

2.0 Employee Relocation & Travel Characteristics

2.1 Tenant Organizations Relocation

A total of 24 different DoD organizations will be relocated to Mark Center. These organizations are currently located at various leased spaces throughout Arlington and Alexandria, at locations that are accessible via Metrorail. As the BRAC 133 site is not located near a Metrorail station, employees will need to adjust to a different commute pattern than which they are accustomed. Nearly 60 percent of the employees currently work in the Crystal City area with 45 percent working in Crystal City and 14 percent working in Pentagon City. An additional 31 percent currently work along the Rosslyn-Ballston corridor and a total of 8 percent work in Alexandria today, with 5 percent in Old Town Alexandria and another 3 percent at Mark Center.

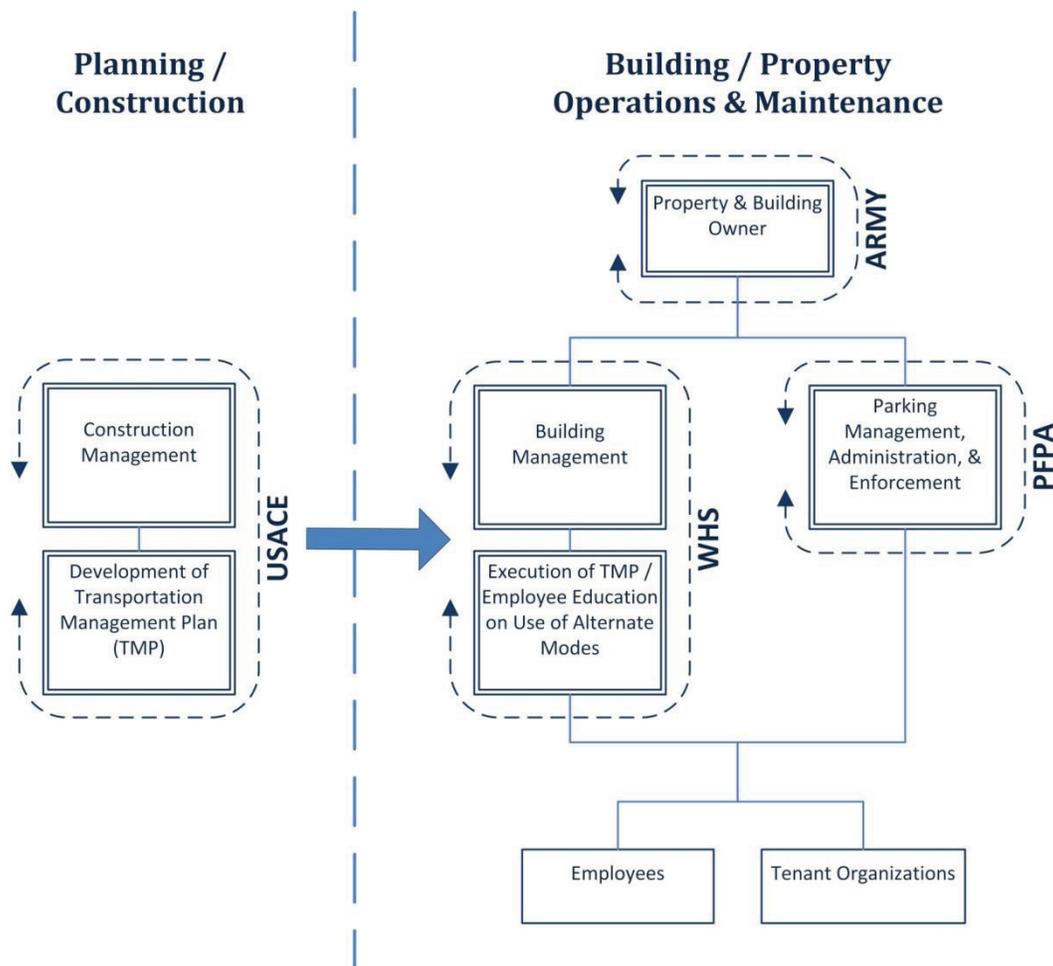
Managing a move with so many different tenant organizations requires extensive coordination. As the property manager, WHS has taken responsibility for this effort and is serving as the primary interface to the 24 tenant organizations before, during, and after relocation. Since September 2009, WHS has been meeting monthly with representatives from each tenant organization to keep them informed and to heed any concerns tenants may have about the relocation. WHS is responsible for implementing the TMP and for monitoring the progress of TMP activities over time. As part of this responsibility, WHS will provide active outreach to tenants and employees to educate them about the various modes of travel available to the site (both in advance of the move as well as on a continuing basis after the building is open). WHS will also be responsible for establishing and maintaining an onsite presence through the WHS Transportation Management Program Office, as is described in Section 5.2.

Other involved organizations include the following:

- **USACE** has responsibility for managing the construction of the building. As part of this responsibility, USACE led the development of the TMP in close coordinating with WHS.
- **The Army**, as property owner, will have responsibility for facilitating communication with the neighboring community.
- **PFPA** uniformed officers will perform traffic control, safety, and enforcement activities at BRAC 133.
- **PFPA PMB** will be responsible for managing parking at BRAC 133. PFPA PMB will manage parking permitting, monitor parking utilization, and enforce parking rules and regulations.

The organizational structure defining the relationships between these organizations is shown in Figure 2-1.

Figure 2-1: Roles and Responsibilities of Organizations Involved in BRAC 133 Development Process

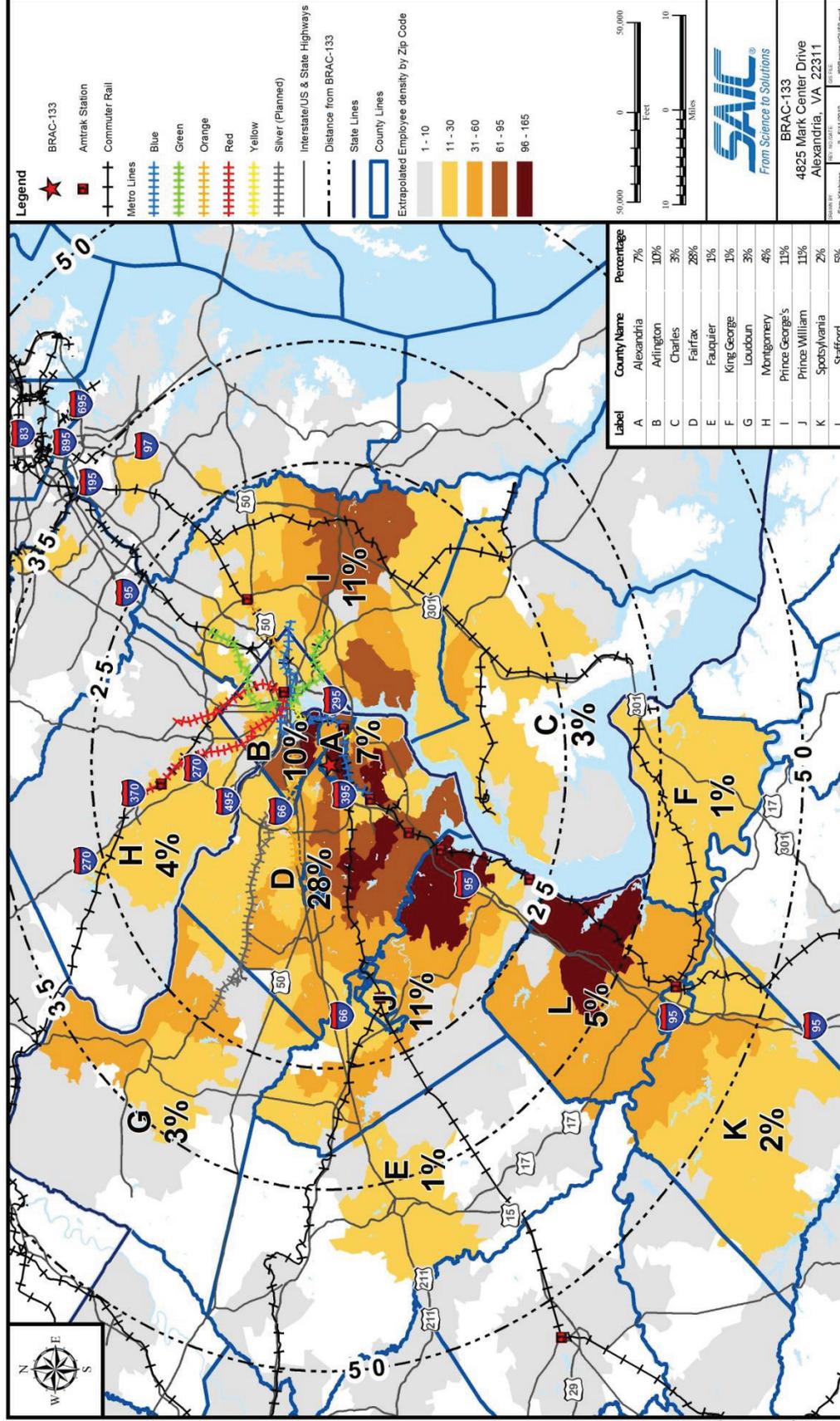


2.2 Employee Attitudes toward Alternative Commute Modes

WHS obtained employee home zip codes from human resources records for all federal employees who will be relocating to BRAC 133, accounting for 69 percent of the total employees. This sample size is large enough to be considered statistically representative of the population¹⁰. The data shows that while employees are distributed quite broadly throughout the Washington DC metropolitan region, the large majority of employees (71 percent) commute from within Virginia (see Figure 2-2). As seen in the figure, the areas of highest density are in Fairfax County as well as along the I-95/I-395 corridor near the Virginia Railway Express (VRE) commuter rail line and Metrorail’s Blue Line. Approximately one-quarter of the employees (23 percent) live in Maryland, and 6 percent live in the District of Columbia. Details of the number of employees in each zip code are provided in Appendix B, along with density maps for each of the major jurisdictions.

¹⁰ Zip codes were obtained for all federal employees. The missing 31 percent of zip codes represents contractor staff who will be working at BRAC 133. As the response rate was statistically significant, characteristics of the federal employees can be applied to the survey population, including contractor staff.

Figure 2-2: BRAC 133 Employee Population Densities



Source: WHS 2009 Commuter Survey; DoD Human Resources Department; ESRI

NOTE: The 14 percent of employees not represented in summary table of this graphic are from other jurisdictions (i.e., City of Fairfax, District of Columbia, and outlying Counties).

EMPLOYEE RELOCATION & TRAVEL CHARACTERISTICS

To predict future mode choice, it is also important to consider what modes of travel employees are using today. While current employee mode share is attributed in some part to where employees work today, looking at current mode share can provide some sense of employee attitudes toward various modes. In August 2009 WHS conducted a survey of all employees (both federal and non-federal) who will be relocating to BRAC 133. WHS received responses from 2,815 employees, representing 44 percent of the employee population, a response rate that can be considered representative of the population. On the survey, employees were asked about their current commute patterns including what mode(s) of transportation they typically use in traveling to work. Respondents were asked to “check all modes that apply” for the benefit of employees who take different modes on different days and for employees who use multiple modes during their typical commute (e.g., an employee may drive to a park-and-ride lot and then take Metrorail, or another employee may typically slug to work, but will take a bus home on days when they need to work late).

The survey findings indicate that a large number of employees use transit – including Metrorail, bus, and/or VRE – for at least some part of their commute today. Eighteen percent use transit as their only mode of travel and an additional 27 percent use transit along with other modes (i.e., transit is one of multiple modes that employees use on a daily basis for their commute, or they use transit on a regular basis, but not every day). This statistic is valid, given that the majority of employees work near a Metrorail station today.

As shown in Table 2-1, nearly one-third of employees ride Metrorail with 9 percent using rail as their primary mode and an additional 21 percent using rail along with other modes. Over one-fifth of employees utilize bus transit, with 5 percent using bus transit as their primary mode, and an additional 16 percent using bus transit along with other modes. Fewer employees use VRE commuter rail, with 3 percent indicating that they use VRE as their primary mode of travel and 3.5 percent indicating that VRE is one of multiple modes that they use.

Table 2-1: Current Commute Modes for Employees

Mode	Percentage of Employees		
	Using this Mode Only	Using this Mode along with Other Modes	Total Using this Mode
Drive Alone	40.78%	14.27%	55.05%
Metrorail	9.35%	21.18%	30.53%
Bus	5.11%	16.18%	21.29%
Carpool/Vanpool	6.22%	4.28%	10.50%
Slug	2.95%	5.68%	8.63%
Walk	1.65%	5.04%	6.69%
VRE	3.16%	3.49%	6.65%
Bike	0.11%	1.40%	1.51%

Note: Values do not total to 100 as respondents were given the option of selecting more than one mode of travel.

The percentages presented in Table 2-1 are helpful in gauging the openness of employee attitudes toward taking transit. It is expected that many of the employees who are already using transit (in particular those coming from Maryland and DC) will remain on transit and use the DoD shuttle to transfer to Mark Center, as extensive shuttle service between BRAC 133 and multiple Metrorail stations will be provided (described in Section 3.5.2). Educating employees about transit options will be a major focus of WHS in managing the employee commute program for BRAC 133, as over 58 percent of employees use some form of transit today and as many indicated that they *think* they will use transit to get to BRAC 133.

The survey also revealed that a large number of employees (41 percent) drive alone today as their primary mode (i.e., this was the only mode of travel that these employees selected on the survey), but it also revealed that many employees are accustomed to ridesharing, in particular those originating from south of BRAC 133. Nearly one-third of employees who live in Northern Virginia (29 percent) rideshare today, and the large majority of these employees live in areas to the south along I-395 in Prince William and Stafford Counties. This is a valid statistic given that many commuters from these counties make use of the HOV lanes on I-395 between Fredericksburg and the Pentagon. Overall, 9 percent of employees use ridesharing as their primary mode today while an additional 10 percent use ridesharing along with other modes (again, ridesharing is either one of multiple modes used on a daily basis for their commute, or the mode used on a regular basis, but not every day). With nearly one-fifth of employees accustomed to ridesharing today, continuing to encourage this practice will also be a major focus for WHS.

A very small percentage of employees (two percent) currently walk or bike as their only mode of travel. However, over four percent of employees indicated that they *anticipate* walking or bicycling to work at the new site. WHS will make walking and biking a focus since a large number of employees (over 500, or 11 percent of the building population) live within 2 miles of Mark Center, with over 100 of these employees (2 percent) living within just 1 mile of the site.

In light of restricted parking at BRAC 133, the biggest challenge that most commuters will face is the distance of the site from a Metrorail station. To address this, WHS will be establishing a shuttle system (described in more detail in Section 3.5.2) providing employees frequent access to five Metrorail stations throughout Northern Virginia, including the Pentagon, King Street, Ballston, West Falls Church, and Franconia-Springfield. As a result of the DoD shuttle service, many commuters already on transit – and in particular those coming from DC and Maryland – will be able to continue their current commute patterns in combination with the DoD shuttle. For those who do not perceive transit as a viable option, rideshare and telework programs can be considered as alternative mode choices. For those who live near the site, there are local transit options, walking, bicycling, and finally the DoD shuttle which may serve as the primary mode of transportation for some employees. Plans for promoting these various mode choices are discussed in detail in the Travel Demand Management Plan in Section 5.

2.3 Employee Trip Generation

2.3.1 Previous Studies

A comparison of the existing traffic studies was conducted to examine the trip generation methodology adopted in those reports and to identify the future site-generated trips for the proposed BRAC 133 and Institute for Defense Analyses (IDA) building developments. For all previous studies, the estimates for new trips generated by BRAC 133 were calculated only for SOV trips, shuttle buses, and trucks, and did not explicitly include rideshare vehicle trips (i.e., carpool, vanpool, and slug). Previous studies assumed that 10 percent to 25 percent of employees would be absent on any given day due to travel, vacation, illness, flexible work schedule, and telecommuting, and then applied a 40 percent TMP reduction to this total number of employees to determine SOV trips generated during a typical day. The total number of typical day SOV trips was then compared against available parking spaces to determine parking adequacy and potential overflow. Table 2-2 shows a comparison of the various factors that were utilized in the TMP trip generation process from all prior Mark Center traffic studies. The discussions below provide further details on the methodology that was adopted in determining the projected mode splits for the BRAC 133 site.

Table 2-2: Comparisons of Projected Mode Splits and Site Generated Peak Hour Trips from Prior Mark Center Studies

Report / Study	Employees present on a Typical Day Shift		Visitors per day	Opening Year Employee Trip Modal Split	Single Occupant Vehicle (SOV) Trips (Employee + Visitor)	Rideshare (Carpool/Vanpool/Slug) Trips	Peak Hour Shuttle Bus & Truck Trips	Total Number of Parking Spaces
	Percent %	Total Number of Employees						
Mark Center Traffic Impact Study (TIS) - Wells & Associates, March 2003	n/a (Note 1)	n/a (Note 1)	n/a (See Note 1)	10% Transportation Management Plan Trip Reduction assumed	WHS: • AM Peak - 1,801 trips • PM Peak - 1,872 trips IDA: • AM Peak - 481 trips • PM Peak - 449 trips	Not considered	Included as part of SOV trips	4,839 spaces (inclusive of government vehicle and visitor parking spaces)
Final Environmental Assessment (FEIS) BRAC 133, Fort Belvoir - USACE/Tetra Tech, July 2008	90%	5,768	500 visitors	• SOV - 58% • Rideshare - 21% • Walk/Bike/Other - 1% • Metrorail - 20%	WHS/BRAC 133: • AM Peak - 1,091 trips • PM Peak - 1,091 trips	WHS/BRAC 133: • AM Peak - 395 trips • PM Peak - 395 trips	WHS/BRAC 133: • AM Peak - 31 trips • PM Peak - 31 trips	3,845 spaces (inclusive of government vehicle and visitor parking spaces)
BRAC 133 Transportation Improvement & Management Plan (TIMP) - Wells & Associates, July 2008	75%	4,807	239 visitors (5% of employees present during day shift)	• SOV - 60% • Rideshare - 12% • Bus Transit - 5% • Walk/Bike/Other - 3% • Metrorail - 20%	WHS: • AM Peak - 1,240 trips • PM Peak - 1,309 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	Not considered	• AM Peak - 34 trips • PM Peak - 34 trips	3,904 spaces (inclusive of government vehicle and visitor parking spaces)
VDOT Mark Center (BRAC) Transportation Study	88%	5,618	239 visitors (5% of employees present during day shift)	• SOV - 60% • Rideshare - 12% • Bus Transit - 5% • Walk/Bike/Other - 3% • Metrorail - 15% • Re-adjusted SOV - 80%	WHS: • AM Peak - 1,240 + 332 trips • PM Peak - 1,309 + 332 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	Not considered	• AM Peak - 34 trips • PM Peak - 34 trips	3,846 spaces (inclusive of government vehicle and visitor parking spaces)
Mark Center (BRAC 133) Transportation Study - City of Alexandria/VHB, November 2009	89%	5,721	239 visitors (5% of employees present during day shift)	• SOV - 60% • Rideshare - 12% • Bus Transit - 5% • Walk/Bike/Other - 3% • Metrorail - 20%	WHS: • AM Peak - 1,240 + 110 trips • PM Peak - 1,309 + 110 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	Not considered	• AM Peak - 34 trips • PM Peak - 34 trips	3,900 spaces (95% occupancy considered full; inclusive of government vehicle and visitor parking spaces)
Mark Center (BRAC 133) Access Study Operational Analysis Report / IIR - VDOT, January 2010	75%	4,807	239 visitors (5% of employees present during day shift)	• SOV - 60% • Rideshare - 12% • Bus Transit - 5% • Walk/Bike/Other - 3% • Metrorail - 20%	WHS: • AM Peak - 1,254 trips • PM Peak - 1,323 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	Not considered	• AM Peak - 34 trips • PM Peak - 34 trips	3,904 spaces (inclusive of government vehicle and visitor parking spaces)
USACE Transportation Management Plan (TMAP) - Benham/SAIC, July 2010	90%	5,768	500 visitors	• SOV - 57% • Carpool - 5% • Vanpool - 3% • Slug - 3% • Bus Transit - 5% • Walk - 2% • Bike - 2% • Metrorail - 23%	WHS: • AM Peak - 1,345 trips • PM Peak - 1,277 trips IDA: • AM Peak - 470 trips • PM Peak - 433 trips	WHS: • AM Peak - 81 trips • PM Peak - 77 trips	WHS: • AM Peak - 68 trips • PM Peak - 68 trips	5,747 spaces (inclusive of 150 government vehicle and 67 visitor parking spaces)

NOTE: 1. Institute of Transportation Engineers (ITE) Trip Generation rates to generate peak hour trips.

2.3.2 Mode Split Projections Rationale

The BRAC 133 employee origin zip code data obtained from WHS were examined for origin locations, zip code clusters, existing travel patterns, adjacent transit corridors, and ride sharing prospects. The data were also compared with information obtained on mode choice from the WHS commuter survey to determine travel characteristics of the relocating employees. Observations made from the above comparison were used to determine the likely future projected non-SOV mode splits to the BRAC 133 site, including carpool, vanpool, slug, walk, bike, bus transit, and rail transit¹¹. Table 2-3 below shows the modes employees currently use to get to work (“current mode choice”) as well as the modes that employees believed they would use in the future (“anticipated mode choice”). It should be noted that at the time of the survey, employees were not yet familiar with the modes of access that would be available to them at BRAC 133, so the anticipated mode split percentages may not be entirely realistic.

Many employees checked multiple modes as employees were asked to “check modes all that apply” for the benefit of those who take different modes on different days and for those who use multiple modes during their typical commute (e.g., an employee may drive to a park-and-ride lot and then take Metrorail, or another employee may typically slug to work but may take the bus home on days when they need to work late). The first column (“Using this Mode Only”) represents the percentage of employees who selected *only* that mode, indicating that it is their primary, and possibly only, mode of travel. The second column (“Using this Mode along with Other Modes”) represents the percentage of employees who checked that mode along with other modes. The third column (“Anticipated Mode Choice after Relocating to BRAC 133”) represents the primary mode that employees believed they would use in the future.

Table 2-3: Current and Anticipated Mode Choice as Reported by Employees on 2009 WHS Survey

Primary Mode Choice	Current Mode Choice		Anticipated Mode Choice after Relocating to BRAC 133
	Using this Mode Only	Using this Mode along with Other Modes	
Rideshare	6.22%	10.50%	7.30%
Slug	2.95%	8.63%	4.47%
Bus Transit	5.11%	21.29%	14.40%
Walk	1.65%	6.69%	2.13%
Bike	0.11%	1.51%	1.95%
Metrorail	9.35%	30.53%	12.58%
VRE	3.16%	6.65%	3.16%

Source: WHS Employee Transportation Survey for Commuter Patterns, Fall 2009.

Projected primary mode splits were determined based on current and anticipated employee travel modes as shown in the above table, current employee origin zip codes (and hence, their feasible

¹¹ Note that rail users will be transported to the BRAC 133 site by DoD shuttles which will operate during the morning and evening peak periods at frequent headways from multiple Metrorail stations.

modes), and commuter patterns in the metropolitan Washington D.C. region obtained from various sources. The rationale that went into determining each mode split is explained below.

Rideshare

The WHS commuter survey reported that 6.2 percent of BRAC 133 employees exclusively use carpool or vanpool as their primary mode of transportation. It is projected that a higher percentage of employees (at least 8 percent) will rideshare at the new work location. There are several reasons that suggest that there will be greater opportunity for ridesharing. First, a significant number of BRAC 133 employees are already familiar with carpool/vanpool (although only 6.2 percent use ridesharing as their primary mode today, an additional 10.5 percent use it for some part of their commute), and there will be a greater incentive to rideshare at the new building given the fact that parking is so severely restricted, and that carpools and vanpools will be guaranteed a priority parking space. Employee comments from the WHS survey results requesting verification on a guaranteed parking space allotment for carpool/vanpool commuters suggest the same. Furthermore, based on an employee zip code review, it is understood that there's feasibility for more carpools and vanpools to form based on where employees live. The density maps generated from the zip code data (see Appendix B) show high densities of origin zip codes located within close proximity in southern suburbs along I-395 in Virginia, counties where ridesharing is traditionally very high. Finally, a 2007 Commuter Connections study showed that 7.6 percent of commuters in the region regularly utilize rideshare option, and that of commuters who have access to HOV lanes for their commute, 11 percent use vanpool/carpool to get to work¹². Although, there is not currently direct HOV access at Seminary Road, it is expected that many employees will still take advantage of HOV lanes, riding to the Pentagon, and turn around to travel along I-395 SB general purpose (GP) lanes for the time savings as discussed in Section 3.4.

Slug

Based on the existing and anticipated travel modes, it is anticipated that a certain percent of employees at BRAC 133 are expected to commute by means of "slugging" or "casual carpooling." An August 2009 report titled *Estimating the Energy Impact of Casual Carpooling* projected almost 9,700 commuters in the Washington D.C. region slugging every day¹³. Prince William County (56 percent), Fairfax County (22 percent), Stafford County (17 percent), and the City of Fredericksburg (5 percent) are home to the greatest number of "sluggers," which also holds true for a significant portion of BRAC 133 employees¹⁴. More importantly, the Pentagon is the most popular slugging destination, representing 33 percent of slug trips made throughout the Washington D.C. region¹⁵. Similar to the rideshare options previously discussed, slugging is feasible for employees traveling to Mark Center because of its proximity to the I-

¹² "2007 State of the Commute Survey Report from the Metropolitan Washington DC Region", Commuter Connections, June 2008 webpage <http://www.mwcog.org/uploads/pub-documents/yldZWA20080903151902.pdf> (last accessed May 5, 2010)

¹³ "Estimating the Energy Consumption Impact of Casual Carpooling", Minett, P. and Pearce, J., August 2009 webpage <http://www.flexiblecarpooling.org/casualcarpoolingenergysaving.pdf> (last accessed May 5, 2010)

¹⁴ "Dynamic Ridesharing (Slugging) Data", Prepared for Virginia Department of Transport, Final Report", Prepared by Vanasse Hangen Brustlin, Inc., June 15, 2006

¹⁵ Ibid.

95/I-395 corridor, despite the lack of direct HOV access at Seminary Road. BRAC 133 employees with a parking permit can utilize the HOV lanes by picking up sluggers, dropping them off at the Pentagon, and then driving back to Mark Center. Although three miles may seem to be a significant distance to travel after the drop-off point at the Pentagon, many drivers are expected to consider this a feasible option. A December 2008 study titled *The Native Slugs of Northern Virginia* shows that 65 percent of sluggers travel to work anywhere from 10 minutes to greater than 30 minutes beyond the slugging drop-off point. This fact is also promising for employees who do not have access to parking. These employees can participate in casual carpooling by riding to the Pentagon with other sluggers and then taking the DoD shuttle from there to Mark Center. DoD will offer free shuttle service between BRAC 133 and the Pentagon every 10 minutes during peak hours (more details regarding the DoD shuttle plan are discussed in Section 3.5.2).

Local Bus Transit

This mode share projection focuses only on employees who use local bus transit routes that directly serve Mark Center as their primary mode of transportation. The projected mode share was determined based on a comparison of the existing bus routes that serve Mark Center along with the origin zip codes retrieved from the employee survey data. Currently, a number of employees live near the existing bus routes that stop along Beauregard Street or at Southern Towers adjacent to Mark Center, within a walking distance of 0.25 - 0.5 miles. While the employee zip codes indicate that commuting via bus will require a significant walk to the bus stop for some commuters, 51 percent of regional commuters who use alternate modes travel up to a mile from their home to the alternate mode meeting point¹⁶ (see Section 3.3 for more discussion on bus transit service). More details regarding bus transit routes serving the region are included in Appendix C.

Walk / Bicycling

Based on the existing and anticipated travel modes, it is anticipated that a number of BRAC 133 employees will walk and/or bicycle as their primary mode of travel. Nearly four percent of Alexandria residents walk to work while slightly over half a percent bike to work¹⁷. The average commute for walkers is 1.42 miles while the average commute for bikers is 8.17 miles. Currently, over 100 employees live within 1 mile, and over 500 employees live within two miles of Mark Center. In addition, the BRAC 133 facility includes bicycle racks, shower facilities, and other amenities for commuters bicycling/walking to work. The *2007 State of the Commute Survey Report from the Metropolitan Washington DC Region*¹⁸ showed that 12 percent of people who work for employers in Alexandria, Arlington County, and the District of Columbia that provide incentives/support services have used the bicycle/walk services at some point and that three percent report bicycling/walking as their *primary*

¹⁶ *2007 State of the Commute Survey Report from the Metropolitan Washington DC Region*, Commuter Connections, June 2008 webpage <http://www.mwcog.org/uploads/pub-documents/yldZWA20080903151902.pdf> (last accessed May 5, 2010)

¹⁷ Bicycle and Pedestrian Plan for the National Capital Region. July 2006, webpage (last accessed May 5, 2010) <http://www.mwcog.org/uploads/committee-documents/v1ZfWl020070726155118.pdf>

¹⁸ *2007 State of the Commute Survey Report from the Metropolitan Washington DC Region*. Commuter Connections. June 2008. <http://www.mwcog.org/uploads/pub-documents/yldZWA20080903151902.pdf>

mode. With a significant number of employees within walking/biking distance to Mark Center and their excessive interest in information regarding walk/bicycle amenities and employer incentives (as expressed in the WHS commuter survey comments), as well as the on-site amenities being provided at BRAC 133, a high percent of walking and bicycling trips are anticipated.

Rail Transit (WMATA, VRE, MARC)

A higher percent of Mark Center employees than that observed from the 2009 commuter survey are expected to take rail transit as their primary mode of travel. This assumption is justified based on the extensive DoD express shuttle service planned directly to serve Mark Center from nearby Metrorail stations (Blue/Yellow/Orange Lines and VRE) at frequent headways. Employees were not fully informed of the proposed DoD shuttle plan when the survey was conducted and were unable to make informed decisions about rail transit use. However, many employees, as noted from the WHS commuter survey, had requested for an extensive shuttle program to make transit an attractive mode choice, since parking is so severely limited at the BRAC 133 site. Additionally, with 10 percent to 30 percent of employees riding Metrorail today, it is implicit that employees are accustomed to transit.

2.3.3 Proposed Primary Mode Splits and Trip Projections

Based on a careful review and detailed analysis of all of the above data, future primary mode choice percentages were projected for BRAC 133 employees after relocation to Mark Center. It should be noted that these mode split percentages are not explicit goals, but rather they together achieve the overall goal of 40 percent or greater of non-SOV mode use. WHS will establish TDM strategies (as described in Section 5) to encourage non-SOV modes. The mode use of employees will be carefully and continuously monitored by WHS (as explained in Section 6, the Monitoring and Evaluation Plan), after opening day and used to establish set goals for each mode as per relocated employee travel patterns.

The primary mode split assumptions were determined based on the total number of available parking spaces, with the exception of government vehicle and visitor parking spaces, to determine the maximum number of SOV trips that would be accessing the site. The proposed plan for the BRAC 133 site provides parking in two parking structures. The proposed North Garage is an eight-level structure that will be used for both employee and visitor parking. The South Garage is a nine-level structure that will be exclusively used for employee parking. The North Garage provides a total of 2,032 parking spaces, of which 67 spaces will be allotted for visitor parking, and the South Garage provides 1,715 spaces. Together they provide for a total of 3,747 parking spaces. With 150 spaces being reserved for government vehicle parking, a total of 3,530 spaces will be allotted for employee parking. This was considered as the threshold value for determining the potential number of SOV trips that could be accommodated by the site.

The following is the projected primary mode split for the BRAC 133 employees relocating to Mark Center:

- SOV – 57%
- Carpool – 5%
- Vanpool – 3%
- Slug – 3%

EMPLOYEE RELOCATION & TRAVEL CHARACTERISTICS

- Local Bus Transit – 5%
- Rail Transit / DoD Shuttle – 23%
- Walk – 2%
- Bike – 2%

To accurately determine the total number of vehicular trips associated with ridesharing employees, average occupancy rates were assumed for carpools, vanpools, and slug vehicles based on the HOV lane requirements of the regional roadway network. The I-395 HOV lanes require a minimum vehicle-occupancy of three or more passengers, while the I-66 HOV lanes require only two or more passengers. Based on BRAC 133 employee origin zip codes, employees will be using both of these roadways to access the site. Hence, it is estimated that some BRAC 133 carpools will have two occupants while others will have three or more. Therefore, an average carpool vehicle occupancy rate of 2.3 persons per vehicle (ppv) was used. This assumption is in line with assumptions made by WMATA in a previous study¹⁹. Vanpool programs nationwide typically carry anywhere from 7 to 15 passengers per vehicle. Hence, a conservative vanpool vehicle occupancy rate of 7.0 ppv was assumed for BRAC 133 vanpools²⁰. With the consideration that all slug vehicles will have to meet the I-395 HOV lane occupancy requirements, it was assumed that each slug trip represents three employees.

It should be noted that the projected primary mode split assumes that only those employees riding Metrorail or VRE will utilize the DoD shuttle (these employees will use the shuttle to complete the last leg of their trip from the Metrorail stations to Mark Center). However, it is likely that some employees will make use of the shuttles in other ways. As discussed in Section 3, the DoD shuttles will provide employees access to five Metrorail stations in the region, namely, King Street, Pentagon, Ballston, West Falls Church, and Franconia-Springfield. Service will be available at 10- or 15-minute headways during peak periods and will also be available during off-peak periods with service to the Pentagon (15-minute headways) and Franconia-Springfield (30-minute headways). Possibilities for other employees to be served by the shuttle include the following: employees could drive and park at a Metrorail station that is served by the DoD shuttle (e.g., Franconia-Springfield or West Falls Church); employees could slug to the Pentagon and board the Pentagon DoD shuttle; or employees could walk or get dropped off at one of the Metrorail stations that is served by the DoD shuttle. Based on employee feedback from the 2009 WHS Commuter Survey, it is anticipated that this mode of travel will be popular among the BRAC 133 employees. WHS will continuously monitor employee travel patterns and DoD shuttle bus ridership, and amend the shuttle plan as appropriate. As employees adapt to using the Rail Transit/DoD Shuttle mode, a considerable reduction in SOV trips and the overall number of vehicular trips entering the site is anticipated, thus benefiting the adjacent roadway network and neighborhood communities.

Table 2-4 shows the projected primary mode splits and associated vehicular trip projections. The projected mode splits were applied toward the total number of employees expected to be present on a typical day (percent employee occupancy rate) to determine the number of employees accessing the site by various modes and to determine the overall site-generated vehicular trips. For traffic analysis purposes, the TMP has assumed that 90 percent of BRAC 133 employees will be present on a typical

¹⁹ *Technical Memorandum, Task 4.1: Analysis of Existing and Potential Transit Demand, WMATA, January 2010*

²⁰ United States Environmental Protection Agency (EPA) and Air and Radiation Transportation and Air Quality document titled *Vanpool Programs: Implementing Commuter Benefits under the Commuter Choice Leadership Initiative* webpage: http://www.bestworkplaces.org/empkit/files/section3/vanpool_benefit_brief.pdf (last accessed July 20, 2010)

work day and will be commuting to the site. This assumption, though conservative when compared to many of the prior studies, represents the maximum number of vehicular trips generated by the BRAC 133 site and was used in performing the traffic operations and impact analysis included in Section 4. TDM strategies of telecommuting, flex time, and compressed work week (see Section 5) when successfully implemented by the tenant agencies, will decrease the total number of site-generated trips. WHS will carefully implement of all the TDM strategies included in the TMP and will monitor employee travel patterns over time, making changes to their plan as necessary to change mode split and generated trips. Detailed discussion of trip distribution of all the generated trips along the existing roadway network and opening day (2011) traffic volumes are included in Section 4.

EMPLOYEE RELOCATION & TRAVEL CHARACTERISTICS

Table 2-4: Trip Projections of BRAC 133 Employees with Proposed Mode Split

		Percent of Total Employees Present on a Typical Weekday						
		100%	95%	93%	90%	85%	80%	75%
Number of Employees present on a Typical Day Shift		6409	6089	5928	5768	5448	5127	4807
57% Single Occupant Vehicle Trips		3653	3470	3379	3288	3105	2923	2740
Carpool	Number of Employees (5%)	320	304	296	288	272	256	240
	Vehicle Trips (2.3 ppv) ¹	139	132	129	125	118	111	104
Vanpool	Number of Employees (3%)	192	183	178	173	163	154	144
	Vehicle Trips (7 ppv) ²	27	26	25	25	23	22	21
Number of Walking & Biking Employees (2% each)		256	244	237	231	218	205	192
Slug	Number of Employees (3%)	192	183	178	173	163	154	144
	Vehicle Trips (3 ppv)	64	61	59	58	54	51	48
Employees Riding Local Bus Transit serving Mark Center (WMATA/DASH) (5%)		320	304	296	288	272	256	240
Number of Employees Utilizing Rail Transit (and DoD Shuttle from Metro Stations to Mark Center) (23%)		1474	1400	1364	1327	1253	1179	1106
Total Incoming Employee Trips on a typical Weekday		3884	3690	3593	3496	3301	3107	2913

NOTE: (1) Technical Memorandum, Task 4.1: Analysis of Existing and Potential Transit Demand, WMATA, January 2010

(2) United States Environmental Protection Agency (EPA) and Air and Radiation Transportation and Air Quality document titled Vanpool Programs: Implementing Commuter Benefits under the Commuter Choice Leadership Initiative

Total Number of BRAC 133 Employees = 6,409

Total Number of Government Vehicle Parking Spaces = 150

Total Number of Visitor Parking Spaces = 67

Potential Rideshare Priority Parking Spaces = 320

Potential Alternate Fuel or Low Emission Vehicle Priority Parking Spaces = 192

Total Number of Parking Spaces = 3,747

Total Number of BRAC 133 Parking Spaces = 3,530

Total Number of ADA Spaces = 48