Prince William County

Base Realignment and Closure Transportation Impact Analysis

Final Report

BRAC

Prepared For:

Prince William County Planning Office
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Prince William, Virginia 22192

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December 2009

EXECUTIVE SUMMARY

I. Background & Study Approach

In 2005, the Base Realignment and Closure (BRAC) Commission recommended the movement by 2011 of nearly 19,300 jobs to Fort Belvoir and approximately 3,000 jobs to Marine Corps Base Quantico (MCBQ). Fort Belvoir is located approximately 5 miles north of the Potomac Communities in Fairfax County and the City of Alexandria. Marine Corps Base Quantico is located in Prince William, Fauquier and Stafford Counties.

BRAC activities are expected to add an additional 4,300 households to Prince William County by 2030. The EIS for each of the military installations identify and provide recommendations to mitigate on-post impacts; however, neither report specifically addresses the off-post effects of BRAC to Prince William County. At the local level, the realignment of jobs and commuting patterns is expected to have significant effects on population, housing and transportation.

To address the transportation impacts from BRAC activities, the Department of Defense/Office of Economic Adjustment provided a grant to the County to conduct this BRAC Impact Study. A major goal of the analysis is to provide recommendations that will assist the County in identifying strategies to develop new land use and transportation policies to offset the impacts of BRAC activities (See Figure ES-1 BRAC Study Area).

After documenting existing land use and transportation conditions in the BRAC Study Area, forecasts were developed for population, employment and households for the years 2015 and 2030. Using output from the County's travel demand model, deficiencies in the roadway system were catalogued. Planning level cost estimates were developed to address these deficiencies.

The study process first defined baseline year 2005 conditions, and then evaluated three basic development scenarios:

- Scenario 1: Baseline – Future Conditions without BRAC Impacts (2015 and 2030)
- Scenario 2: Future Conditions with BRAC Impacts and No Transportation or Zoning Changes (2015 and 2030)
- Scenario 3: Future Conditions with BRAC Impacts and Recommended Transportation and Land Use Improvements (2015 and 2030).

Scenario 3 was expanded to include three alternatives to address forecasted deficiencies: 3a emphasized roadway improvements only; 3b included transit oriented development near Virginia Railway Express (VRE) stations; and, 3c forecasted mixed-use development in areas as recommended by *the Potomac Communities Revitalization Plan*. Based on the findings of the Scenario 3 alternatives analysis, a Preferred Alternative that combines elements of all three but emphasizes transit oriented development and enhanced transit service was defined and recommended. The recommendations are followed by a series of actions required for implementation.

Finally, the report discusses potential sources of funding to address BRAC impacts.

BRAC Impact Study

Study Area Map

November 2009

Figure ES-1

II. Existing Conditions

Land Use

Analysis focused on the recommendations in the ***2008 Prince William County Comprehensive Plan*** and the ***Potomac Communities Revitalization Plan***, and in the provisions of the ***Zoning Ordinance.*** For the Potomac Communities, the County's plans emphasize development – and redevelopment where appropriate – to more urban and mixed uses. The three areas most suitable for such revitalization are North Woodbridge, Neabsco Mills and Triangle.

The County's Zoning Ordinance has mapped two overlay districts in the Study Area: the Redevelopment Overlay and the Highway Corridor Overlay districts. The Redevelopment Overlay District provides guidance to promote the renewal of areas experiencing economic decline and has been mapped in the Triangle and *North Woodbridge* area. The Highway Corridor Overlay District is intended to mitigate the adverse visual and functional impacts that can occur along major arterials and has been mapped on State Route 234, Dale Boulevard, Gordon Boulevard, and Route 1.

Transportation

The transportation system has several improvements programmed. From the County's current Capital Improvement Program two segments of Route 1 are funded through bond referenda:

- **Route 1 Improvements (Dale Boulevard to Featherstone Road)**
- **Route 1 Improvements (Joplin Road to Bradys Hill Road)**

In addition to locally funded improvements, VDOT has programmed several improvements. These are listed in Table ES-1.

Table ES-1
Programmed Improvements in BRAC Study Area
FY 2010-FY 2015

Project	Funding Source	Cost (x $1,000)	Additional Funds Required (x $1,000)	Start of Construction
Route 234: Partial Intersection Reconstruction at Route 1	*HSIP*	*597*	*205*	*FY 2013*
Replace and Widen Bridge & Approach at Neabsco Creek	Bridge Replacement	37,480	0	Underway
Route 1: Fuller Heights Road Relocation	Primary	1,785	0	FY 2011
Route 234 Park & Ride Lot Expansion	*Primary*	*8,515*	*0*	*Underway*
Woodbridge VRE Parking Lot Expansion	*Public Trans*	*821*	*164*	*N/A*
Route 1 Widening (Town of Dumfries)	Urban	500	125	N/A

Beyond these programmed improvements, the principal feature in the long-range transportation plan in the BRAC Study Area is the widening of Route 1 to six lanes throughout its entire length. While included in the year 2030 plans, no schedule has been set for completion of the widening... In addition to roadways, the study area also includes transit and ride sharing facilities and services. Park and Ride lots have been established at ten locations in or near the study area. The Potomac & Rappahannock Transportation Commission (PRTC) provides bus transit service in two forms:

Fixed-route service, *OmniLink*, includes two routes in the Study Area:

1. Quantico – PRTC Transit Center (west of I-95 at Dale Boulevard) via Route 1
2. Woodbridge/Lake Ridge/PRTC Transit Center: The circular route includes both clockwise and counterclockwise service.

Commuter express service, *OmniRide*, includes four routes in the Study Area:

1. Triangle-Washington (I-95/Route 123 Commuter Lot):
2. Dumfries-Washington (Fox Lair Drive & Route 234/Route 1 Commuter Lot):
3. PRTC Transit Center-Franconia/Springfield Metro Station ; and,
4. Cardinal Drive and Washington, serving the Route 1 corridor between Dale Boulevard and Prince William Parkway.

According to PRTC, seating capacity on vehicles used for *OmniLink* service in the BRAC Study area is sufficient for demand. Increases in ridership could easily be accommodated by existing service. The *PRTC Bus Plan* is intended to "…properly plan for major facility needs having 25-30 year lives…" (page 1-1). The document develops and evaluates alternative service policies to meet identified needs. The recommended service policy (Service Policy 4) provides for the following service improvements in the BRAC Study Area:

1. New *OmniRide* service between Woodbridge and the Engineer Proving Grounds; and,
2. Expansion of *OmniRide* Route 1 service with more frequent headways and expanded hours

Virginia Railway Express (VRE) provides fixed-route heavy rail commuter service between Fredericksburg and Washington service with stations in the Study Area at Quantico, Rippon Landing, and Woodbridge.

VRE service expansion on the Fredericksburg line includes expanded parking lots, more train sets and larger train sets to accommodate growth. It also identifies a potential new station at Cherry Hill.

III. Scenario 1: Future Conditions Without BRAC

Socioeconomic forecasts of population, households and employment developed by the County were used to generate forecasts of year 2015 and 2030 traffic volumes. The basis for the forecasts was documented in the publications, ***Round 7.1 Cooperative Forecasting: Population and Households Forecasts to 2030 by Traffic Analysis Zone*** and ***Route 7.1 Cooperative***

Forecasting: Employment Forecasts to 2030 by Traffic Analysis Zone.[1] Any roadway segment on the arterial and collector network that did not exhibit a service level of D or better was considered deficient. This scenario served as the baseline for comparison with the other "with BRAC" scenarios.

Once deficient roadway segments had been identified, planning level cost estimates were developed, and these estimates included design, utility adjustments, and right of way and construction costs. Cost estimates show that to improve the road network to LOS D or better in 2015, the total cost is **$598 million.** To improve the road network to LOS D or better in 2030, the total cost is **$733 million**.

IV. Scenario 2: Future Conditions With BRAC Impacts Without Transportation Or Land Use Changes

Population and Employment Growth and Distribution

Using data and forecasts provided in the FEIS documents for Fort Belvoir and for MCBQ, forecasts of BRAC related population, households and employment in the County for the years 2015 and 2030 were developed. It was estimated the 22.2 percent of Fort Belvoir BRAC employees residing in the County resulted in a forecast of 4,284 residents by 2030 and 3,118 residents by 2015. For MCBQ, the number of BRAC residents in was forecasted at 982 for both 2015 and 2030. The forecasted number of added employees from BRAC related growth was estimated at 3,882 in 2015 and 4,041 in 2030.

The distribution of BRAC related households was developed using the findings in the Fort Belvoir FEIS as a guide. The place of residence for BRAC related employees will tend to increase with frequency as the distance from the facility is reduced. Most of the Fort Belvoir and MCBQ employee's place of residence was forecasted within an approximate 25 minute commute from the respective facility. In contrast, the distribution of added employment in the County resulting from BRAC population growth was based on forecasted county-wide employment growth from 2005 to 2015 and also to 2030.

Using the forecasts of year 2015 and 2030 socioeconomic data with BRAC, travel demand modeling analysis of the with BRAC impacts scenario indicate an increase in the number of deficient roadway segments and in the cost to address them. When compared to the deficiencies identified in the without BRAC Scenario 1, most of the added deficiencies are forecast to occur in the North Woodbridge area.

The cost estimates show that to improve the road network to LOS D or better in 2015, the total cost is $**683.8 million**. To improve the road network to LOS D or better in 2030, the total cost is **$845.6 million.** When compared with the cost of addressing roadway deficiencies forecasted to occur without BRAC, the cost of BRAC related deficiencies is forecast in 2015 to be $86 million higher (at $684 million) and in 2030 to be $113 million higher (at $846 million).

V. Scenario 3: With BRAC With Improvements

Scenario 3 is comprised of three components that were analyzed for 2015 and 2030:

[1] Department of Human Services, Planning and Public Safety, Metropolitan Washington Council of Governments. 2008.

- Scenario 3a: Roadway Improvements Alternative
- Scenario 3b: Transit Oriented Development (TOD) Alternative
- Scenario 3c: Mixed Use Development Alternative.

V.1. Scenario 3a: Forecast Conditions with BRAC with Roadway Improvements

Using the same socioeconomic forecasts used in developing the model forecasts in Scenario 2 (With BRAC without Roadway Improvements), but improving the network to address all the deficiencies identified in Scenario 2, the travel demand model results indicate that more improvements will be needed. With the improvements to the Route 1 corridor (widening up to eight lanes), the model is able to provide the heavy north-south traffic flow an alternative path to the I-95 corridor. The results indicate that with its added capacity and higher speeds under congested conditions, the assignment process is shifting more trips to Route 1, and consequently, even though it has been widened, the service level is still viewed as deficient – LOS E or worse.

Cost estimates for Scenario 3a (2015 and 2030) indicate that improving the road network to LOS D or better in 2015, the total cost would cost **$ 859 million**. To improve the road network to LOS D or better in 2030, the total cost would be **$1.097 billion.**

V.2. Scenario 3b: Future Conditions With BRAC and Transit Oriented Development

To reduce overall travel demand, a strategy of encouraging transit oriented development has been included as an alternative for the analysis of a with BRAC impacts scenario. The availability of the commuter transit service like that available at VRE station has been shown to reduce the number of auto trips generated by transit oriented development (TOD). Consequently, a reduction of 25 percent of the peak hour trips has been applied to the total trips in the areas in which TOD has been forecasted in this scenario.

TOD development consists of a relatively high density of residential use with mixed office and retail commercial uses included. Because of the relatively high density (16 dwelling units per acre) the multi-family located at the VRE Rippon Landing station could be considered an example of transit oriented development. For this Scenario 3b, the North Woodbridge TOD has a residential density approaching 50 units per acre and the Harbor Station TOD has a residential density of approximately 30 units per acre.

The forecasted impacts from the travel demand model indicate that the inclusion of TOD development in the North Woodbridge and Harbor Station areas results in a reduction in the estimated cost of addressing deficient roadways in the BRAC Study Area. With BRAC and TOD, the costs are **$605 million** in 2015 and **$748 million** in 2030 – $7.0 million higher in 2015 and $15.7 million higher in 2030 than the costs for Scenario 1.

V.3. Scenario 3c: Future Conditions with BRAC and Mixed Use Development

Mixed use development offers the potential to reduce the amount of auto trips generated by a site either by linking trips within different uses with the mixed use development of by providing more attractive non-auto modes, such as walking and bicycling, in addition to transit. The mixed use developments included office, residential and retail and were located in the *North Woodbridge*, Neabsco Mills, Harbor Station and Triangle areas. Residential densities were moderate to high, with most units forecasted to be multi-family. Commercial development was split among office, retail and other uses..

The reduction in auto trips from mixed-use development is based on the application of a capture rate – trips *captured* within the development. Trip capture rate estimates between office and residential and between office and retail are relatively low – two to three percent between retail and office, and two percent between office and residential. For a substantial proportion of total trips to be captured within a mixed use development, a significant number of the site trips must be related to retail activities. On average only 7 percent of the total trips were estimated to be captured within the area. .The travel demand model results for Scenario 3c show that the number of roadway segments that are the highest among all the Scenario 3 alternatives. The cost estimates show that to improve the road network to LOS D or better in 2015, the total cost would be **$752 million**. To improve the road network to LOS D or better in 2030, the total cost would be **$1.02 billion.**

VI. PREFERRED ALTERNATIVE

The findings of the Analysis of Alternatives highlights that the most effective way for offsetting the BRAC related transportation impacts involves a combination actions including modifying land use plans and policies, enhancing transit service and improving roadways. The analysis of alternatives shows that the transportation impacts can be offset in whole or in part by individual tactics, but that the greatest offset of impacts would be produced by a coordinated strategy using all three tactics. As a result, the overall strategy of the Preferred Alternative builds on the findings of studies of the trip making characteristics of transit oriented development incorporates the general findings of the alternative analysis. The forecasted efficiencies gained with implementation of this strategy will more than offset the transportation impacts of BRAC activities.

Land Use

The proposed land use policies for the Preferred Alternative focus on promoting transit oriented development in three locations in the Study Area:

1. **North Woodbridge**. TOD development area would accommodate 4,310 multi-family units and 2,395 total employees. The FAR for non-residential uses is recommended at 0.5, and 40% of the non-residential floor area is in retail use.
2. **Harbor Station** TOD development area would accommodate 7,386 multi-family units and 1,551 total employees. The FAR for non-residential uses is recommended at 0.3. Recognizing also that the distance from the Route 1 corridor diminishes the potential for major retail use, 25% of the non-residential floor area is in retail use.
3. **Neabsco Mills**. TOD development area would accommodate 1,746 multi-family units and 1,386 total employees. The FAR for non-residential uses is recommended at 0.4, and with access to the Route 1 and Optiz Boulevard corridors 65% of the non-residential floor area is in retail use.

Roadway Improvements

In conducting the alternatives analysis for the With BRAC and Without BRAC scenarios, deficiencies were addressed regardless of the planned status of the related improvements. In contrast, development of the Preferred Alternative roadway improvements were developed to be more consistent with the transportation element of the *Comprehensive Plan.* In addition to

modification to the travel demand model network, the assignment of trips to and from the three TOD areas was reduced by 25 percent.

The results of the travel demand model analysis of the 2015 and 2030 Preferred Alternative estimate the cost of the 2015 roadway improvements at **$571 million** and the 2030 roadway improvements at **$575 million** (See Figure ES-2 Preferred Alternative Year 2030 Roadway Improvements).

Transit Service Enhancements

While there exists or planned VRE transit service at Woodbridge and at Harbor Station, there is no current frequent and reliable transit service in the vicinity of Neabsco Mills. To address this deficiency, the Preferred Alternative includes establishment of a PRTC *OmniLink* transit route between the PRTC Transfer Station at Potomac Mills Road to the Woodbridge VRE station.

Based on fare box recovery factors estimated by PRTC, fares would cover approximately 20% of annual operating costs, leaving an annual deficit of approximately **$1,750,000.** Enhance transit service would not start until the proposed transit oriented mixed-uses has advanced to occupancy. Leading up to that time, the County should coordinate with PRTC to modify existing routes and facilities to provide for the eventual service enhancement.

VII. Summary of Findings and Conclusions

The key findings in the Final Environmental Impact Statements for the BRAC facilities were:

- Net increase in workforce of approximately 19,300 at Fort Belvoir and 3,000 at MCBQ;
- 225 of the Fort Belvoir and 33% of the MCBQ BRAC employees will reside in the County;
- The location of the place of residence within the County for the added workforce will tend to increase in frequency as the distance from facility decreases; and,
- The proportion of the additional workforce that commutes to work by transit is not likely to exceed 3 percent at Fort Belvoir, and transit service is not available at the MCBQ BRAC site.

Total forecasted BRAC related growth for Prince William County is as follows:

Year	Households	Population	Employment
2015	4,101	10,999	3,819
2030	5,266	13,867	4,041

Table ES-2 presents a comparison of forecasted roadway improvements for the BRAC scenarios. The table shows the comparative differences in costs. Two factors should be noted:

1. The Preferred Alternative includes enhanced transit costs that are not included in the other scenarios; and,
2. The Preferred Alternative does not include the cost of widening all deficient (LOS E & LOS F) roadways if the *Comprehensive Plan* recommends otherwise. For example, Route 1 widened to 6 lanes only (as recommended in the *Comprehensive Plan).* Consequently, several roadways in the Study Area are forecasted to exhibit service levels worse than LOS D.

BRAC Impact Study

Preferred Alternative 2030

November 2009

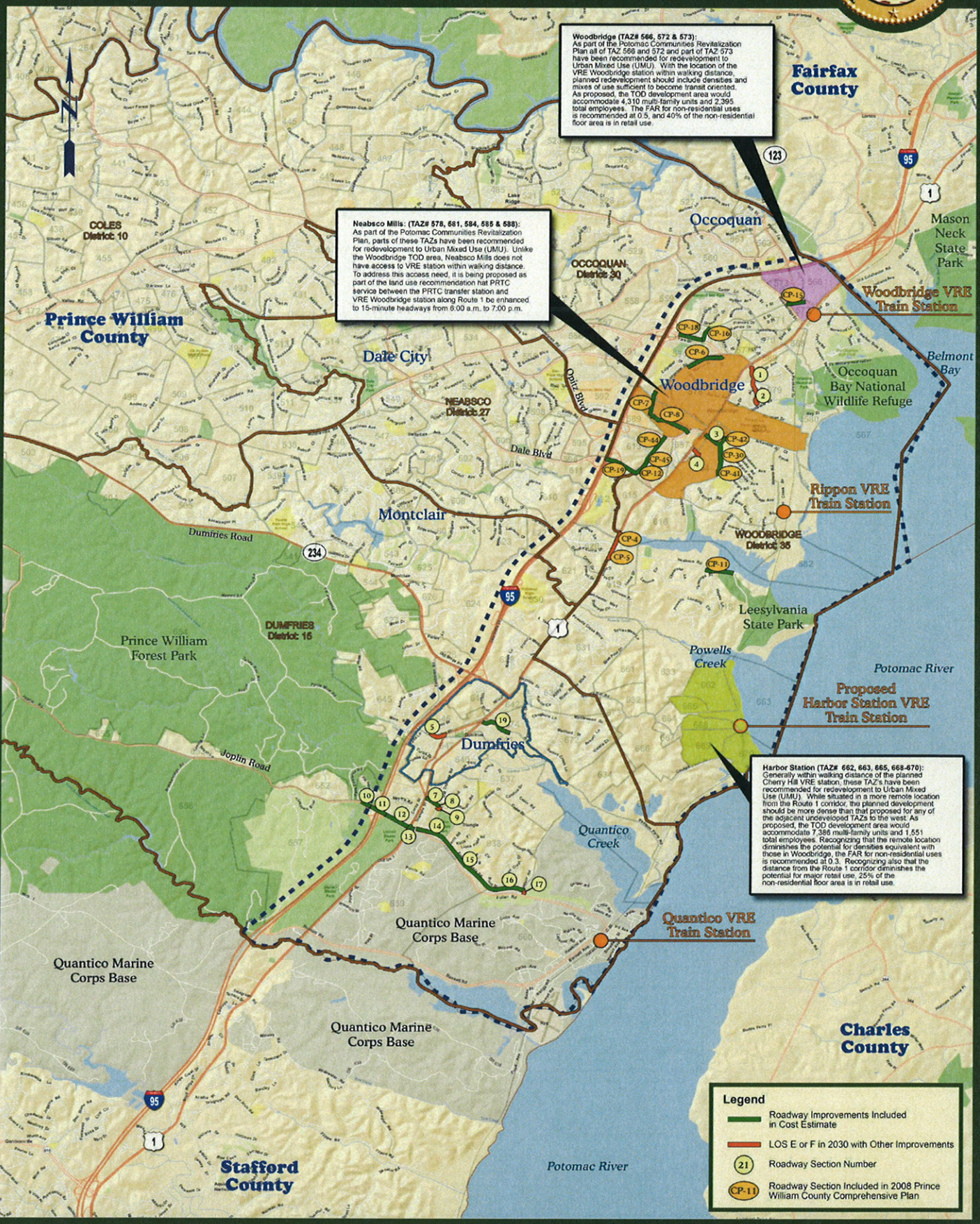

Figure ES-2

VIII. Recommendations

Based on the findings of the study of the forecasted impacts associated with BRAC activities in the Study Area, the Preferred Alternative is recommended. It offers the most effective method for applying a strategy to offset the marginal deterioration in transportation service resulting from increase traffic volumes associated with BRAC.

Table ES-2
Comparison of Roadway Costs: BRAC Scenarios

SCENARIO	Roadway Costs ($ million)	
	2015	2030
Scenario 1: Without BRAC	598	733
Scenario 2: With BRAC	684	846
Scenario 3a: BRAC & Roadway Improvements	859	1,097
Scenario 3b. BRAC and TOD	605	749
Scenario 3c: BRAC and Mixed-Use	751	1,016
Preferred Alternative*	**575**	**571**

.* Excludes transit service annual operating cost of $1,418,301.

Implementation

Implementation of the recommended strategy will require a multifaceted set of actions involving land use planning, zoning, roadway and transit infrastructure analysis and capital improvement programming.

Comprehensive Plan

Harbor Station - The first implementation task will be the amendment of the *Comprehensive Plan* in the eastern area of Harbor Station to recommend transit oriented development. The appropriate balance of densities for housing units should be defined, as well as an appropriate mix of non-residential uses.

North Woodbridge – While recommended for Urban Mixed Use (UMU) in the *Comprehensive Plan*, the appropriate mix and densities for development and redevelopment should be defined.

Neabsco Mills - The *Comprehensive Plan* recommends UMU in Neabsco Mills, but further study needs to be completed prior to defining the area for transit oriented development. However, application of the current UMU recommendations should be pursued.

Transit Analysis

With the support of the County, PRTC should determine the appropriate timing and phasing strategy for implementing the enhanced transit service. Concurrently, the County should amend the *Comprehensive Plan* to provide for transit oriented development in the Neabsco Mills TAZs currently recommended for UMU development.

Proffer Guidelines

To add flexibility in responding to existing and forecasted mobility needs, the County should expand the guidelines for rezoning applications located in the areas recommended for TOD development. Specifically, after computation of the monetary amount according to current policy, the applicant may proffer and the County may accept use of the funds for capital facilities associated with planned transit service improvements.

While this approach has been practiced (the Harbor Station proffers include the VRE planned station), it is not explicitly documented in either the County's proffer guidelines or in the *Comprehensive Plan*. To provide for transportation proffer flexibility, the following planning actions should be completed:

1. Identify planned transit improvements in the three TOD areas as part of the amendments to the *Comprehensive Plan* (see VIII.1.2. *Comprehensive Plan*);
2. Amend the document, *A Policy Guide for Monetary Contributions*, to provide for use of monetary proffers for transit capital improvement costs; and,
3. Develop a separate set of proffer guidelines for each of the three transit oriented development areas.

It should be noted that proffered monetary contributions based either residential or non-residential development should be available for use to fund transit capital improvements.

Modal Connectivity Guidelines

The County should develop guidelines to be applied to development proposals in the three transit oriented development areas that provide for ease of connection between uses and modes. These guidelines should encourage development plans that accommodate pedestrian and bicycle access to both land uses and transit modes. Provision of off-road trails, bicycle lockers and racks, and covered transit stops are examples of measures that encourage such connective activities.

Funding Opportunities for Implementation

Congress has not specifically dedicated any money to fund the needed transportation improvements. Funding for the Prince William County BRAC improvements will likely include a mix of federal, state, local and possibly private (developer) sources. There are a growing number of localities and states securing funding earmarks from Congress and state legislatures, using local bond measures to generate funds, and using a variety of creative financing methods to provide funds for transportation projects. Major transportation projects are rarely funded from a single source. Rather, a funding program is developed to take advantage of directed funding sources that may exist at a local, state or federal level. The most promising sources of funding available at this time are described below:

Transportation Authorization Act of 2009 (STAA): The initial version of the STAA proposes $340 billion for highway construction investment, including at least $100 billion for Capital Asset Investment to begin to restore the National Highway System.

American Recovery and Reinvestment Act (ARRA): There are a variety of opportunities for funding with economic stimulus funds available through the ARRA. The Department of

Transportation TIGER (Grants for Transportation Investment Generating Economic Recovery) program will provide $1.5 billion of discretionary funds.

Department of Defense Office of Economic Adjustment (OEA): The OEA is the Department of Defense's primary source for assisting communities that are adversely impacted by Defense program changes, including Base Realignment and Closure (BRAC) actions.

Defense Access Road (DAR) Program: Roads providing access to military installations are usually not owned by the Department of Defense. Military installations are not responsible (nor may they provide funding) for the maintenance of any public highway. The DAR Program provides a legal vehicle by which the Department of Defense can indirectly help to pay for a portion of improvements to certain public highways which are necessary to mitigate an unusual impact of a defense activity.

There are specific traffic-related benchmarks that trigger the initiation of a DAR project. Projects results from the assessment of the on-site commander that road improvements are required and that the associated state or local transportation agency does not have the resources to implement them. It is the responsibility of SDDC to determine the eligibility of proposed improvements for financing through the use of DAR funds.

Tax Increment Financing and Special Taxing Districts: When a public project such as a roadway improvement is carried out, there is often an increase in the value of surrounding real estate, and the potential for new investment in the area. This increased value and investment sometimes generates increased tax revenues, which are known as a tax increment. Tax Increment Financing dedicates tax increments within a certain defined district to finance debt issued to pay for the project.

Public-Private Partnership: Public-Private partnerships are an increasingly important means of getting transportation infrastructure developed. The private sector sees value in getting additional transportation infrastructure constructed and in participating in the project upside.

BRAC Impact Study

Study Area Map

December 2009

Figure ES-1

BRAC Impact Study

Preferred Alternative 2030

December 2009

Woodbridge (TAZ# 566, 572 & 573):
As part of the Potomac Communities Revitalization Plan all of TAZ 566 and 572 and part of TAZ 573 have been recommended for redevelopment to Urban Mixed Use (UMU). With the location of the VRE Woodbridge station within walking distance, planned redevelopment should include densities and mixes of use sufficient to become transit oriented. As proposed, the TOD development area would accommodate 4,310 multi-family units and 2,395 total employees. The FAR for non-residential uses is recommended at 0.5, and 40% of the non-residential floor area is in retail use.

Neabsco Mills: (TAZ# 578, 581, 584, 585 & 588):
As part of the Potomac Communities Revitalization Plan, parts of these TAZs have been recommended for redevelopment to Urban Mixed Use (UMU). Unlike the Woodbridge TOD area, Neabsco Mills does not have access to VRE station within walking distance. To address this access need, it is being proposed as part of the land use recommendation hat PRTC service between the PRTC transfer station and VRE Woodbridge station along Route 1 be enhanced to 15-minute headways from 6:00 a.m. to 7:00 p.m.

Harbor Station (TAZ# 662, 663, 665, 668-670):
Generally within walking distance of the planned Cherry Hill VRE station, these TAZ's have been recommended for redevelopment to Urban Mixed Use (UMU). While situated in a more remote location from the Route 1 corridor, the planned development should be more dense than that proposed for any of the adjacent undeveloped TAZs to the west. As proposed, the TOD development area would accommodate 7,386 multi-family units and 1,551 total employees. Recognizing that the remote location diminishes the potential for densities equivalent with those in Woodbridge, the FAR for non-residential uses is recommended at 0.3. Recognizing also that the distance from the Route 1 corridor diminishes the potential for major retail use, 25% of the non-residential floor area is in retail use.

Fairfax County
COLES District 10
Prince William County
OCCOQUAN District 30
Occoquan
Woodbridge VRE Train Station
Mason Neck State Park
Belmont Bay
Occoquan Bay National Wildlife Refuge
Woodbridge
Dale City
NEABSCO District 27
Dale Blvd
Opitz Blvd
Montclair
Rippon VRE Train Station
WOODBRIDGE District 35
Dumfries Road
DUMFRIES District 15
Prince William Forest Park
Leesylvania State Park
Powells Creek
Potomac River
Proposed Harbor Station VRE Train Station
Joplin Road
Dumfries
Quantico Creek
Quantico Marine Corps Base
Quantico VRE Train Station
Charles County
Stafford County

CP-4, CP-5, CP-6, CP-7, CP-8, CP-11, CP-12, CP-15, CP-16, CP-18, CP-19, CP-30, CP-41, CP-42, CP-44, CP-45

Legend

- Roadway Improvements Included in Cost Estimate
- LOS E or F in 2030 with Other Improvements
- 21 — Roadway Section Number
- CP-11 — Roadway Section Included in 2008 Prince William County Comprehensive Plan

Figure ES-2