

TECHNICAL MEMORANDUM

To: MDOT/MTA

From: Parsons Brinckerhoff

Date: April 29, 2008

Subject: Baltimore-Washington Investment Corridor: Identification of Corridor Transit Markets and Transit Service Strategy Alternatives.

This memorandum provides an overview of the work performed under Tasks 3 and 4 of the Baltimore-Washington Investment Corridor (BWIC) Travel Markets Study. Building on the results of Task 2, which quantified travel demand between study area districts, this memorandum identifies the transit orientation of the study area districts, and from this, existing and future potential transit markets. A transit service strategy is then offered for these markets.

District Transit Orientation

Each district in the study area was qualitatively assessed to identify its current and likely 2030 degree of transit orientation on a five-point scale ranging from low to high. Factors used to determine a district's current transit orientation included the level of existing rail and fixed-route bus service, population and employment density, land use mix, parking availability, presence of clustered development and pedestrian facilities. The latter three factors were assessed based on inspection of recent (2005-2007), publicly available aerial photographs.

Future likely transit orientation was estimated by considering the likely impact of projected population and employment and available information on local or regional transit-oriented planning for the district.

The results of this assessment are summarized in the table below:

No.	District Name	Current Transit Orientation	Likely 2030 Transit Orientation	Notes
1	DC CBD	High	High	High existing transit mode share results from dense transit network, high parking cost, employment density and walkability.
2	North DC	Medium-High	Medium-High	
3	Alexandria	Medium-High	Medium-High	
4	Arlington	High	High	Residential and employment densities are similar to Washington CBD and clustered near Metro stations.
5	Silver Spring-Bethesda	Medium-High	High	A high share of forecast employment growth is anticipated to be directed to planned transit oriented developments.
6	Capital Heights	Medium	Medium	
7	East PG Co.	Medium-Low	Medium-Low	
8	College Park	Medium	Medium-High	Existing land use is moderately transit friendly. Projected expansion at the University of Maryland may result in constrained parking and increased transit orientation.
9	New Carrollton	Medium	Medium	

10	Greenbelt	Medium	Medium-High	Identified as an activity cluster by MWCOG, projected to have 50% employment growth by 2030. Opportunity for development to be oriented toward existing Metro and MARC stations.
11	Bowie	Medium-Low	Medium-Low	
12	Muirkirk	Medium-Low	Medium	MWCOG has identified an emerging activity center in the Konterra/Route 1 subarea of the Muirkirk district with high forecast employment growth.
13	Odenton	Low	Medium	BRAC-related employment growth and transit oriented planning is likely to significantly improve transit orientation.
14	Annapolis	Medium	Medium	Annapolis Comprehensive Plan calls for improved bicycle and pedestrian facilities and expanded local transit services but little increase in employment and residential density.
15	East Montgomery County	Medium	Medium	
16	Laurel	Medium-Low	Medium-Low	
17	Jessup	Medium-Low	Medium-Low	
18	East Anne Arundel	Low	Low	Existing dispersed development supports little to no fixed route transit service in this and other districts with 'low' designations.
19	West Howard County	Low	Low	
20	East Howard County	Low	Low	
21	Columbia	Medium	Medium-High	Downtown Columbia development strategy is focused on pedestrian and transportation improvements and increases in residential and employment density.
22	BWI Airport	Medium	Medium-High	Recent zoning change and forecast growth in airport activity are likely to increase employment density near MTA transit services.
23	Glen Burnie	Low	Low	
24	Carroll County	Low	Low	
25	West Baltimore Co.	Medium-Low	Medium	Redevelopment opportunities exist near MTA transit services.
26	South Baltimore Co.	Medium-Low	Medium-Low	
27	West Baltimore City	Medium-High	Medium-High	
28	East Baltimore City	Medium-High	Medium-High	
29	North Baltimore Co.	Medium-Low	Medium-Low	
30	East Baltimore County	Medium-Low	Medium-Low	

In this analysis, it is important to distinguish between the potential market for transit services from a forecast of ridership on a particular facility or service. Decisions of individuals to choose transit over other modes, and to choose a particular transit facility or service, depend on many factors -- the relative cost, travel time, span, frequency and convenience of service compared to other alternatives. As the level of service improves on a particular transit facility the demand for that service also increases. This analysis is not a forecast of ridership on a particular facility, but rather an estimate of the overall size of a potential transit market.

As a strategic study, a central question is the size of the potential market for transit if an appropriately attractive service can be implemented. This potential market is likely to be driven by the overall size of the travel market, and the competitiveness of transit with the auto for a similar trip, particularly at the destination end. For choice riders, conditions at the destination end are particularly relevant in the decision to use transit. At the origin end, choice riders often can access a transit stop or station via an auto, but choices at the destination end may be limited to walking or transferring to a bus. Where parking is constrained, pedestrian facilities are present and a wide variety of jobs and services are within walking distance of a station, transit demand is likely to be higher than where these amenities are absent at the destination end. On the other hand, if a car is available to access a transit station, transit demand can originate in suburban and even rural districts.

The table below suggests potential mode shares that may be achieved for different types of travel markets. These shares are roughly based on observed transit mode shares from the Baltimore Metropolitan Council (BMC) model dataset. Experience indicates transit is most competitive at capturing work trips due to a number of factors including fewer chained trips, times of travel which coincide with periods when transit is most competitive, employer incentives and relatively less reliance on traveling as a member of a group.

Potential Transit Mode Shares Associated with Transit Orientation Levels

Orientation	Potential Transit Mode Share	
	Work Trips	Non-Work Trips
High	50%	25%
Medium-High	25%	12.5%
Medium	10%	5%
Medium-Low	2%	1%
Low	1%	0.5%

Transit Trip Tables

“Order of magnitude” transit trip tables were estimated for the study area by combing the person trip tables developed in Task 2 with the results of the transit orientation assessment, and assuming the potential transit mode shares presented above. The analysis that follows is concentrated on the AM (three-hour) peak period because transit volumes are highest during this period and the highest potential volume will drive the decision on an appropriate strategy to serve anticipated demand. Estimated transit trip tables for 2005 and 2030 are included in the appendix.

It should be noted that the distribution of trips for this analysis in the forecast year is assumed to be constant regardless of the facilities implemented. Research suggests that people may change their employment and residence locations in response to improved accessibility provided by transportation facilities. Individual travelers may also change their trip making behavior in response to a change in accessibility by selecting jobs, shopping or leisure destinations that are easier to reach. This phenomenon is often referred to as the induced demand for a transportation facility. The magnitude of this induced demand is proportional to the degree of change in accessibility. Most of the investments considered in this corridor are likely to have relatively modest impacts on overall accessibility, but some very high-speed alternatives previously considered in the corridor, such as the maglev proposal, may

alter accessibility such that residential and employment locations as well as individual travel destination decisions are impacted. These changes are not reflected in this study and would require more detailed analysis.

The table below offers an order-of-magnitude estimate of existing transit trip demand and potential growth in the study area between 2005 and 2030. Growth assessments are driven by increased population and employment in addition to improved transit orientation between 2005 and 2030.

Order-of-Magnitude Transit Trips and Anticipated Growth by District

#	District Name	Estimated 2005 Inter-District Trips		Anticipated Growth in Transit Trips	
		Originating in District	Destined to District	Originating in District	Destined to District
1	DC CBD	7,800	86,900	Low	Stable
2	North DC	27,000	13,200	Low	Stable
3	Alexandria	17,800	9,000	Low	Low
4	Arlington	16,600	17,200	Low	Low
5	Silver Spring-Bethesda	18,800	9,200	Low	High
6	Capital Hgts	17,900	2,800	Low	Stable
7	East PG Co	6,000	200	Low	Low
8	College Park	7,700	3,100	Low	High
9	New Carrollton	9,600	3,200	Low	Low
10	Greenbelt	2,500	1,900	High	High
11	Bowie	2,700	300	Low	Low
12	Muirkirk	2,000	400	High	High
13	Odenton	3,300	300	Low	High
14	Annapolis	2,400	2,000	Low	Stable
15	East Mont Co	5,700	1,200	Low	Stable
16	Laurel	2,900	1,500	High	Low
17	Jessup	1,000	500	High	High
18	East Anne Arundel	2,900	200	High	Stable
19	West Howard Co	200	0	Low	High
20	East Howard Co	1,800	100	High	Low
21	Columbia	3,800	3,600	Low	High
22	BWI Airport	800	2,800	High	High
23	Glen Burnie	2,800	300	High	Stable
24	Carroll Co	1,500	0	High	Low
25	West Balt Co	2,600	500	Low	High
26	Southwest Balt Co	4,700	800	Low	Stable
27	West Balt City	4,800	7,200	Low	Stable
28	East Balt City	4,300	23,500	Low	Stable
29	North Balt Co	6,400	1,100	Low	Stable
30	East Balt Co	6,900	600	Low	Stable

In general, growth for originating trips is driven by population growth and is relatively uniform across the study area. Districts anticipated to experience higher than average growth are clustered in the Maryland suburbs beyond the Washington and Baltimore beltways.

Growth in AM peak transit trips destined to study area districts is more varied, ranging from no growth to significant increases. Change in transit trips destined to a district is largely a function of forecast

employment growth or change in transit orientation. Stable or declining growth in transit volumes are predicted in districts where employment growth is low or negative, or where job-housing balance is forecast to improve and therefore accompanied by a decline in demand for inter-district travel. Transit demand to Odenton is anticipated to grow as a result of employment growth associated with the BRAC realignment decisions as well as enhanced transit orientation.

Identification of Transit Markets

Transit markets were identified by analyzing the individual district-to-district potential transit demand and aggregating them to common destinations in the study area. The markets with high transit potential are concentrated on the central areas of Washington and Baltimore, but also include non-traditional suburb-to-suburb and reverse commute markets. Their relative size and growth potential, by direction, are summarized in the following sections. Markets with an anticipated growth between -10% and +10% are characterized as “stable” growth; markets with anticipated change in volume above and below this threshold are indicated as “growing” and “declining,” respectively. Market size is characterized according to the table below, and the corresponding transit investment level will be expanded upon in the next phase of the study (task 5).

Estimated Transit Market Size	AM (3-hr) Peak Period Volume (in the Peak Direction)	Corresponding Transit Investment Level
Very Low	Less than 240 trips	Volume of trips unlikely to support low capital cost transit investment
Low	Between 240 and 1,800 trips	Volume of trips supportive of lower capital cost transit investments
Medium	Between 1,800 and 4,800 trips	Volume of trips supportive of moderate capital cost transit investments
High	More than 4,800 trips	Volume of trips supportive of higher capital cost transit investments

jobs-housing balance. Reverse commute demand, currently low volume, is anticipated to grow. Trip lengths in this market are short.

The market identified as *Mid-Corridor, Along Camden, To/From DC* includes transit demand between Muirkirk, Laurel and Jessup districts along the Camden MARC line and districts in the District of Columbia and Virginia. In the busiest direction, toward Washington, demand is of medium volume and anticipated to decline due to improved job-housing balance in the District and the mid-corridor and the resulting decline in longer-distance travel. Reverse commute volume in this market is currently very low, but expected to grow due to increased employment opportunities in the mid-corridor. Trips in this market are of medium length.

The market identified as *Mid-Corridor, Along Penn, To/From DC* includes transit demand between the Bowie, Odenton and BWI districts along the Penn MARC line and districts in the District of Columbia and Virginia. In the busiest direction, toward Washington, demand is moderate and anticipated to remain at similar volume. Growth is anticipated in the reverse commute market, which currently has very low volumes. Trips in this market are of medium length.

Of special interest is the market identified as *Greater DC To/From BWI* including estimated transit demand from districts in the District of Columbia and Virginia to and from the BWI Airport district. Existing transit demand in the AM peak is busiest toward Washington, DC and anticipated to grow, but is currently of very low volume. In the forecast year, the busiest direction is anticipated to switch toward the airport and also experience significant growth. Trips lengths in this market are long.

Travel to and from Baltimore

The market identified as *North Radial, To/From Baltimore* includes transit demand between North Baltimore County and districts in Baltimore City. Demand in the busiest direction, toward Baltimore City, is high, but not expected to grow significantly through 2030. Reverse commute transit demand, currently low volume, is also anticipated to remain about the same. Trip lengths in this market are short.

The market identified as *East Radial, To/From Baltimore* includes transit demand between East Baltimore County and districts in Baltimore City. Demand in the busiest direction, toward Baltimore City, is high. Reverse commute transit demand in this market is low. Demand in both directions for this market is anticipated to remain stable. Trip lengths in this market are short.

The market identified as *Southeast Radial, To/From Baltimore* includes demand between Annapolis, East Anne Arundel County and Glen Burnie districts and districts in Baltimore City. Demand in the busiest direction, toward Baltimore City, is moderate, but anticipated to decline due to growth in competing opportunities for employment in Odenton and other districts between the Washington and Baltimore Beltways. Modest growth is anticipated in the reverse-commute market from Baltimore, which currently has very low transit demand. Trips in this market are of medium length.

The market identified as *West Radial, To/From Baltimore* includes demand between Baltimore City and the following districts to the west and northwest: Southwest Baltimore County, East Howard County, West Howard County, West Baltimore County and Carroll County. Demand in the busiest direction, toward Baltimore, is high and anticipated to remain stable. Significant growth is anticipated in the reverse-commute market from Baltimore, which currently has low volume. Trips in this market are of medium length.

The market identified as *Mid-Corridor, Along Camden, To/From Baltimore* includes demand between the Jessup, Laurel and Muirkirk districts along the Camden MARC line and Baltimore City. Demand in the busiest direction, toward Baltimore, is low and anticipated to remain stable. Demand in the reverse-commute direction from Baltimore, currently with very low volume, is anticipated to grow.

The market identified as *Mid-Corridor, Along Penn, To/From Baltimore* includes demand between the BWI, Odenton and Bowie districts along the Penn MARC line and Baltimore City. Demand in the busiest direction in 2005, toward Baltimore, is low and is not anticipated to grow. By 2030, the busiest direction is anticipated to reverse toward BWI, Odenton and Bowie and grow as a result of increased employment in the middle of the corridor. Trips in this market are of medium length.

Travel to and from Columbia

The market from *Columbia To/From Greater DC* includes travel between Columbia and districts in the District of Columbia and Virginia. Demand in the busiest direction, toward Washington, is low and not anticipated to grow due in part to improved jobs-housing balance and growth in competing opportunities for jobs in districts between the Washington and Baltimore beltways. Strong growth is anticipated in the reverse commute market toward Columbia, which currently has very low volumes. Trips in this market are of medium length.

The market from *Columbia To/From Baltimore* includes travel between Columbia and both districts in Baltimore City. Similar to travel to Washington, demand in the busiest direction, toward Baltimore, is anticipated to remain stable. Growth is anticipated in the reverse commute market from Baltimore. Trips in this market are of medium length.

The market identified as *Columbia To/From Odenton* includes travel between the Columbia, Laurel, Jessup and Odenton districts. Demand in both directions is low, but anticipated to grow significantly through 2030. Trip lengths in this market are short.

Travel Between the Beltways

The market identified as *Between the Beltways, Along Camden* includes travel among the Muirkirk, Laurel and Jessup districts along the Camden MARC line between the Washington and Baltimore beltways. Demand in this market is approximately evenly split and expected to grow. Trip lengths in this market are short.

The market identified as *Between the Beltways, Along Penn* includes travel among the Bowie, Odenton and BWI districts along the Penn MARC line adjacent to the Camden corridor described above. Similar to the Camden corridor, transit demand is approximately evenly split between the southwest and northeast directions and anticipated to grow. Trip lengths in this market are short.

The market identified as *Annapolis To/From Mid-Corridor and Howard County* stretches across the study area from West Howard County to Annapolis and includes the districts of East Howard County, Columbia, Jessup and Odenton. Demand in the busiest direction, toward Annapolis, is currently low and anticipated to remain stable. Growth is expected in the opposite direction toward Odenton and Columbia. Trip lengths in this market are long.

Summary

The table below summarizes the 2005 and 2030 volumes for the markets identified in the study area. In general, traditional high-volume markets for transit toward Baltimore and District of Columbia are anticipated to remain stable or decline somewhat during the study period. Markets with forecast growth are concentrated in non-traditional reverse commute and suburb-to-suburb markets.

Transit Market Potential AM Peak Transit Volumes Summary

Market	Direction	Trip Length	Volume		Growth
			2005	2030	
Across Study Area	<i>To DC</i>	Long	Low	Low	Growing
	<i>To Baltimore</i>		Very Low	Low	Growing
Within Beltway, North Radial, To/From DC	<i>To DC</i>	Short	High	High	Stable
	<i>Reverse from DC</i>		Low	Low	Growing
Within Beltway, Northeast Radial, To/From DC	<i>To DC</i>	Short	High	High	Stable
	<i>Reverse from DC</i>		Low	Low	Growing
Mid-Corridor, Along Camden, To/From DC	<i>To DC</i>	Medium	Medium	Medium	Declining
	<i>Reverse from DC</i>		Very Low	Very Low	Growing
Mid-Corridor, Along Penn, To/From DC	<i>To DC</i>	Medium	Medium	Medium	Stable
	<i>Reverse From DC</i>		Very Low	Very Low	Growing
Greater DC To/From BWI	<i>To DC</i>	Long	Very Low	Very Low	Growing
	<i>From DC</i>		Very Low	Low	Growing
North Radial, To/From Baltimore	<i>To Baltimore</i>	Short	High	High	Stable
	<i>Reverse from Baltimore</i>		Low	Low	Stable
East Radial, To/From Baltimore	<i>To Baltimore</i>	Short	High	High	Stable
	<i>Reverse from Baltimore</i>		Low	Low	Stable
Southeast Radial, To/From Baltimore	<i>To Baltimore</i>	Medium	Medium	Medium	Declining
	<i>Reverse from Baltimore</i>		Very Low	Very Low	Growing
West Radial, To/From Baltimore	<i>To Baltimore</i>	Medium	High	High	Stable
	<i>Reverse from Baltimore</i>		Low	Low	Growing
Mid-Corridor, Along Camden, To/From Baltimore	<i>To Baltimore</i>	Medium	Low	Low	Stable
	<i>Reverse from Baltimore</i>		Very Low	Very Low	Growing
Mid-Corridor, Along Penn, To/From Baltimore	<i>To Baltimore</i>	Medium	Low	Low	Stable
	<i>Reverse from Baltimore</i>		Low	Low	Growing
Columbia To/From Greater DC	<i>To DC</i>	Medium	Low	Low	Stable
	<i>Reverse from DC</i>		Very Low	Low	Growing
Columbia To/From Baltimore	<i>To Baltimore</i>	Medium	Low	Low	Stable
	<i>Reverse from Baltimore</i>		Low	Medium	Growing
Columbia To/From Odenton	<i>To Odenton</i>	Short	Low	Low	Growing
	<i>From Odenton</i>		Low	Medium	Growing
Between the Beltways, Along Camden	<i>SW Bound</i>	Short	Low	Medium	Growing
	<i>NE Bound</i>		Low	Medium	Growing
Between the Beltways, Along Penn	<i>SW Bound</i>	Short	Low	Low	Growing
	<i>NE Bound</i>		Low	Low	Growing
Annapolis To/From Mid-Corridor and Howard County	<i>Toward Annapolis</i>	Long	Low	Low	Stable
	<i>Toward Howard County</i>		Very Low	Low	Growing

The table on the following page presents the same information as above, but places each market into one of twelve categories in a matrix format. Markets with the most existing riders are on the right-hand side, and markets with projected growth are listed in the first row.

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Categorization of Markets According to Growth and AM Peak Period Transit Volume

		Base Year (2005) Volume			
		Very Low	Low	Medium	High
Transit Market Growth	Growing	Across Study Area - To Baltimore Mid-Corridor, Along Camden - From DC Mid-Corridor, Along Penn - From DC Greater DC - To BWI BWI - To Greater DC Southeast Radial (Annapolis) - From Baltimore Mid-Corridor, Along Camden - From Baltimore Greater DC - To Columbia Annapolis - Toward Mid-Corridor and Howard Co.	Across Study Area - To DC Within Beltway, North Radial - From DC Within Beltway, Northeast Radial - From DC West Radial - From Baltimore Mid-Corridor, Along Penn - From Baltimore Baltimore - To Columbia Columbia - To Odenton Odenton - To Columbia Between the Beltways, Along Camden - Toward SW Between the Beltways, Along Camden - Toward NE Between the Beltways, Along Penn - Toward SW Between the Beltways, Along Penn - Toward NE		
	Stable		North Radial - From Baltimore East Radial - From Baltimore Mid-Corridor, Along Camden - To Baltimore Mid-Corridor, Along Penn - To Baltimore Columbia - To Greater DC Columbia - To Baltimore Mid-Corridor and Howard Co. - Toward Annapolis	Mid-Corridor, Along Penn - To DC	Within Beltway, North Radial - To DC Within Beltway, Northeast Radial - To DC North Radial - To Baltimore East Radial - To Baltimore West Radial - To Baltimore
	Declining			Mid-Corridor, Along Camden - To DC Southeast Radial (Annapolis) - To Baltimore	

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Volume in the Central Baltimore to Central DC Corridor

Much previous planning work has been directed toward options for improved limited or non-stop service between downtown Washington and downtown Baltimore. Analysis in previous study tasks indicated the total volume of travel from central Washington to Baltimore represented a small fraction of trips in the study area. In this study, potential transit demand, assuming optimistic shares for transit, are just 1,700 trips in the AM peak period in 2030. This suggests a non-stop service between the two downtowns should not be the central focus of investment in the Corridor.

Previous travel forecasting supporting the planning for the Baltimore-Washington Maglev demonstration project with stops at Washington's Union Station, BWI, and Baltimore's Inner Harbor included a daily ridership estimate for this service of 27,200 one-way trips in the opening year (envisioned at the time to be 2013)¹. Extrapolating the values reported in the EIS document to 2030 yields more than 39,000 daily trips forecast for 2030. Assuming 30% of the estimated one-way maglev trips would occur during the AM peak, the implied 11,700 trips in the Maglev EIS is an order of magnitude larger than the transit potential identified in this study. There are several reasons for this discrepancy. First, the travel time savings afforded by the maglev project would have made the facility attractive to trips originating in a wider number of districts than assumed in this analysis. Moreover, the Maglev travel forecast may have assumed dramatic changes in employment and residential location in response to changed accessibility in addition to significant changes in trip patterns. This study assumes that commuter (work) trip patterns in 2030 will be the same as in the year 2000, and trip patterns for all other trips will be similar to the base year (2005) and grow in proportion to forecast population and employment. The travel forecast for the Maglev service may include trip purpose like tourism and excursion rides on the new technology that are not reflected in this analysis. And finally, the novelty of the new system and its speed of significantly faster than current experience may have resulted in projected mode shares that are higher than even the optimistic assumptions used in this analysis.

Potential Volumes in Key Corridors

For the transit markets identified above, multiple markets are aligned along common corridors. To better understand the cumulative volumes, travel trips are aggregated to represent potential loading along a conceptual transit facility with stops in each district for four key corridors.

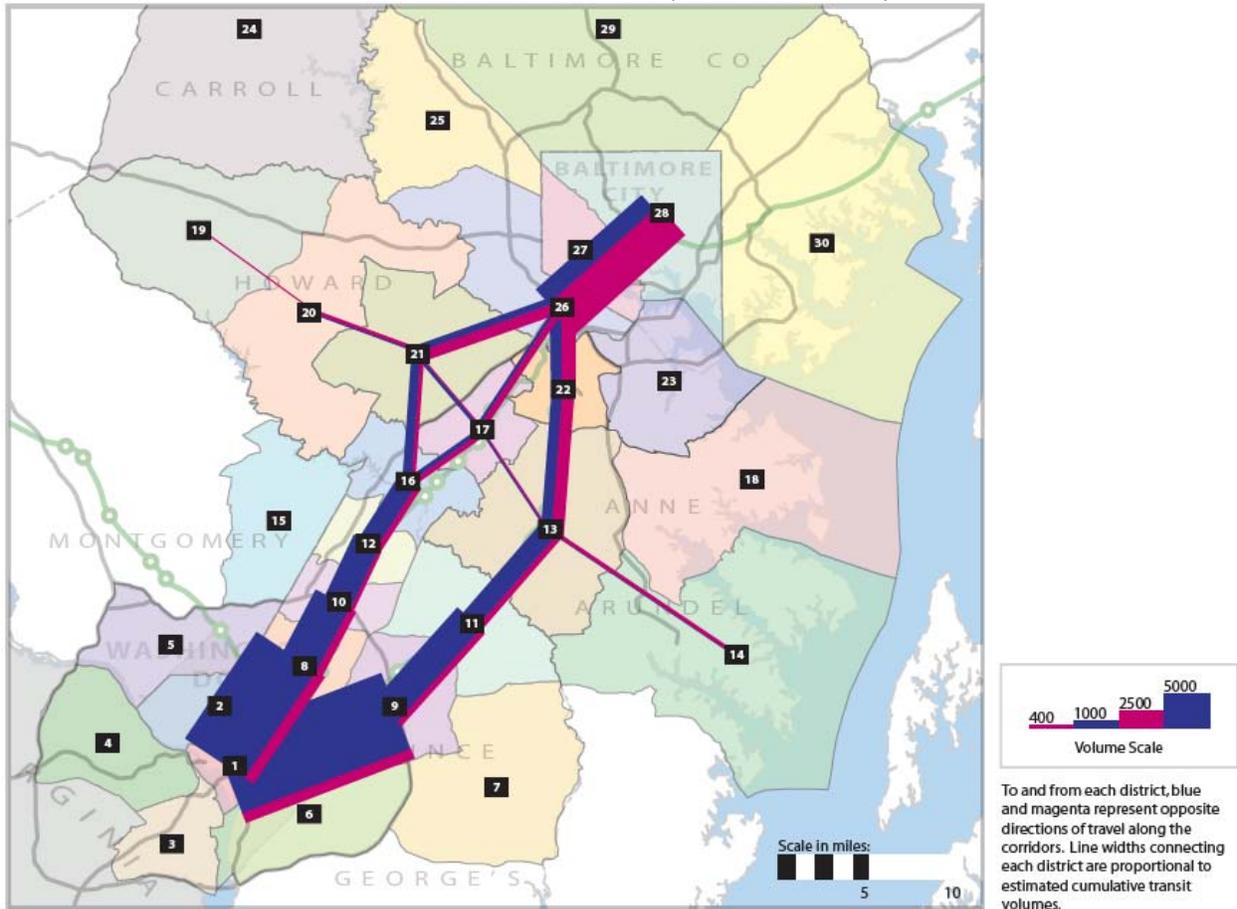
Conceptually, the maps can be thought of as load profiles displaying the AM peak period load leaving a station in the district. However, they are not intended to represent the actual loadings on a transit line since multiple services may be operating in the corridor to serve the underlying markets. Moreover, trips originating outside the study area and those that have long access journeys perpendicular to the corridor may not be reflected in these volume estimates. These limitations notwithstanding, the volume estimates presented in the charts below are helpful in identifying directions and locations likely to experience growth and appropriate end points of high-capacity facilities.

The following maps present this information with lines scaled in proportion to estimated volumes. Lines shaded in blue represent travel toward Washington, or in the case of the perpendicular corridor toward Annapolis, and magenta shaded lines indicate travel in the opposite direction.

Existing transit demand, as shown in the map below, is concentrated toward districts in the District of Columbia and Virginia. The highest volumes in the study area are radially inbound just inside the Washington Beltway. There is a similar, but smaller radial flow into Baltimore City complemented by a sizable reverse commute market for those living in Baltimore and traveling to jobs between the beltways in beyond in Washington. Volumes in non-traditional markets, across the study area and reverse commutes, are small.

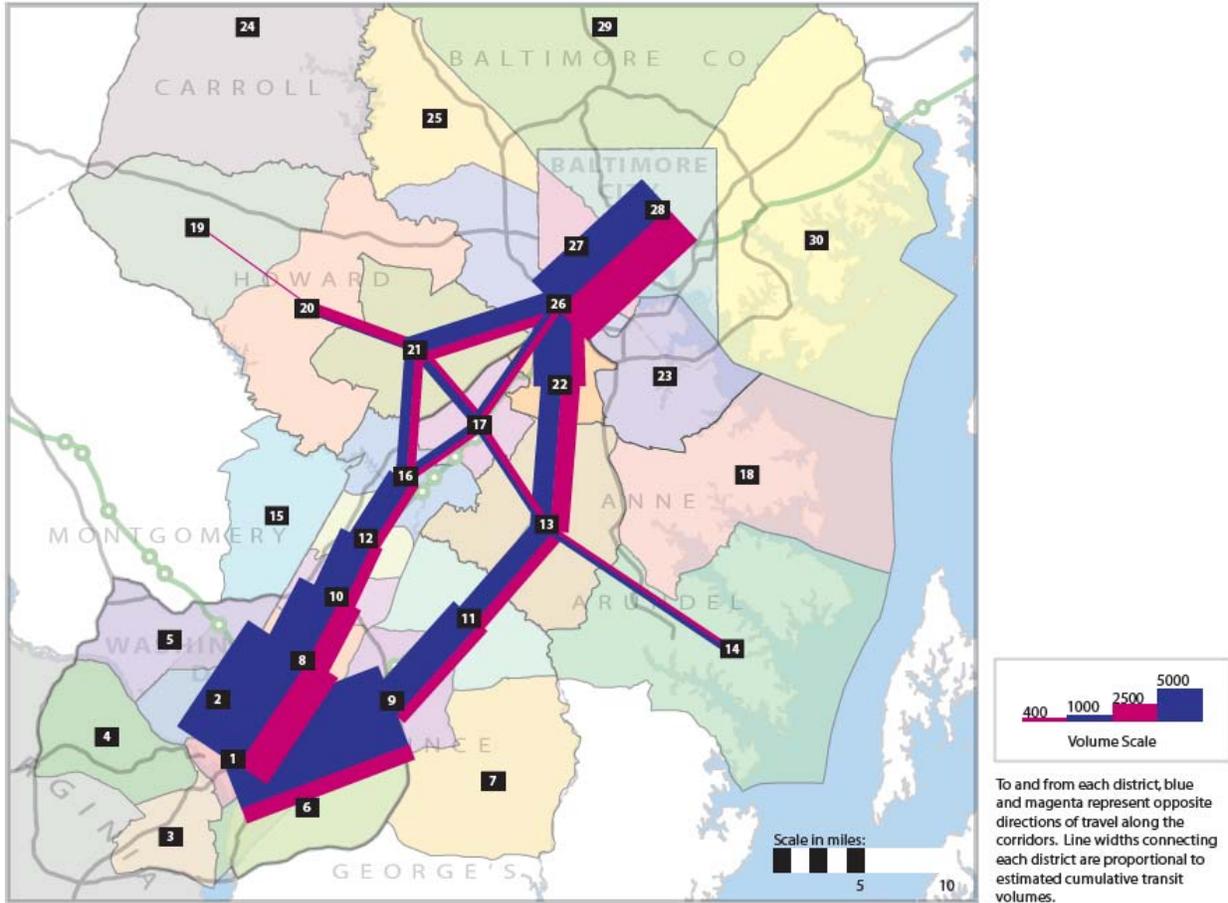
¹ Baltimore-Washington Maglev Project Final Environmental Impact Statement, 2006 Update

2005 Corridor Volumes (AM Peak Period)



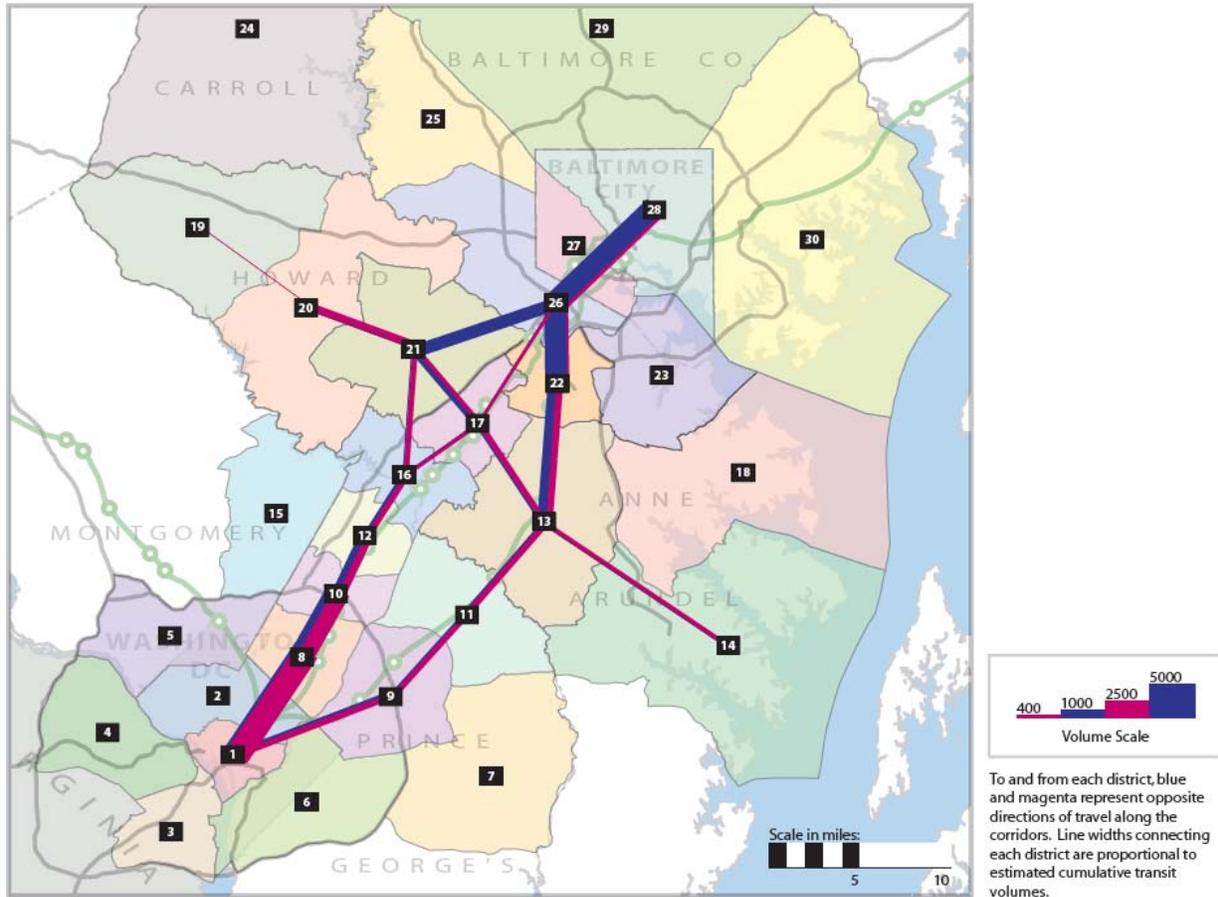
Volumes estimated for 2030, which are shown below at the same scale, indicate the combined effects of forecasted growth in employment and improved transit orientation. Demand is expected to increase in nearly all markets, but is particularly notable in the non-traditional reverse commute and suburb-to-suburb travel. Along the Camden MARC line, relatively high transit demand extends from Washington as far as Laurel (District 16). Demand from Baltimore is particularly high as far as BWI (District 22) and to a lesser extent, extends to Odenton (District 13) along the Penn Line.

2030 Corridor Volumes (AM Peak Period)



The map below indicates the change in transit volumes along the key corridors from 2005 to 2030. As discussed in the analysis of individual markets, the corridor segments anticipated to experience the most growth are in non-traditional reverse commute and suburb-to-suburb markets. High forecast residential growth in the District of Columbia will absorb much of the employment growth there and slow the growth in demand for long distance and radial trips. In contrast, high rates of employment growth in districts between the Washington and Baltimore beltways results in increased demands for reverse-commute and suburb-to-suburb transit service.

Change in Volumes from 2005 to 2030 (AM Peak Period)



Transit Service Framework

Existing and potential transit markets in the study corridor have been identified based on work completed in previous phases. To initiate the identification of transit service strategies and alternatives for the various markets, the following framework is proposed based on trip lengths and the peak period travel volumes.

The table below identifies a hierarchy of service classifications, similar to the functional classification system used for highways. For each service classification, various transit service strategies and transit vehicle technology options are identified based on trip length and the volume of travel to be accommodated. For markets with a potential volume of “medium” or above, the higher capacity strategies are appropriate. Relevant existing or proposed services in the study area are identified as examples of the types of improvements that could be considered. This framework will be applied to the transit markets in the next phase of this study (task 5).

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Service Classifications	Relative Service Capacity	Transit Service Strategies	Transit Vehicle Technology Options	Additional Features	Specific Study Area Examples
Long Haul (Inter-City, i.e. travel across the study area)	Higher Capacity	Fixed route express (widely spaced stops) ¹	Maglev; Commuter Rail; Over-the-Road Coaches	Stations; Park-and-ride; Buses in HOV lanes on freeways; Seats for all passengers	Baltimore-Washington Maglev Express or skip-stop MARC service on the Penn and Camden Lines
	Lower Capacity	Fixed route express (widely spaced stops) Fixed route local (medium spaced stops) ²	Standard Bus, (possibly over-the-road coaches); Vanpools	Park-and-ride; Buses in HOV lanes on freeways; Seats for all passengers	Bus service between park-and-ride lots and Baltimore, Washington, BWI, Ft. Meade, and other employment centers MTA commuter assistance program
Medium Haul (Metropolitan, i.e. travel between districts)	Higher Capacity	Fixed route express (medium spaced stops) Fixed route local (frequent stops) ³	Commuter Rail; Heavy Rail; Light Rail; Articulated Bus	Stations; Park-and-ride; Buses in reserved lanes; Signal priority; Some passengers stand during peak periods	Expanded MARC service Metrorail Green Line extension Extended or new MTA light rail or bus lines
	Lower Capacity	Fixed route local (frequent stops)	Standard Bus; Vanpools	Mixed traffic operations; Shelters; Some passengers stand during peak periods	MTA bus Metrobus
Local, Feeder & Circulator Travel (i.e. intra-district and adjacent district travel)	Higher Capacity	Fixed route local (frequent stops)	Standard Bus; Streetcar	Many passengers stand during peak periods	MTA Bus, Metrobus, Howard Transit, Connect-A-Ride, etc. services
	Lower Capacity	Fixed route local (frequent stops); Demand responsive Special services	Small Bus; Shuttles; Station Cars		Howard Transit, Connect-A-Ride, etc. services Dial-a-ride services Paratransit services Employer-sponsored shuttles (Ft. Meade)

¹ Stop spacing greater than 2 miles.

² Stop spacing ½ to 2 miles.

³ Stop spacing ¼ to ½ mile.

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Transit Service Strategy

Based on the proposed framework presented above, a transit service strategy is identified for each of the markets as described in the table below by combining findings on trip length and peak period volumes in 2030. Markets with a 2030 peak period volume of medium or higher are recommend for analysis of potential higher-capacity transit service strategy alternatives. Moreover, strategies are developed for each market on the basis of the demand in the busiest direction as this is likely to drive the type of investment made, particularly for high capacity alternatives. Where existing higher-capacity services may be partially meeting the projected transit demand, this service is noted.

Transit Service Strategy By Market (AM Peak Direction)

		Trip Length	2030 Peak Direction Volume	Service Strategy	Service Capacity	Notes
	Across the Study Area	Long	Medium	Long Haul, Fixed Route Express	Higher	Served by existing MARC and commuter bus services
DC	Within Beltway, North Radial, To/From DC	Short	High	Local, Fixed Route	Higher	Served by existing Metro service
	Within Beltway, Northeast Radial, To/From DC	Short	High	Local, Fixed Route	Higher	Served by existing Metro service
	Mid-Corridor, Along Camden, To/From DC	Medium	Medium	Medium Haul, Fixed Route Express	Higher	Highest demand extends as far as Laurel
	Mid-Corridor, Along Penn, To/From DC	Medium	Medium	Medium Haul, Fixed Route Express	Higher	Served by existing MARC service
	Greater DC To/From BWI	Long	Low	Long Haul, Fixed Route Express	Lower	Modest travel demand
Baltimore	North Radial, To/From Baltimore	Short	High	Local, Fixed Route	Higher	Served by existing MTA LRT
	East Radial, To/From Baltimore	Short	High	Local, Fixed Route	Higher	Planned MTA LRT service
	Southeast Radial, To/From Baltimore	Medium	Medium	Medium Haul, Fixed Route Express and Local	Higher	Opportunity for reverse commute services
	West Radial, To/From Baltimore	Medium	High	Medium Haul, Fixed Route Express and Local	Higher	Planned MTA LRT service
	Mid-Corridor, Along Camden, To/From Baltimore	Medium	Low	Medium Haul, Fixed Route Express and Local	Lower	Opportunity for reverse commute services

	Mid-Corridor, Along Penn, To/From Baltimore	Medium	Medium	Medium Haul, Fixed Route Express and Local	Higher	Opportunity for reverse commute services
Columbia	Columbia To/From Greater DC	Medium	Low	Medium Haul, Fixed Route Express and Local	Lower	Served by existing express buses
	Columbia To/From Baltimore	Medium	Medium	Medium Haul, Fixed Route Express and Local	Higher	Served by existing express buses
	Columbia To/From Odenton	Short	Medium	Local, Fixed Route	Higher	Limited existing services. Opportunity for higher capacity services.
Mid-Corridor	Between the Beltways, Along Camden	Short	Medium	Local, Fixed Route	Higher	Limited existing services. Opportunity for higher capacity service.
	Between the Beltways, Along Penn	Short	Low	Local, Fixed Route	Lower	Limited existing services.
	Annapolis To/From Mid-Corridor and Howard County	Long	Low	Fixed Route Express	Lower	Opportunity for lower capacity service

Appendix A - Exhibits

Exhibit 1: BWIC Travel Districts

District No.	District Name
1	DC CBD
2	North DC
3	Alexandria
4	Arlington
5	Silver Spring-Bethesda
6	Capital Heights
7	East Prince George's County
8	College Park
9	New Carrollton
10	Greenbelt
11	Bowie
12	Muirkirk
13	Odenton
14	Annapolis
15	East Montgomery County
16	Laurel
17	Jessup
18	East Anne Arundel
19	West Howard County
20	East Howard County
21	Columbia
22	BWI Airport
23	Glen Burnie
24	Carroll County
25	West Baltimore County
26	Southwest Baltimore County
27	West Baltimore City
28	East Baltimore City
29	North Baltimore County
30	East Baltimore County

Appendix B – Quantitative Analysis of Transit Market Potential

The analysis presented below is the quantitative results to analysis of transit market potential supporting the summary presented in the technical memorandum. The values should be considered order-of-magnitude estimates of potential transit demand.

Change in AM Peak Transit Trips by Origin District Between 2005 and 2030

No	District Name	Change in Transit Trips	(%)
1	DC CBD	2,295	30%
2	North DC	8,394	31%
3	Alexandria	3,903	22%
4	Arlington	3,169	19%
5	Silver Spring-Bethesda	4,433	24%
6	Capital Heights	3,308	19%
7	East PG Co	2,340	39%
8	College Park	1,796	24%
9	New Carrollton	2,673	28%
10	Greenbelt	1,359	54%
11	Bowie	1,137	43%
12	Muirkirk	1,184	61%
13	Odenton	886	27%
14	Annapolis	929	40%
15	East Mont Co	2,099	37%
16	Laurel	1,375	48%
17	Jessup	1,402	147%
18	East Anne Arundel	1,349	47%
19	West Howard Co	44	28%
20	East Howard Co	1,613	91%
21	Columbia	924	25%
22	BWI Airport	353	48%
23	Glen Burnie	1,750	64%
24	Carroll Co	1,985	136%
25	West Balt Co	854	34%
26	Southwest Balt Co	1,906	41%
27	West Balt City	1,284	27%
28	East Balt City	1,623	38%
29	North Balt Co	1,924	30%
30	East Balt Co	1,587	23%
	Entire Study Area	59,881	31%

The study area is forecast to grow by 31% or nearly 60,000 AM peak period transit trips. Growth in trips originating in a district is largely driven by forecast population growth. The largest magnitude growth is predicted for the North DC district with 8,394 trips. Jessup shows the largest percentage growth of 147% or 1,402 AM peak trips.

Change in AM Peak Transit Trips by Destination District Between 2005 and 2030

No	District Name	Change in Transit Trips	(%)
1	DC CBD	8,395	10%
2	North DC	202	2%
3	Alexandria	1,373	15%
4	Arlington	4,130	24%
5	Silver Spring-Bethesda	8,983	98%
6	Capital Heights	246	9%
7	East PG Co	48	20%
8	College Park	6,572	215%
9	New Carrollton	749	23%
10	Greenbelt	4,071	213%
11	Bowie	38	14%
12	Muirkirk	3,191	781%
13	Odenton	5,390	1912%
14	Annapolis	(50)	-2%
15	East Mont Co	107	9%
16	Laurel	640	42%
17	Jessup	291	62%
18	East Anne Arundel	(5)	-3%
19	West Howard Co	1	45%
20	East Howard Co	33	26%
21	Columbia	6,117	168%
22	BWI Airport	6,402	232%
23	Glen Burnie	2	0%
24	Carroll Co	6	15%
25	West Balt Co	2,050	442%
26	Southwest Balt Co	(4)	-1%
27	West Balt City	45	1%
28	East Balt City	860	4%
29	North Balt Co	(15)	-1%
30	East Balt Co	13	2%
	Entire Study Area	59,881	31%

Growth in AM peak transit trips destined to the study area districts are more varied, ranging from a modest decline to an increase of more than 1900%. Change in transit trips destined to a district is largely a function of forecast employment growth or change in transit orientation. Declines in transit volumes are predicted in districts where employment growth is low or negative, or where job-housing balance is forecast to improve and therefore accompanied by a decline in demand for inter-district travel. The highest absolute magnitude growth, 8,983 transit trips, is anticipated for the Silver Spring-Bethesda district followed closely by 8,395 trips destined to the Washington, DC central business district. The highest percentage growth district is Odenton with 5,390 trips representing a 1912% growth. Transit demand to Odenton is anticipated to grow as a result of employment growth associated with the BRAC realignment decisions as well as enhanced transit orientation.

Travel across the study area

The market identified as *Across the Study Area* includes travel to or from districts in the District of Columbia and surrounding districts within the Washington beltway and Baltimore City and districts in Baltimore County to the north and east. In the busiest direction, toward Washington, AM peak period

volume is anticipated to grow from 1,065 trips to 1,263 trips between 2005 and 2030. Transit travel in this market is anticipated to grow by 32%, and the growth will be fastest in the reverse, toward Baltimore, direction.

Travel to and from DC

The market identified as *Within Beltway, North Radial, To/From DC* includes trips between the College Park and Greenbelt districts and the District of Columbia and Virginia. In the busiest direction, toward Washington, AM peak period volume is anticipated to decline modestly from 6,393 to 5,976 trips. Overall, transit demand is anticipated to grow 12% because of significant projected employment growth in the Maryland suburbs. Reverse commute transit demand from Washington is expected to grow significantly.

The market identified as *Within Beltway, Northeast Radial, To/From DC* includes trips between the New Carrollton district and districts in the District of Columbia and Virginia. In the busiest direction, toward Washington, transit demand is anticipated to decline slightly from 6,934 to 6,780 AM peak period trips due to improved jobs-housing balance. Transit travel in both directions is expected to decline a modest 1%.

The market identified as *Mid-Corridor, Along Camden, To/From DC* includes transit demand between Muirkirk, Laurel and Jessup districts along the Camden MARC line and districts in the District of Columbia and Virginia. In the busiest direction, toward Washington, demand is anticipated to decline modestly from 2,158 to 1,801 trips and, similarly, travel in both directions is anticipated to decline 17%, due to growth in employment opportunities in the mid-corridor and an associated decline in long-distance travel.

The market identified as *Mid-Corridor, Along Penn, To/From DC* includes transit demand between the Bowie, Odenton and BWI districts along the Penn MARC line and districts in the District of Columbia and Virginia. As with the adjacent Camden corridor, transit demand is anticipated to decline from 2,596 to 2,340 trips. Despite growth in the reverse-commute market from Washington, travel in both directions is anticipated to decline by 3%.

Of special interest is the market identified as *Greater DC To/From BWI* including estimated transit demand from districts in the District of Columbia and Virginia to and from the BWI Airport district. Existing transit demand in the AM peak is busiest toward Washington, DC and is estimated at 124 trips. In the forecast year, the busiest direction is anticipated to switch toward the airport and grow to 335 trips. While this market has relatively small estimated volume, transit demand in both directions is anticipated to more than double by 2030.

Travel to and from Baltimore

The market identified as *North Radial, To/From Baltimore* includes transit demand between North Baltimore County and districts in Baltimore City. Demand in the busiest direction, toward Baltimore City, is anticipated to grow from 5,430 to 5,877 transit trips. Overall transit demand in this market is anticipated to grow 8%.

The market identified as *East Radial, To/From Baltimore* includes transit demand between East Baltimore County and districts in Baltimore City. Demand in the busiest direction, toward Baltimore City, is anticipated to grow from 5,739 to 6,943 transit trips. Overall transit demand in this market is anticipated to grow 5%.

The market identified as *Southeast Radial, To/From Baltimore* includes demand between Annapolis, East Anne Arundel County and Glen Burnie districts and districts in Baltimore City. Demand in the busiest direction, toward Baltimore City, is anticipated to decline from 2,803 and 2,478 trips due to growth in competing opportunities for employment in Odenton and other districts between the Washington and

Baltimore Beltways. Despite modest anticipated growth in the reverse-commute market from Baltimore, overall transit demand in this market is anticipated to decline 10%.

The market identified as *West Radial, To/From Baltimore* includes demand between Baltimore City and the following districts to the west and northwest: Southwest Baltimore County, East Howard County, West Howard County, West Baltimore County and Carroll County. Demand in the busiest direction, toward Baltimore, is anticipated to change modestly from 5,808 to 5,791 transit trips. Significant growth in the reverse-commute market from Baltimore results in an anticipated 9% growth in demand in both directions.

The market identified as *Mid-Corridor, Along Camden, To/From Baltimore* includes demand between the Jessup, Laurel and Muirkirk districts along the Camden MARC line and Baltimore City. Demand in the busiest direction, toward Baltimore, is anticipated to grow from 673 to 713 trips. Demand in the reverse-commute direction from Baltimore is anticipated to grow faster resulting in a combined growth in this market of 22%

The market identified as *Mid-Corridor, Along Penn, To/From Baltimore* includes demand between the BWI, Odenton and Bowie districts along the Penn MARC line and Baltimore City. Demand in the busiest direction in 2005, toward Baltimore, is estimated at 1,061 trips. By 2030, the busiest direction is anticipated to reverse toward BWI, Odenton and Bowie and grow to 1,297 trips. The combined demand in this market is anticipated to grow 76%.

Travel to and from Columbia

The market from *Columbia To/From Greater DC* includes travel between Columbia and districts in the District of Columbia and Virginia. Demand in the busiest direction, toward Washington, is anticipated to decline modestly from 1,209 to 1,175 trips due in part to improved jobs-housing balance and growth in competing opportunities for jobs in districts between the Washington and Baltimore beltways. The reverse commute market is anticipated to grow from 187 to 446 trips or 139%. Growth in the reverse commute market toward Columbia results in an anticipated growth of 16% in travel in both directions combined. The overall size of the reverse commute market is likely to support only low capital cost transit investments.

The market from *Columbia To/From Baltimore* includes travel between Columbia and both districts in Baltimore City and East Baltimore County beyond. Similar to travel to Washington, demand in the busiest direction, toward Baltimore, is anticipated to decline from 1,710 to 1,564. By 2030, demand is anticipated to be greater in the reverse commute direction, toward Columbia, growing from 837 to 2,389 trips. Growth in the reverse commute market from Baltimore results in an anticipated growth of 55% in travel in both direction combined.

The market identified as *Columbia To/From Odenton* includes travel between the Columbia, Laurel, Jessup and Odenton districts. Demand in the busiest direction, from Odenton toward Columbia, is anticipated to grow significantly from 898 to 2,194 trips. Demand in both directions is anticipated exhibit strong growth, nearly tripling by 2030.

Travel Between the Beltways

The market identified as *Between the Beltways, Along Camden* includes travel among the Muirkirk, Laurel and Jessup districts along the Camden MARC line between the Washington and Baltimore beltways. Demand in this market is approximately evenly split. In 2005 the busiest direction is northeasterly with an estimated 916 trips. By 2030, the busiest direction is anticipated to switch toward the southwest with 2,455 trips. Strong employment growth in this corridor is anticipated to result in overall transit demand growth of 2,748 in both directions, or a 153% growth in the existing 1,794 trips. This moderate volume suggests higher capacity transit service strategies that serve the relatively short trip lengths in this market should be investigated.

The market identified as *Between the Beltways, Along Penn* includes travel among the Bowie, Odenton and BWI districts along the Penn MARC line adjacent to the Camden corridor described above. Similar to the Camden corridor, transit demand is approximately evenly split between the southwest and northeast directions. Demand in the busiest northeasterly direction is estimated as 348 trips in 2005. By 2030, the busiest direction switches toward Odenton and has an estimated demand of 1,167 trips. Overall demand in this market is anticipated to grow by more than 250%.

The market identified as *Annapolis to/from Mid-Corridor and Howard County* stretches across the study area from West Howard County to Annapolis and includes the districts of East Howard County, Columbia, Jessup and Odenton. Demand in the busiest direction, toward Annapolis, is anticipated to grow from 502 trips to 533 by 2030. By 2030, the busiest direction will reverse from Annapolis toward Odenton and beyond, with a combined growth of 118%.

The table below summarizes the 2005 and 2030 volumes for the markets identified in the study area. Absolute growth percentages are displayed to quantify anticipated growth. Volumes are shaded by direction to distinguish relative volumes sufficient to support various service strategies discussed in more detail in subsequent memoranda.

Transit Market Potential AM Peak Transit Volumes Summary¹

Market	Direction	Potential AM Peak Transit Volume			
		2005	2030	Growth	%
Across Study Area	<i>To DC</i>	1,065	1,263	198	19%
	<i>To Baltimore</i>	222	438	216	97%
Within Beltway, North Radial, To/From DC	<i>To DC</i>	6,393	5,976	-417	-7%
	<i>Reverse from DC</i>	532	1,770	1,238	233%
Within Beltway, Northeast Radial, To/From DC	<i>To DC</i>	6,934	6,780	-154	-2%
	<i>Reverse from DC</i>	326	403	77	23%
Mid-Corridor, Along Camden, To/From DC	<i>To DC</i>	2,158	1,801	-357	-17%
	<i>Reverse from DC</i>	60	225	166	278%
Mid-Corridor, Along Penn, To/From DC	<i>To DC</i>	2,596	2,340	-255	-10%
	<i>Reverse From DC</i>	45	212	167	375%
Greater DC To/From BWI	<i>To DC</i>	124	172	48	39%
	<i>From DC</i>	84	335	251	298%
North Radial, To/From Baltimore	<i>To Baltimore</i>	5,430	5,877	448	8%
	<i>Reverse from Baltimore</i>	447	445	-2	0%
East Radial, To/From Baltimore	<i>To Baltimore</i>	5,739	6,043	304	5%
	<i>Reverse from Baltimore</i>	293	304	11	4%
Southeast Radial, To/From Baltimore	<i>To Baltimore</i>	2,803	2,478	-325	-12%
	<i>Reverse from Baltimore</i>	119	140	21	18%
West Radial, To/From Baltimore	<i>To Baltimore</i>	5,808	5,791	-17	0%
	<i>Reverse from Baltimore</i>	414	982	568	137%
Mid-Corridor, Along Camden, To/From Baltimore	<i>To Baltimore</i>	673	713	40	6%
	<i>Reverse from Baltimore</i>	79	201	122	154%

¹ Volume shading thresholds: **Tan** >160 peak period trips, **Orange** > 1,200 peak period trips, **Red** >4,800 peak period trips, representing demand likely sufficient to support low, medium and high capital cost transit investments, respectively.

Mid-Corridor, Along Penn, To/From Baltimore	<i>To Baltimore</i>	1,061	1,046	-15	-1%
	<i>Reverse from Baltimore</i>	270	1,297	1,026	380%
Columbia To/From Greater DC	<i>To DC</i>	1,209	1,175	-33	-3%
	<i>Reverse from DC</i>	187	446	260	139%
Columbia To/From Baltimore	<i>To Baltimore</i>	1,710	1,564	-146	-9%
	<i>Reverse from Baltimore</i>	837	2,389	1,553	186%
Columbia To/From Odenton	<i>To Odenton</i>	297	1,344	1,048	353%
	<i>From Odenton</i>	898	2,194	1,296	144%
Between the Beltways, Along Camden	<i>SW Bound</i>	878	2,455	1,577	180%
	<i>NE Bound</i>	916	2,087	1,171	128%
Between the Beltways, Along Penn	<i>SW Bound</i>	257	1,167	909	354%
	<i>NE Bound</i>	348	999	651	187%
Annapolis To/From Mid-Corridor and Howard County	<i>Toward Annapolis</i>	502	533	1,866	250%
	<i>Toward Howard County</i>	107	793	1,514	234%

The market with the largest absolute growth in anticipated transit demand is *Between the Beltways, Along Camden* with 2,748 trips. The market with the highest percentage growth in total demand is *Between the Beltways, Along Penn* with 258% anticipated growth in demand.

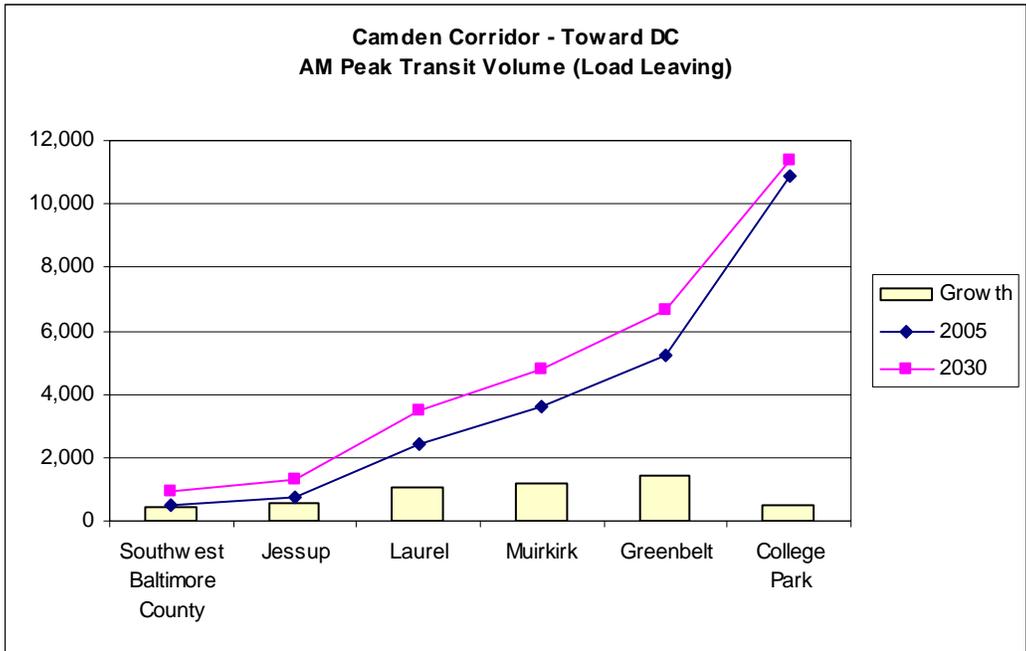
Potential Volumes in Key Corridors

For the transit markets identified above, multiple markets are aligned along common corridors. To better understand the cumulative volumes, travel trips are aggregated to represent potential loading along a conceptual transit facility with stops in each district for four key corridors.

Conceptually, the charts can be thought of as load profiles displaying the load leaving a station in the district. However, they are not intended to represent the actual loadings on a transit line since multiple services may be operating in the corridor to serve the underlying markets. Moreover, trips originating outside the study area and those that have long access journeys perpendicular to the corridor may not be reflected in these volume estimates. These limitations notwithstanding, the volume estimates presented in the charts below are helpful in identifying directions and locations likely to experience growth and appropriate end points of high-capacity facilities.

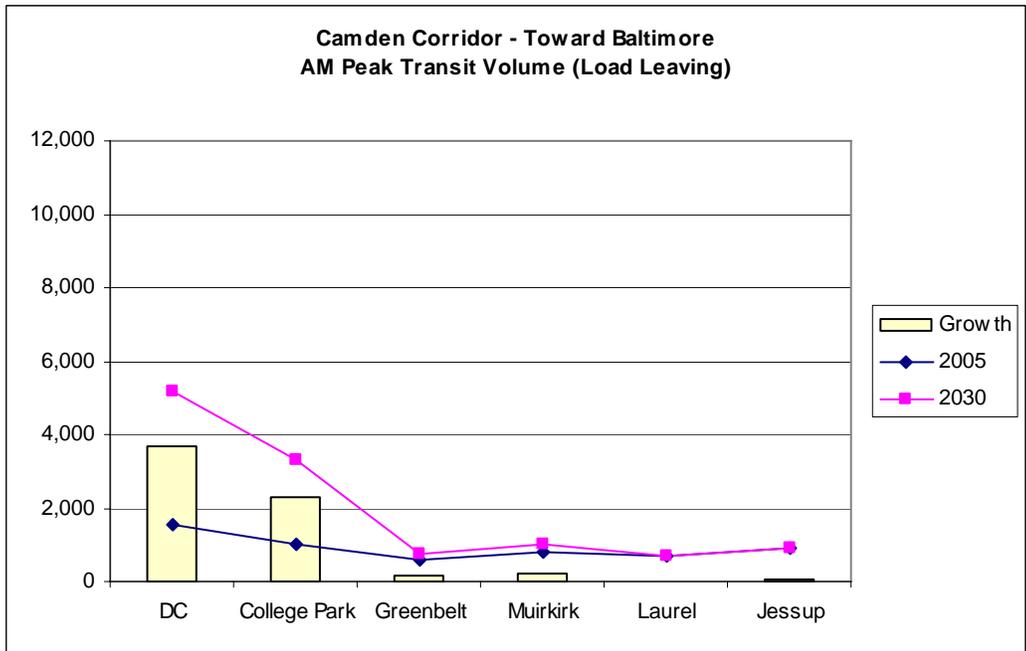
The following charts show conceptual load profiles along four key study area corridors with order-of-magnitude estimates of growth in demand between 2005 and 2030. The first, labeled the Camden Corridor, parallels the Camden MARC line. As an alternative alignment in this corridor labeled Camden Corridor (Columbia Terminal) extends along the Camden MARC line to Laurel and then continues to Columbia. The third corridor extends from Washington to Baltimore along the Penn MARC line. The fourth key corridor extends perpendicularly from the main axis of the study area from West Howard County to Annapolis passing through the East Howard County, Columbia, Jessup, and Odenton districts.

Parallel to the Camden Corridor (Toward DC)



Transit demand in the Camden Corridor is anticipated to grow in the traditional radial market toward Washington, DC. Growth is especially strong as far north as Laurel reflecting increased travel to the District of Columbia and shorter trips between the Washington and Baltimore beltways.

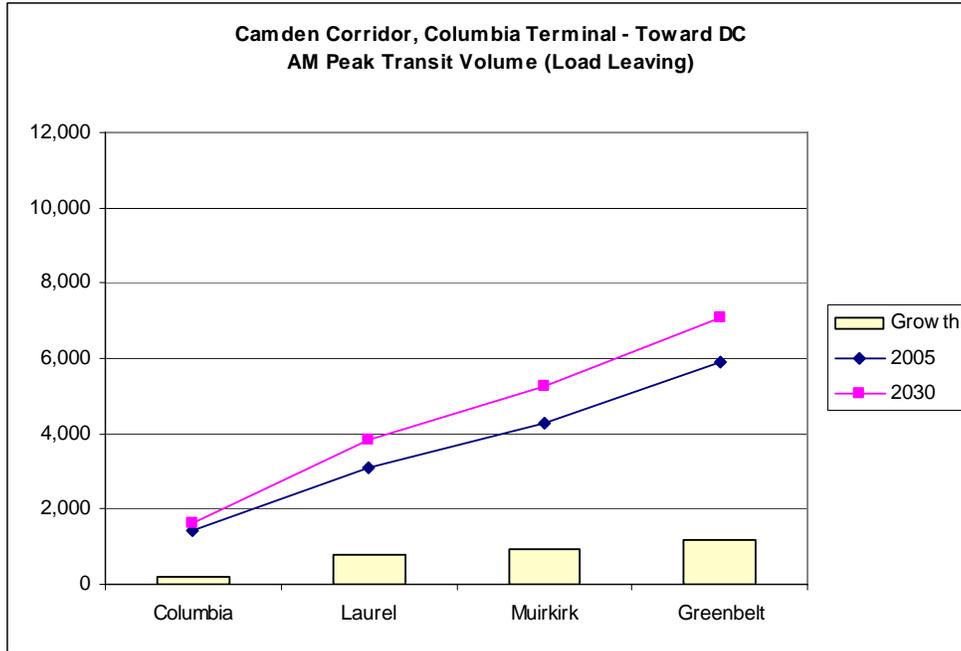
Parallel to the Camden Corridor (Toward Baltimore)



The Camden Corridor toward Baltimore suggests significant growth in reverse commuting, away from central Washington, as far as Greenbelt. Volumes in the base year are relatively low, but grow

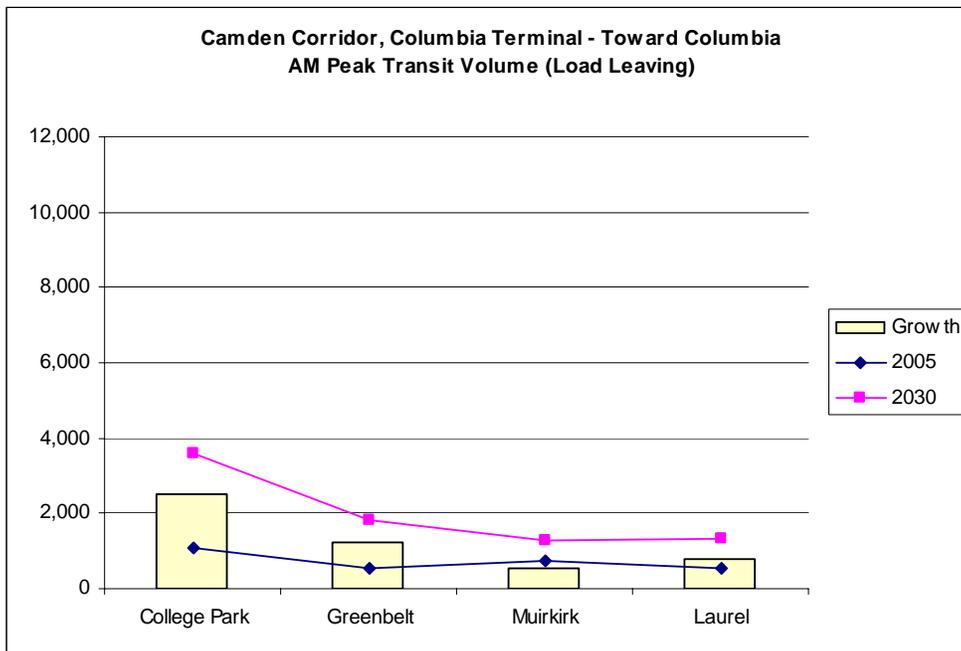
significantly through 2030 as a result of projected employment growth in Maryland and potentially improved transit orientation in districts along the corridor.

Parallel to the Camden Corridor with a Spur to Columbia (Toward DC)



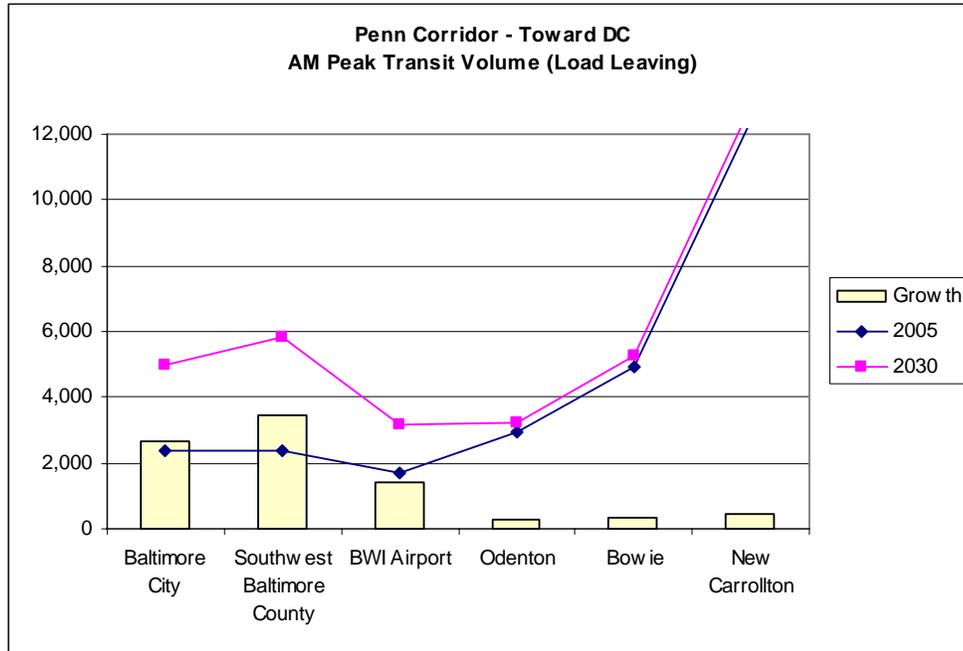
The alternative Camden Corridor with a terminal in Columbia has higher radial volumes toward Washington, DC leaving Laurel. Growth in radial demand increases as the corridor approaches Washington, DC, reflecting the strong projected employment growth in the Washington central business district.

Parallel to the Camden Corridor with a Spur to Columbia (Toward Columbia)



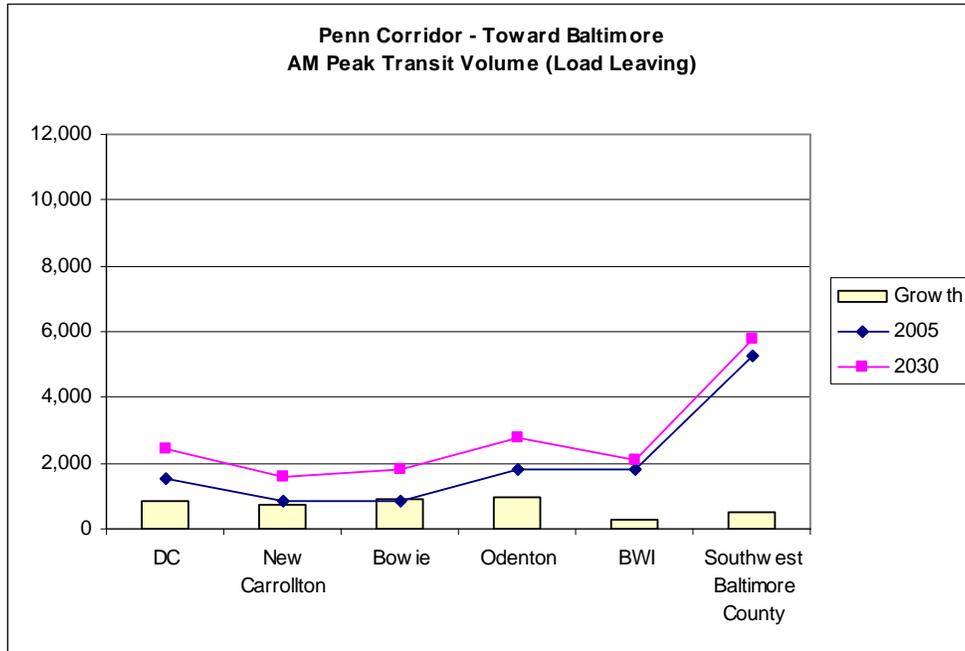
Transit demand in the corridor in reverse direction is anticipated to grow significantly with the highest growth extending as far as Greenbelt. By 2030, more than 1,300 transit trips are anticipated to be destined to Columbia along the corridor axis.

Parallel to the Penn Corridor (Toward DC)



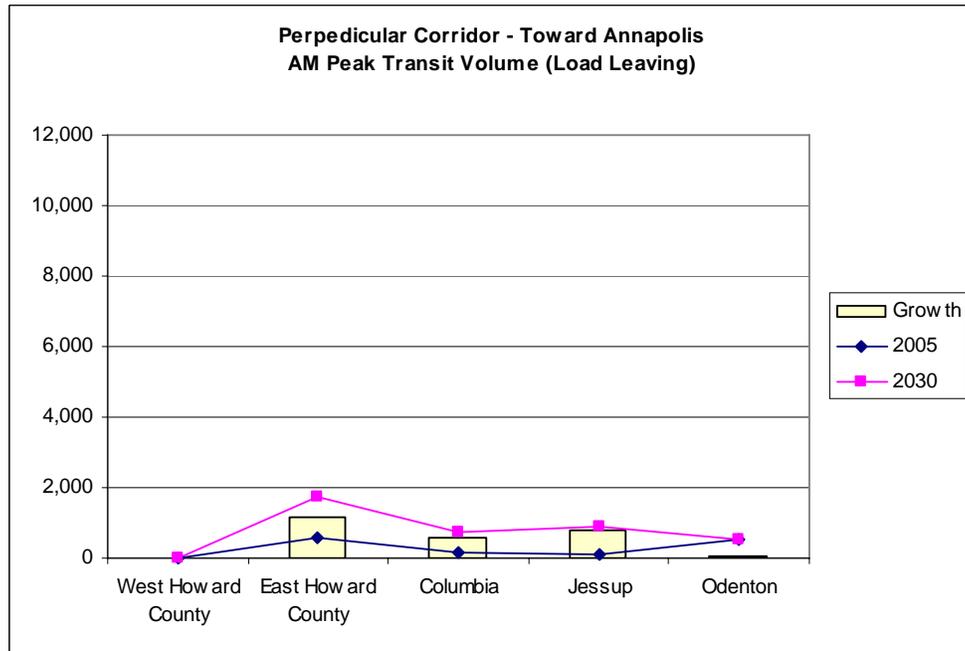
The Penn corridor load profile suggests a rapidly growing reverse commute market from Baltimore to BWI and Odenton. Growth in the traditional radial market toward Washington will continue to be high, but grow modestly. Growth in Odenton, Bowie and New Carrollton is anticipated to be very modest as a result of increased opportunities for employment in districts beyond the beltway and associated reduced need for travel to Washington. The Penn Corridor has the highest volume of the four key corridors examined with more than 12,500 trips estimated to be inbound to Washington from New Carrollton in the AM Peak Period.

Parallel to the Penn Corridor (Toward Baltimore)



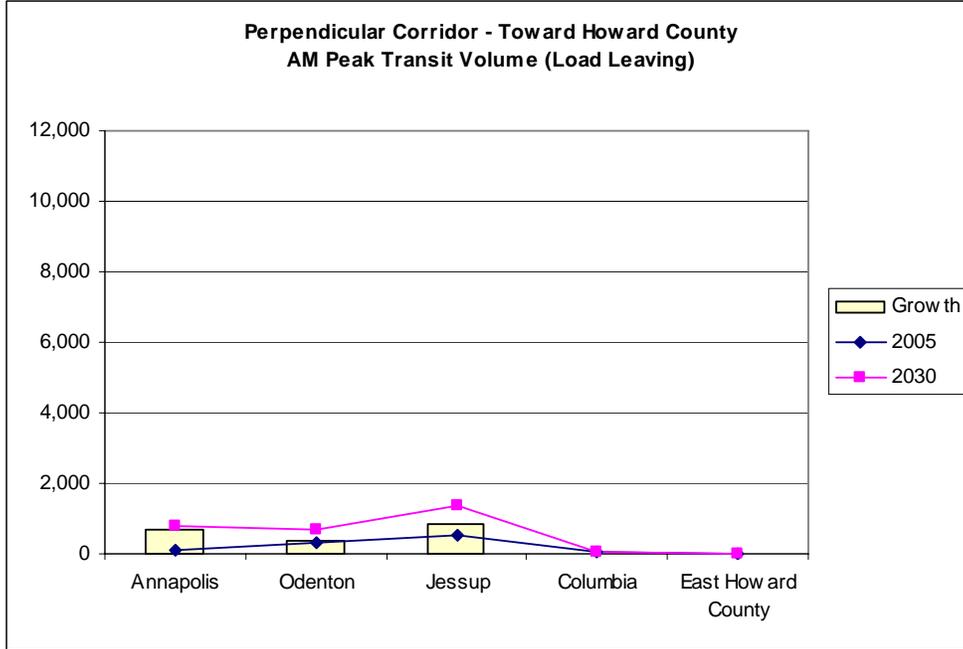
The Penn Corridor in the direction of Baltimore accommodates reverse commuters from Washington and radial commuters to Baltimore. There is evidence of significant growth in demand for intra-corridor travel and reverse commutes to districts between the Washington and Baltimore beltways. Radial growth to Baltimore is very limited due to competing opportunities for employment in mid-corridor districts.

Annapolis To/From Mid-Corridor and Howard County (Toward the Southeast)



Volumes in the this corridor (perpendicular to the main axis of the study area) are modest in 2005. Significant job growth and improved transit orientation are anticipated to increase demand for travel between districts in this corridor. Very little transit demand exists beyond East Howard County.

Annapolis To/From Mid-Corridor and Howard County (Toward the Northwest)



Existing transit demand from Annapolis is quite small but is expected to grow as employment grows in Odenton and Jessup and Columbia. There is little demand for transit services beyond Columbia into Howard County.