97% since 1996

Note:

1. Most ridership counts are for those who go south in the morning to the Baltimore and DC areas and return in the evening.
2. There is no projected ridership data for MARC and Amtrak services

Station Parking

Aberdeen Station: 189 free parking spaces
Edgewood Station: 291 free parking spaces
Planned parking lot expansion

The following transportation projects related to Aberdeen Proving Ground are included in MDOT's FY2007-2012 CTP:

C	\$10.9 million	US 40 Resurfacing – from MD 152 to the MD 24 Overpass – Currently Under Construction
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C	\$32.2 million	US 40 Hatem Bridge – deck replacement – MdTA
D&E	\$11-12 million	US 40 at MD 715 – interchange improvements - Not Funded for Construction
C	\$810 million	I-95 Section 100 – north of I-895 split to north of MD 43, Interchange improvements and managed lanes – MdTA
D&E	\$650-750 million	I-95 Section 200 – from north of MD 43 to north of MD 22 - MdTA
D&E		1-95 from north of MD 22 to the Delaware State Line for additional capacity improvements. MdTA
C	\$83.6 million	I-95/MD 24 interchange reconstruction – MdTA
C	\$3.4 million	MD 755 from MD 24 to Willoughby Beach Road - Construction scheduled to begin spring 2007
D&E	\$90-100 million	Perryman Access Study to improve access to Perryman area. Only funded for planning
C	\$1.7 million	Edgewood MARC station – parking expansion - MTA
D&E	\$50,000	MARC Study, Baltimore City Line to Delaware State Line - TSO

**Table 11
Aberdeen Proving Ground Vicinity Traffic Count**

AADT Facility	Year				
	2001	2002	2003	2004	2005
MD 22 from I-95 east to MD 40	26,250	27,025	28,375	28,750	28,225
MD 22 from MD 40 to APG	17,450	18,025	18,175	18,450	18,125
MD 40 north from MD 22	28,250	29,425	28,675	29,050	28,525
MD 40 south from MD 22 to MD 715	23,750	24,525	26,975	27,250	26,725
MD 40 south from MD 715	31,850	32,825	31,575	31,950	31,325
MD 715 from MD 40 to APG	7,250	7,525	7,775	7,950	7,825

Source: 2001 – 2005, Traffic Volume Map, State Highway Administration

Harford County Transit

It serves seven routes: [Route 1 & 1A](#) - Havre de Grace, Aberdeen, Bel Air; Route 2 & 2A -Joppatowne, Abingdon, Edgewood, Bel Air; Route 3 - Bel Air Town-Go-Round; [Route 4 - Aberdeen Doodlebug](#); Route 5 - Edgewood Circular; [Route 6 & 6A](#) - Edgewood, Riverside, Perryman, Aberdeen; Route 7- Edgewood, Johns Hopkins Hospital, Eastpoint Mall, White Marsh Mall. The frequency of service ranges from 40 minutes to 90 minutes and from 50 minutes to 90 minutes in AM and in PM, respectively.

In particular, Route 1 & 1A connects from northern east, Havre de Grace by way of Aberdeen to northern west, Bel Air. Its stops include Marc Train Station along MD 40 at Aberdeen and Old Post Road at Michael Lane nearby entrance into Aberdeen PG. Aberdeen Doodlbug of Route 4 circulates around Aberdeen vicinity including Marc Train Station along MD 40 and entrance into Aberdeen Proving Ground at the intersection of MD 22 and Post Road. Route 6 & 6A serves between southern west, Edgewater Village and northern east, Marc Train Station at Aberdeen.

MTA Commuter Bus Route No 420 connect between Havre de Grace and Baltimore downtown thru Marc Train Station along MD 40 at Aberdeen.

Map N - Park and Ride in Harford County



Park and Ride Locations in Harford County

The above map shows Harford County, its principal roads and highways, and the location of all Park & Ride lots in the county and nearby from Harford Commuter Assistance Program at Harford County government.

1) The Havre de Grace Park & Ride is located on Level Road (Route 155), just inside of the on ramp to northbound I-95 (Exit 89).

- 2) The Havre de Grace Juniata and Otsego Park and Ride is located on the southwest corner of the intersection of N. Juniata St. and Otsego St. in Havre de Grace.
- 3) The Aberdeen (MARC Train Station) Park & Ride is located on the east side of Philadelphia Boulevard (Route 40), just south of Route 22 (Aberdeen Thruway).
- 4) The Heat Center Park & Ride is located on Churchville Road (Route 22), just west of the I-95 interchange (Exit 85), on Harford County's Higher Engineering Applied Technologies (HEAT) Center campus.

E.4 Fort Meade Description

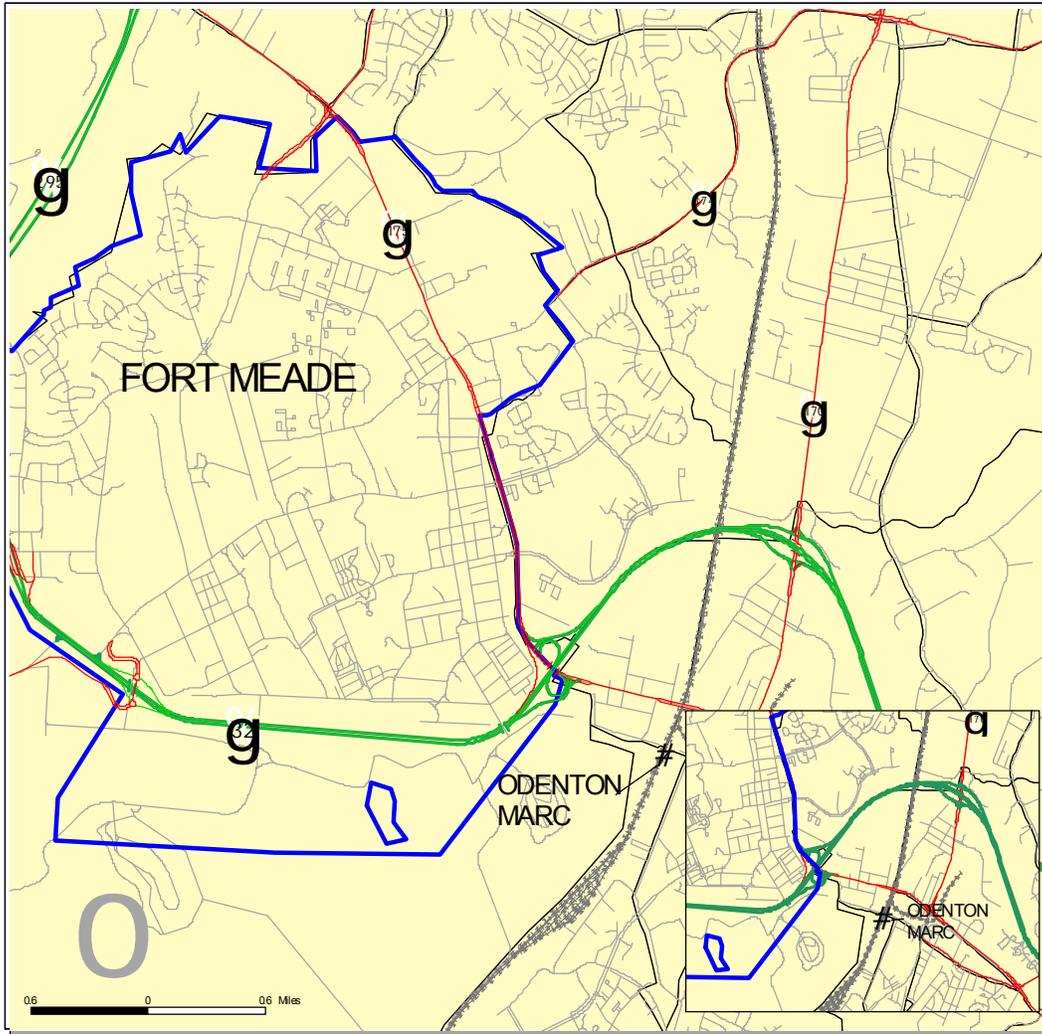
Fort Meade is located east of MD 295/Baltimore-Washington Parkway and north of the Patuxent River in Anne Arundel County. Fort Meade is served by MD 175 and by MD 32. Entrance gates can be found along MD 175, Rockenbach Road, and along MD 32. The Main Gate at Reese Road is a primary entrance to the base complex.

The Gate entrances along MD 175 are located less than two miles from the Odenton MARC Station that provides commuter rail transit service to Baltimore and Washington along MARC's Penn Line.

E.4.1 Fort Meade Transportation Impact Analysis

The Baltimore Metropolitan council was engaged as a sub-contractor to assess the regional transportation implications of the BRAC relocations at Fort Meade. The area of focus included the entire metropolitan Baltimore region and immediate jurisdictions to the south and north (external to the region) of Fort Meade.

The macro-level analysis conducted by BMC utilized the Region Travel Demand Model and considered the region's transportation network, local socio-economic projections and planned network improvements as programmed in the 2006-2011 Maryland Consolidated Transportation Program (CTP) and as scheduled for operation by 2020 in the 2004 Baltimore Region Transportation Plan. This analysis culminated in transportation investment recommendations, needed to meet the transportation requirements associated with BRAC-related employment and household growth. These recommendations are listed in Section C.4 above and in [Appendix F](#).



**Map
FT MEADE**

Compiled by



Maryland Department of Planning
Transportation Unit

KEY

-  Site
- Roads**
-  Interstate Highways
-  State Primary Highways
-  State Secondary Highways
-  Railroads/Piers
-  Roads
-  TAZs

The following transportation projects related to Fort Meade are included in MDOT's FY2007-2012 CTP:

C	\$26.4 million	MD 32 Interchanges at Canine and Samford Roads - Complete
C	\$13.3 million	MD 174 Bridge over I-97 - Complete
D&E	\$640-660 million	MD 3 Improvements from US 50 to MD 32 – Funded for planning only
C	\$8.1 million	Odenton MARC Station surface parking expansion - MTA
D&E	\$50-70 million	Odenton MARC Station – structured 2,500+ space Parking Garage. – MTA
D&E	42.5 million	MD 175 from MD 170 to MD 295 planning study – Funded for planning only
D&E	\$18-20 million	Central Maryland Transit Facility, Ft. Meade - MTA
C	\$23.9 million	MD 295 – Widen from I-695 to I-195 – Construction to begin Spring 2007
D&E	\$350-370 million	MD 295 – Widen from MD 100 to I-195 – Funded for planning only
C	\$29.6 million	MD 216 Relocated – I-95 to US 29 - Complete
C	\$31.8 million	MD 32 – New interchange at MD 32 and Burntwoods Road – Construction to begin Spring 2007
D&E	\$195-205 million	MD 32 – Improvements from MD 108 to I-70 – Planning complete, partial ROW funding
D&E	\$1.3 million	US 1 – Study of improvement between the Baltimore County Line and the Prince George’s County Line – Funded for planning only
D&E	\$500-520 million	MD 201 Extended/US 1 – Improvements along corridor between I-95/I-495 and MD 198 – Funded for planning only
D&E	\$240-260 million	MD 28/MD 198 – Improvements along corridor between MD 97 And I-95 – Funded for planning only
C	\$47.1 million	US 29 – Interchange at Randolph/Cherry Hill Roads – Complete
C	\$48.8 million	US 29 – Interchange at Briggs-Chaney Road – Under Construction
C	\$47.1 million	US 29 – Interchange at MD 198 - Complete
D&E	\$2.5-3 billion	Metro Green Line Extension form Greenbelt to BWI , Planning - MTA

**Table 12
Fort Meade Vicinity Traffic Count**

AADT Facility	Year				
	2001	2002	2003	2004	2005
MD 175 from MD 295 east to Ridge Rd	28,775	29,650	29,925	26,475	25,950
MD 175 from Ridge Rd to Reese Road	21,375	22,050	22,325	22,775	22,350
Reese Road from MD 175 east	8,950	9,225	10,075	10,250	10,025

Source: 2001 – 2005, Traffic Volume Map, State Highway Administration

MARC Service – Fort Meade Area

Service Frequency

Odenton MARC Station (Penn Line)

Northbound: Monday through Friday

Morning: 7 trains (6:19 am, 7:35 am, 8:03 am, 8:41 am, 9:41 am, 10:41 am, & 11:41 am)

Afternoon: 9 trains (12:49 pm, 1:49 pm, 2:42 pm, 4:03 pm, 4:53 pm, 5:21 pm, 5:42, 6:05 pm, & 6:33 pm)

Evening: 4 trains (7:10 pm, 8:04 pm, 9:08 pm, & 11:12 pm)

Southbound: Monday through Friday

Morning: 12 trains (5:11 am, 6:01 am, 6:22 am, 6:48 am, 6:56 am, 7:27 am, 7:40 am, 8:07 am, 8:33 am, 9:23 am, 10:07 am, 11:12 am)

Afternoon: 8 trains (12:03 pm, 1:03 pm, 2:03 pm, 3:08 pm, 4:16 pm, 5:15 pm, 5:48 pm, & 6:45 pm)

Evening: 2 trains (7:45 pm, & 9:53 pm)

Savage Station (Camden Line)

Northbound:

Morning: 3 trains (7:18 am, 7:43 am, & 8:39 am)

Afternoon: 5 trains (1:25 pm, 4:45 pm, 5:16 pm, 5:55 pm, & 6:23 pm)

Evening: 2 trains (7:17 pm & 8:12 pm)

Southbound: Monday through Friday

Morning: 6 trains (5:35 am, 6:01 am, 6:42 am, 7:09 am, 7:48 am, & 8:35 am)

Afternoon: 3 trains (3:55 pm, 5:40 pm, & 6:35 pm)

MARC Ridership

Odenton Station

2,024 Average Daily Ridership (2005); ridership increased 92% since 1996

Savage Station

541 Average Daily Ridership (2005); ridership increased 21 % since 1996

Existing Station Parking

Odenton Station: 1,300 free parking spaces

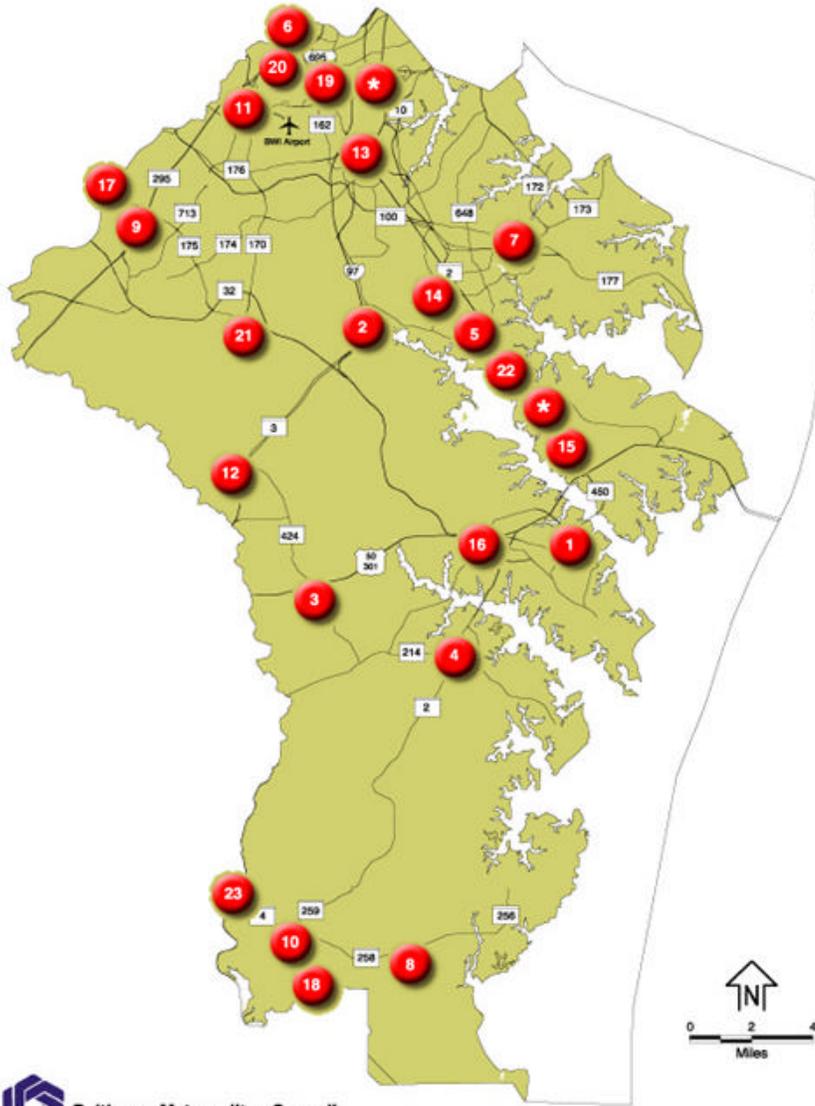
Savage Station: 978 free parking spaces

Local Transit

Corridor Transportation Corporation (CTC) provides fixed route transit service in West Anne Arundel County. Connect-A-Ride Route K provides service from Arundel Mills Mall to Odenton. Route K serves Meade Village and Fort Meade via the Reese Road Gate. Key points serviced include: Severn, Lake Village, Meade Village, Pioneer City, Seven Oaks, Telegraph Road, Odenton MARC Rail Station, Johns Hopkins Medical Center (Winmark Center) on Annapolis Road. Hours of Service CTC Route K: 6:30AM to 11:05PM Monday-Friday; 8:25AM to 11:05 PM Saturdays; 7:55AM to 9:05PM Sundays/Holidays. Service frequency: approximately 60 minutes Monday-Saturday; approximately 120 minutes Sundays and Holidays.

Howard County Transit Purple Route provides transit in a service area west of Fort Meade from Laurel Mall to the Savage MARC Station, Dorsey MARC Station and Elkridge. Purple Route service is Monday-Friday is from 6:00 am to 9:10 pm at approximately one-hour intervals.

Map P - Park and Ride
Anne Arundel County Park and Ride Facilities



VII. PUBLIC SCHOOL CAPACITY AND UTILIZATION ISSUES

A. Summary

- The anticipated in-migration of households associated with projected employment growth at the four BRAC installations will result in what is currently an undetermined increase in the number of school-aged children in each of the affected jurisdictions. Estimates related to BRAC household demand for the eight-jurisdiction study area can be found in Table 2. Affected LEAs should review Table 2 to assist in the determination of estimates of elementary, middle, and high school enrollment forecasts resulting from BRAC household in-migration. These forecasts should be used in the development of BRAC related public school construction requests for the upcoming FY 2009 CIP cycle.

- Maryland uses an established Public School Construction Program (PSCP) to address LEA funding priorities. Requests for additional school capacity to address projected enrollment increases generated by BRAC household projections must be substantiated by individual Local Education Agencies (LEA). This is done through their Public School Capital Improvement Programs (CIP), which are submitted, to the State Public School Construction Program (PSCP). The Interagency Committee on School Construction (IAC) determines whether requested building improvements are warranted, and considers them based on formulas for State construction assistance and guidelines for assessing facility needs that are established in State law and in regulation. Priority of need is a top consideration. In addition, a constant factor during review is the equitable distribution of CIP funding throughout the State and fulfillment of State commitments for providing equal educational opportunities across the State. It is very important for LEAs to effectively analyze BRAC related (as well as other) enrollment increments and to phase enrollment and capacity needs over several years in order to meet projected school needs in 2015.

- The approved FY 2007 CIP (April, 2006) was developed prior to receipt of hard data regarding potential BRAC household impact. The proposed FY 2008 CIP requests have recently been submitted by the LEAs to the PSCP for approval of school construction needs. The Interagency Committee on School Construction (IAC) is currently forwarding the first round of school construction requests to the Board of Public Works for approval of planning and funding. The FY 2008 recommendations were based on current school capacity (State Rated Capacity or SRC), current enrollment, utilization rate and future year school enrollment projections, as well as population projections and housing forecasts. *Unfortunately, the FY 2008 CIP requests from the BRAC impact jurisdictions do not appear to incorporate hard data to assess the projected BRAC school impact needs in the eight jurisdictions covered in this report. This should be corrected for the FY 2009 CIP cycle.*

- In order to meet projected BRAC public school construction needs, individual LEAs should review the Summary of BRAC Household Demand Through 2015 in relation to Expected Housing Supply as indicated in Table 2 of this report. The potential impacts of the changes that are anticipated to result from BRAC should be thoroughly reviewed by

the LEAs as well as their respective county governing bodies. Since initial BRAC impacts will be experienced by 2009, it will be important that the household projections and derivations or other substantiated BRAC household projections be reflected in the LEAs upcoming Educational Facilities Master Plan submittals during the summer of 2007 and in subsequent CIP requests in the autumn of 2007, as well as future year submittals. It will be necessary to phase in BRAC related school construction requests over several upcoming CIP submittal cycles.

- In order to meet BRAC related school construction needs, it may become necessary to develop a supplemental procedure for out of cycle funding. It may also become necessary to seek supplemental funding from federal sources for those school districts that are most heavily impacted by BRAC-related population increases. Should the need arise, an additional round of funding could be considered if it is determined that the initial BRAC related school construction needs cannot be addressed through the FY 2009 CIP process which begins in the autumn of 2007. An out of cycle funding process could be considered which would involve a separate round of funding that would likely occur before the formal FY 2009 CIP is completed in May 2008. Such a proposal should be thoroughly studied in order to address BRAC related school projection needs and approved by the Governor and General Assembly for funding prior to submission of LEA school construction requests. It may well become necessary for the Department of Defense and other appropriate agencies of the federal government to contribute funding, through grants or other mechanisms, to underwrite at least some portions of some BRAC-related public school construction projects in affected jurisdictions.

- It is also recommended that the BRAC school construction process prioritize school construction needs based upon school location and Priority Funding Area/Sewer Area status. Proximity to the military installations should be a factor in determination of school funding priorities. Through this process, both the proximity to the affected military installation and whether or not the school facility resides in a certified Priority Funding Area/sewerage area should be considered in the CIP prioritization process with school facilities located nearer to BRAC sites and in Priority Funding Areas receiving higher priorities. This “gravity-model approach” will help target school funding to areas of the greatest need nearer to the BRAC installations as opposed to areas that are at greater distances from the base sites. This approach will also result in the financing of school related infrastructure in areas receiving priority for State funding in accordance with State Smart Growth policies and regulations.

- It should be noted that the finite amount of State funding allocated each year for school construction projects does not currently meet the total needs submitted by LEAs in the current CIP requests. Currently (FY 2008), \$894 million is being requested by LEAs, which is approximately a 22 percent increase from FY 2007. The State will not likely meet the additional funding needs resulting from BRAC without additional funding allocations. In light of the projected BRAC related household growth and associated public school enrollment increases in affected jurisdictions, the Governor and General Assembly could consider whether additional school funding should be targeted to meet BRAC related public school funding needs and how those funds should be allocated.

•The Department of Defense (DOD) provides estimates of the “gain in military dependent students” in the Report on Assistance to Local Educational Agencies for Defense Dependents Education, November 7, 2006. These estimates include both military and civilian dependent students by BRAC installation, by State. For the Maryland BRAC installations, DOD provides the following: *Aberdeen Proving Ground is estimated to generate 1,973 military dependent students; Fort Meade is estimated to generated 1,821 military dependent students; Andrews Air Force Base is estimated to generate 410 military dependent students. It should be noted that these DOD estimates are for “military dependent students” only and the report does not incorporate estimates for the school age dependents of indirect employees or induced/tertiary workers. The geographic distribution of school age military dependents by LEA is also not addressed in the DOD report.*

•The Office of Economic Assistance (OEA) is a major DOD resource for assisting communities that are significantly impacted by Defense program changes. OEA planning assistance is available for a wide range of community development activities, including school expansion, when the military mission is increasing at an installation. OEA grant assistance is not available for constructing schools. Additional information can be obtained through the OEA DVD “Managing Growth, Communities Respond.” For additional information, contact www.oea.gov.

•The Fiscal Year 2007 CIP was approved in April 2006. The following projects have been approved for planning and/or construction in the eight Maryland counties identified as receiving areas for BRAC:

FY 2007 CIP APPROVED PROJECTS IN BRAC COUNTIES

ANNE ARUNDEL COUNTY

Seven Oaks Elementary School – new construction
Tracy’s Elementary School – renovation/addition
Harman Elementary School – renovation/addition
Pasadena Elementary School – replacement
North County High School – addition
Meade High School – Science lab

BALTIMORE CITY

*Violetville Elementary School – renovation/addition
Dunbar High School – renovation
Carver Vocational-Technical High School – renovation
Highlandtown Elementary/Middle School – renovation/addition

BALTIMORE COUNTY

*Vincent Farms Elementary School – new construction
Windsor Mill Middle School – new construction
Southwest Academy - Renovation

Holabird Middle School – renovation
Loch Raven Technical Academy School – renovation
Woodlawn Middle School – renovation
Catonsville Middle School – renovation
Deep Creek Middle School – renovation

CECIL COUNTY

*Calvert Elementary School – addition
Elkton High School – renovation/addition
Perryville Middle School – renovation

HARFORD COUNTY

*Joppatowne Elementary School – addition/renovation
North Harford High School – renovation/addition
Patterson Mill Middle/High School – new construction

HOWARD COUNTY

New Northeastern Elementary School – new construction
Dayton Oaks Elementary School (formerly New Western Elementary School)
– new construction
Waverly Elementary School – addition
Alholton Elementary School – Kindergarten/Pre-K addition
Clemens Crossing Elementary School – Kindergarten/Pre-K addition
Cradlerock Elementary/Middle School – Kindergarten/Pre-K addition
Gorman Crossing Elementary School – Kindergarten/Pre-K addition

FY 2007 CIP APPROVED PROJECTS IN BRAC COUNTIES (Cont'd.)

HOWARD COUNTY (Cont'd.)

Hammond Elementary School – Kindergarten/Pre-K addition
Ilchester Elementary School – Kindergarten/Pre-K addition
Northfield Elementary School – Kindergarten/Pre-K addition
Phelps Luck Elementary School – Kindergarten/Pre-K addition
Rockburn Elementary School – Kindergarten/Pre-K addition
Waterloo Elementary School – Kindergarten/Pre-K addition
Laurel Woods Elementary School – renovation
Running Brook Elementary School – renovation
*Laurel Woods Elementary School – Kindergarten/Pre-K addition
*Longfellow Elementary School – Kindergarten/Pre-K addition
*Pointers Run Elementary School – Kindergarten/Pre-K addition
*Stevens Forest Elementary School – Kindergarten/Pre-K addition
*Swansfield Elementary School – Kindergarten/Pre-K addition
*Talbot Springs Elementary School – Kindergarten/Pre-K addition
*Thunder Hill Elementary School – Kindergarten/Pre-K addition

MONTGOMERY COUNTY

Richard Montgomery High School – replacement
Northwood High School – replacement
R. Sargent Shriver Elementary School (formerly, Downcounty Consortium Elementary School #27) – renovation/addition
A. Mario Loiederman Middle School - renovation
Rosemont Elementary School – addition
Clarksburg Area High School – addition

PRINCE GEORGE'S COUNTY

Regional High School – new construction
DuVal High School – addition
Parkdale High School – addition
Adelphi Elementary School – renovation
Suitland High School – Science lab
High Point High School – Science lab
Marlton Elementary School – renovation
Oakcrest Elementary School – renovation
Bowie Area Elementary School – new construction
Bladensburg High School - replacement

* Indicates projects that have received Planning approval only
- List does not show systemic renovations; for a complete project list, including funding amounts, see text of full document

•The aforementioned FY 2007 CIP projects were requested and approved in response to already-established criteria, without available hard data on BRAC; however, the resulting

additional capacity in the respective counties may be considered a starting point towards accommodating new student populations in coming years

B. Introduction

There is the potential for a substantial, but still as yet undetermined, increase in school-age children from BRAC household growth in the eight-jurisdiction study area. For example, a recent survey of workers at Fort Monmouth, New Jersey (whose jobs will be transferred to APG), indicated that approximately one-quarter will move to Maryland but that those who are planning to move will tend to be the younger workers who are more likely to have school-age children.

Since enrollment increases will necessitate expanded school capacity in some areas of the State, the Maryland Department of Planning has conducted an analysis of available data on current school enrollment, capacity and utilization in the eight-jurisdiction study area, as well as projected enrollments. This information is presented in the three parts: 1) In Section C is a primer on State Rated Capacity and related elements as they pertain to school construction and BRAC; 2) In Section D is the FY 2007 Capital Improvement Program data on school construction projects that are being planned in BRAC counties to meet foreseeable future needs, and a brief discussion about priority-setting for BRAC-related projects; and 3) In [Appendix I](#) is a K-12 schools survey of each jurisdiction in the BRAC receiving area (including school-by-school performance, enrollment, capacity and utilization data). [Appendix J](#) contains a listing of the nonpublic schools and their enrollments.

C. Background/Definitions

C.1 School Capacity

In Maryland the commonly used standard for school capacity is “State Rated Capacity” (SRC). The Administrative Procedures Guide for Maryland’s Public School Construction Program defines SRC as “the maximum number of students that reasonably can be accommodated in a facility without significantly hampering delivery of the educational program.” The Guide goes on further to state that “It (SRC) is not intended to be a standard of what class sizes should be. School system staffing varies widely depending on a number of factors. It is, however, a criteria used in evaluating whether a particular school is overcrowded such that relief is needed and provision of additional space may be warranted.”

While State Rated Capacity may not be intended as a standard for classroom sizes, in actual practice the SRC number for any school is established by a formula derived by multiplying the number of classrooms in each grade by a State approved capacity for each classroom. In 2004 the Maryland General Assembly passed legislation that established the following classroom capacities for elementary schools:

Total number of pre-kindergarten classrooms x 20 students

Total number of kindergarten classrooms x 22 students

Total number of grades 1 – 5 classrooms x 23 students

Total number of grade 6 classrooms x 25 students

Total number of special education classrooms (self contained) x 10 students

Adding these totals for an individual school will yield the SRC for that particular school.

Secondary school (middle, junior, and senior high grades 6 – 12 inclusive) capacities are derived by taking 85 percent of the product of the number of teaching stations times 25 and then adding the product of the number of teaching stations for special education times 10. Put another way the formula is:

Total number of secondary classrooms x 25 students x 0.85

Total number of special education classrooms x 10 students.

The application of these formulas results in a State Rated Capacity for each public school that is established by the local school board and approved by the Maryland Department of Planning. The State Rated Capacity for a school may be revised if its program changes, if the programmatic use of the specific teaching station changes or if a portion of the building is provided for the long-term use of an entity other than the school system. State Rated Capacity figures, along with seven year school enrollments (current and projected) and utilization rates, are among the elements used to determine the viability of State funding for various Public School Construction projects. For instance, projected school enrollments are employed in the formula for determining the maximum amount of square footage of new construction, building renovation or additions that the State will fund during the yearly review of Capital Improvement Program (CIP) requests for public school construction.

Some school systems will also use a locally defined capacity number (LRC). These locally defined numbers use the same measuring technique, but may have slightly lower numbers for classroom sizes. *Significant numbers of incoming students due to BRAC may necessitate increased need for school capacity in some jurisdictions, but this must be demonstrated through established criteria (i.e. the aforementioned formulas) and processes (e.g. formal request to, review and analysis by, and approval from the Maryland Department of Planning).*

C.2 Current School Enrollments and Utilization Rates

In Maryland, school enrollments are measured annually at the beginning of the school year, (in September). The Local Education Agency (LEA) of every county is required to determine the Full Time Equivalent (FTE) enrollment for each of its system's schools as of September 30th. The utilization rate of a school facility is established by comparing

the State Rated Capacity to the current FTE enrollment (otherwise stated as the formula FTE/SRC), and calculating the percentage of the building as it is currently being utilized. Thus, for example, a school with SRC of 545 and a September 30, 2005 FTE enrollment of 562 would have a utilization rate of 562/545, or 103 percent.

The utilization rate is one component used to measure school facility needs; for example, any school building that is operating at 60% or less of the SRC is considered under-utilized, while those operating at or over the SRC are considered over capacity.¹ The utilization rate of a school is a strong determining factor when the State's Interagency Committee (IAC) is assessing whether the State should participate in funding any school building renovation, addition, replacement or new construction project. (Other relevant factors include the age and condition of an existing school; the proximity, age, condition and utilization rate of any adjacent schools; and future enrollment and community population projections.) *Any substantiated information about expected incoming school-aged population due to BRAC could be considered as a basis for requesting capacity increases for existing schools in impacted areas. Justifications for new schools or building additions take into account the number of students in excess of SRC at an existing school, as well as current and projected enrollments and capacities at appropriate and adjacent schools.*

C.3 Future Enrollments and Population Projections

Every year, each LEA is mandated to calculate enrollment projections for the next five years and the tenth year out for its schools on a countywide basis, and for the next seven years for each individual school by year and by grade. Enrollment projections must be developed using birth data and the cohort survival method, and may be verified by use of county population and age groupings. The data must be submitted to, and accepted by, the Maryland Department of Planning, which also independently develops its own jurisdiction-wide enrollment projections. The LEAs' projections must be within 5.0 percent of MDP's figures; if they are not, the LEAs are required to revisit their calculations or provide justification for the differences. *While it may not be possible to demonstrate the anticipated impact of BRAC on future enrollments using established methods, allowances may be made in cases where the LEAs can provide supporting data, such as official estimates of numbers of school-aged children relocating to particular areas of the respective counties.*

LEAs must utilize general countywide population projections as well, as the data obviously informs the future educational needs of the respective counties, and these figures also have to be reviewed and approved by the Maryland Department of Planning. Analyses of future demographic trend data should be developed based on natural population increase, migration, household size, housing building permits, employment trends, current and projected population distribution, and pupil yield formulas. Community development plans, including comprehensive plans, water and sewer plans, transportation plans and land use plans, should also support and substantiate countywide population projections. *An LEA that expects a population increase attributable to BRAC*

¹ In many circumstances, some degree of overcrowding is normal and can be accommodated.

should be sure to incorporate as much available information as possible on anticipated growth patterns and population shifts into its upcoming population projection submittal.

Each LEA also has to include these enrollment projections and population projections as part of its annual Educational Facilities Master Plan (EFMP) submittal. This document, which is reviewed by MDP as well, is a planning tool that presents the LEA's projected educational facility needs. The analysis and conclusions in it are intended to be the basis upon which each public school capital improvement project is justified. Other components of the EFMP include goals, standards and guidelines, community analysis, school facility inventory and evaluation, and facility needs analysis, each of which is briefly described below.

LEA Goals, Standards and Guidelines: This section of the EFMP outlines the policies of the local board of education regarding school development and utilization, including teacher-to-student ratios, transportation policies, provisions for special education and career technology education, districting and redistricting policies, grade organization policies, school closing procedures and other relevant education program policies. *Any data that is available regarding possible impact of the anticipated influx of BRAC students on, for example, student/teacher/staff ratios, transportation policies (i.e. on-base vs. off-base), or special DOD-related training programs in public schools could be incorporated into this section of the EFMP.*

Community Analysis: The EFMP should directly relate to existing community plans, such as building and subdivision plans, existing (and proposed) Adequate Public Facilities Ordinance (APFO) policies and constraints, and forecasted shifts in housing and employment patterns. *New and expanding housing developments, creation of secondary and tertiary job markets, and other growth that is expected to result from BRAC-related demand should be addressed, and substantiated as much as possible, in this section.*

Inventory and Evaluation: This list accounts for all school facilities under an LEA's purview, and is part of the basis for consideration of CIP requests. It is essentially a snapshot that includes current pertinent data for each school, such as age, square footage, physical condition, construction history, previous September 30th FTE enrollment, SRC, utilization rate, grade organization, and, in some cases, feeder system information. *This section would help to demonstrate the capability of each school facility to accommodate added (BRAC) population, based on the present status of each structure. The feeder system data could be particularly useful when considering anticipated population influx on and near military bases.*

Facility Needs Analysis: This section is essentially an indicator of anticipated future school construction project needs based on ongoing analysis of projected enrollments, facility inventory data, and information about service areas. It is the framework for subsequent CIP request submittals. For instance, the physical

condition of each existing school facility is analyzed to determine whether future renovation, replacement, addition or systemic renovation projects are required. Existing capacity is compared to projected enrollments to ascertain whether there is a substantiated need for additional capacity projects. Utilization rates for current and recent years are examined for trends to see, for example, if any schools should be considered for closure, consolidation or redistricting. Former school buildings, closed in previous years because of declining enrollments but now used for other educational purposes or by local government, are considered for potential reuse as public school buildings. School construction project needs are identified for the coming year through six years out, and are described in this section based on anticipated scope of project, description of community to be served using land use designations and other related parts of the adopted county comprehensive plan, expected population distribution, water and sewer capacity, and building and subdivision plans.

C.4 Capital Improvement Program (CIP)

The Capital Improvement Program for Maryland's public schools is a State-mandated mechanism for determining need and providing funding for construction of school facilities. Capital improvements include any type of building or site construction and/or improvements to building systems that is eligible for State funding, as determined within the regulations of the Public School Construction Program (PSCP). Each LEA develops its list of annual CIP requests based their analyses of facility needs over several prior years, and submits its request to the PSCP each October for the fiscal year that is two years from the calendar date (for example, CIP requests for Fiscal Year 2008 were received in October and November of 2006).

School projects involving new construction (including building replacement), building additions and/or renovations are nearly always based on need determinations made several years prior. Renovations of school buildings' systemics (i.e. mechanical, structural, HVAC, plumbing, communications, and roofing systems) are anticipated based on useful life expectancy, but by their nature need can also suddenly crop up on relatively short notice. Two other funding programs, the Aging Schools Program (ASP) and the Qualified Academy Zone Bond Program (QZAB), are administered by the PSCP to address typically smaller, repair-oriented projects. These programs cannot be used to construct additional school capacity.

The CIP requests from individual LEAs are reviewed and considered for funding by the State's Interagency Committee on School Construction (IAC) within a prescribed framework, including capital budget constraints, priority of need as indicated by the LEA, viability of projects and eligibility within a defined CIP category. The Maryland General Assembly determines the annual total budget allocation for school construction. In order to provide for an equitable distribution of State dollars and to fulfill State commitments for providing equal educational opportunities across the State, formulas for State construction assistance and the guidelines for assessing facility needs are established in State law and in regulation. Projects are subject to final approval by the

Board of Public Works, based on recommendations from the IAC. The IAC review process for CIP projects begins each October with the submittal of LEAs' requests and runs through May, when the Board of Public Works gives final approval. An official document is produced in June of each year, once the CIP is finalized, but amendments may be required based on various factors, such as unanticipated lower bid amounts for a project, cancellation of an approved project, increase of project allocation through reversion of funds allocated to other projects, etc.

The established State funding formulas may not necessarily match or reflect the yet-to-be-identified needs in the receiving counties for BRAC. The Maryland State Legislature sets the annual total budget allocation for Public School Construction funding. There is a finite amount of funding to work with, so simply adding BRAC-related school construction projects to the CIP requests over the next several years will not automatically translate to increases in funding amounts. It may well become necessary for the Department of Defense and other appropriate agencies of the Federal Government to contribute funding, through grants or other mechanisms, to underwrite at least some portions of some BRAC-related public school construction projects.

D. Fiscal Year 2007 CIP and the Impact of BRAC on Priority-Setting for Public School Construction

The current process in Maryland for identifying needs for expansion of school capacity at the elementary, middle, and high school levels relies heavily on approved forecasts of countywide school age population as distributed among specific schools by the local education agencies. Those forecasts are sensitive, over a reasonable time frame, to changes in countywide projections of population and housing. In addition, each LEA has the opportunity to address local needs generated by sudden changes to community character and development in the Educational Facility Management Plans submitted annually prior to submittal of the annual capital budget requests for State assistance. School capacity needs are not solely related to an increase in the number of new households or land use changes. Enrollment increases can just as easily result from changes to the character of a neighborhood, the sale of older housing to new families with younger children or the introduction of new educational programs such as full-day kindergarten. *Such changes could result from the program changes at military bases in Maryland approved by the federal government under the BRAC process. The potential impacts of these changes are now under study by the LEAs and their respective county governments, and may be reflected in their future Educational Facility Master Plans and their capital improvement program requests to be submitted in October 2006 (for Fiscal Year 2008).*

As indicated above and in the discussion on Facility Needs Analysis, each LEA's CIP submittal is developed on a continuum: in other words, the CIP requests that the LEAs submitted in October 2006 are for planning and funding consideration for Fiscal Year 2008. Additionally, the LEAs are required to list their CIP requests in priority order; it is understood that those projects that are lower in priority often have less likelihood of

receiving State funding approval, and so they are often carried over into subsequent years' requests. Many projects have been in the pipeline for some time, in some cases up to five years, based on identified needs. *Thus, many of the public school construction projects necessitated by BRAC and substantiated through the required EFMP process did not show up in the FY 2008 CIP. It is expected that a number of BRAC related public school construction requests will appear in the FY 2009 CIP.*

[Appendix G](#), taken from the FY 2007 CIP document, shows the public school construction projects that have been approved for Planning and/or Funding in the BRAC counties. These project requests and approvals were determined without prior knowledge of or input concerning potential BRAC impacts. However, due to the necessarily prescient nature of the CIP, the effects of new projects on school capacity may coincidentally bode well for some of the “receiving” school districts in terms of helping them to begin to prepare for additional student populations.