

MEMORANDUM

June 9, 2009

TO: Transportation, Infrastructure, Energy and Environment Committee  
FROM: <sup>Go</sup> Glenn Orlin, Deputy Council Staff Director  
SUBJECT: I-270/Corridor Cities Transitway (CCT) Project Planning Study

The Maryland Transit Administration (MTA) and State Highway Administration (SHA) have completed their Draft Alternatives Analysis/Environmental Assessment (AA/EA) for improvements in the I-270/US 15 Corridor from Shady Grove to north of the City of Frederick. The improvements include both the Corridor Cities Transitway (CCT) from Shady Grove to the southern part of Clarksburg, widening of I-270, and new interchanges and other access points on I-270. MTA and SHA held public hearings on the AA/EA on June 16 and 18; the transcripts of these hearings have been forwarded to Councilmembers under separate cover.

The purpose of this worksession is for the Committee to prepare recommendations to the Maryland Department of Transportation as to what should be the Locally Preferred Alternatives for the CCT and I-270—in as much detail as possible. The full Council will take up the Committee's recommendations on July 21. As with other major State projects, an important (although not required) objective is that there be consensus between the Executive and Council as to the preferred alternatives, and that that consensus extend, if possible, to the Cities of Rockville and Gaithersburg, and even to Frederick City and County.

**Testimony.** Most of the testimony has been about the CCT's mode. Elected officials and organizations who addressed this matter generally preferred LRT, but noted that BRT was acceptable; the most important point is that a CCT of some type be built as soon as possible. The individuals who spoke were fairly well split between preferring LRT or BRT.

**Planning Board recommendations.** The Planning Board held a worksession on July 6 and developed detailed recommendations, summarized in the Chairman's July 8 letter (©A-E). The key recommendations are that:

- The transit mode for the CCT would be Bus Rapid Transit (BRT), not Light Rail (LRT).
- The current master plan alignment in Gaithersburg West would be relocated to the south to pass through Johns Hopkins University's Belward Farm and the Life Sciences Center. Minor alignment changes on the Crown Farm and at the Kentlands would also be incorporated in the design.
- The operations and maintenance facility would be a Metropolitan Grove Site 6, the location of the Police Department's automobile impoundment lot.

- I-270 would be widened so that there are two express toll lanes (ETLs) in each direction from Shady Grove Road to the proposed Newcut Road interchange in southern Clarksburg, but that north of the Newcut Road interchange to Frederick County the improvement be limited to adding only two through lanes. The lanes could be reversible ETLs running southbound in the morning peak and northbound in the evening peak.
- The ETLs would be High Occupancy Toll (HOT) lanes, meaning that carpoolers would use the lanes free of charge.

The Planning staff's packet, which provides the background and analysis for the Board's recommendations, is on ©1-48.

At this writing neither the Executive nor the County Department of Transportation has expressed a position, although the matter is being actively discussed internally. The Cities of Rockville and Gaithersburg also have not yet formed their recommendations.

***BRT or LRT?*** Council staff substantially concurs with the Planning Board, especially with regard to the choice of BRT as the mode for the CCT. Unlike the Purple Line corridor, where most trips will be made between specific points along the line—that is, between the Metro stations and between the relatively dense and tight activity centers of Bethesda, Silver Spring, Langley Park, University of Maryland, College Park, and New Carrollton—the CCT will draw patrons only as well as it serves the moderate-to-low density outer suburbs through which it passes. BRT is much better suited to the Upcounty transit market: it can serve as both the “collector” mode (buses picking up commuters close to home) and the “line haul” mode (carrying these same commuters from one corridor city to another) *without an intervening transfer in many cases*. With LRT, nearly all passengers would have to drive or take a bus to the nearest station, wait and transfer to the LRT, and then encounter another transfer if headed downcounty or to the District via Metrorail (more than 30% of the line's boardings will be at the Shady Grove Metro Station).

The traffic modeling for the CCT has assumed that more than ¾ of the BRT service would be running on the CCT line back and forth between COMSAT and Shady Grove with 6-minute peak (and 10-minute off-peak) headways. But such a service deployment does not fully maximize the value of a BRT line, which can accommodate bus routes starting off the CCT at the home end of trip, use the CCT to go from corridor city to corridor city, and then go off-line again to reach multiple destinations. While the BRT would be marginally slower than LRT for the trunk-line service between COMSAT and Shady Grove—38 minutes versus 36 minutes (due to the bus's slightly slower acceleration and deceleration and slightly longer dwell times at stations)—the total travel time savings from home to final destination could be considerably faster by BRT.

The other argument usually raised is that LRT is a better focus for economic development than BRT. However, as noted in the BRT briefing presented to the Committee on June 29, many cities in North America (and elsewhere) are turning to BRT as a more cost-effective means of providing rapid transit service, and the stations are proving to be attractive nodes for development. The important features of a successful transitway are an exclusive right-of-way, a steady speed which is much superior to over-the-road speeds, short headways, and prominent,

well-designed stations. As diesel/electric hybrid vehicles become more common, it can be anticipated that buses running along the CCT would run in a non-polluting mode, which is particularly important due to the presence of a parallel bikeway.

Less important in the long-term, but very important in the short-term, is BRT's lower cost to build and operate. Building a BRT line to COMSAT in Clarksburg would cost about \$450 million, or about as much money as it would take to build LRT as far as Metropolitan Grove. (The LRT capital cost to COMSAT would cost about \$778 million.) BRT can also be built incrementally, so that not as much capital has to be programmed at one time to make progress. Finally, while the LRT has to have a yard and shop adjacent to the line—and in the first operating segment—BRT buses can be housed and maintained in any bus depot.

Much of the testimony mentioned that MTA's analysis of the Hopkins development may ultimately estimate high enough ridership so that LRT would be justified. However, even if it did, BRT is still the better choice for this corridor, for the reasons outlined above. Unlike the Purple Line, no segment of the CCT will have high enough ridership that cannot be served by the capacity of a BRT line.

**Alignment.** The Planning Board's recommendation that the alignment be dipped south through the Hopkins development and the Life Science Center presupposes that the Council will agree with added density proposed there in the Draft Gaithersburg West Master Plan. Although there is no community consensus yet as to how much density should be added, it is clear that there will be enough to warrant an even more circuitous route than the currently planned CCT alignment.

In reality there will be two distinct transit markets in the Upcounty. Service to the Shady Grove Metro Station for commuters headed to Rockville, Bethesda, and the District will generally opt for existing or enhanced express bus service on I-270. Service to the Kentlands, Hopkins, Life Sciences Center, Crown Farm and King Farm, however, will generally find the CCT service to be superior, even if the route is more circuitous than is already planned.

**Operations and maintenance facility.** As noted above, the Planning Board recommends the existing Police Department impoundment lot as the location for this facility. The AA/EA includes an estimated cost of acquiring the property for the depot; presumably the State would request that the County donate the property for a depot, with the funds used instead to acquire another property and to relocate the impoundment lot. However, no site has yet been identified for the relocated impoundment lot.

Another advantage of BRT is that the impoundment lot may not be needed in the short-to-mid term, since buses may be accommodated among the three Ride On depots (Brookville, Shady Grove, and North County) and the Metrobus depot at White Flint. Nevertheless, the depot situation needs to be sorted out before the CCT project proceeds too far into the design stage.

**I-270.** The cost of the I-270 improvements dwarfs the cost of the CCT; it constitutes 83-90% of the total cost. Much of the highway improvements are in Frederick County (at this time we do not have a breakdown of the cost between the two counties). But the fact that the

improvements in Montgomery County would be Express Toll Lanes—and, preferably, HOT lanes that would extend onto the current HOV lanes and ultimately to the HOT lanes under construction on the Virginia portion of the Capital Beltway—arguably would provide an even larger *transit and ridesharing* benefit than the CCT itself, as well as providing some modest congestion relief for low-occupancy vehicles not opting to pay the toll.

A significant issue about the highway improvements is how they should be prioritized vis-à-vis the CCT and other State transportation project priorities. This is not a matter before the Council now, however. The more pressing issue is, for the Locally Preferred Alternative, what should be the cross-section north of Germantown? The AA/EA shows two alternatives: Alternative 6 would add one ETL in each direction; Alternative 7 would add two ETLs in each direction. Both, however, are shown as having the same footprint, with Alternative 6 featuring much wider shoulders on either side of each ETL.

The Clarksburg Master Plan adopted in 1994 would specifically limit the number of through lanes on I-270 through Clarksburg (and to the County line) to 6 lanes: two more than currently exist. This limit was set purposely to meter traffic entering the County so as not to overload the segments of I-270 further south. Alternative 6 is consistent with the Clarksburg Plan, while Alternative 7 is not. The Planning Board recommends an alternative consistent with the master plan, but it also recommends considering that this be accomplished by adding two reversible ETLs rather than one ETL in each direction. The Planning staff notes that future traffic in this segment is split about two-thirds/one-third, which would match the capacity in each direction if the lanes were reversible. Reversing the lanes also results in a much smaller footprint for the roadway, since there would be two median barriers (and attendant shoulders) instead of three. This is a reasonable alternative that should be pursued further in the next stage of preliminary engineering.

***Agenda for this worksession.*** The worksession, which is scheduled for three hours, will proceed as follows:

1. MTA and SHA staff will provide an overview of the transit and highway alternatives evaluated in the AA/EA.
2. Planning staff will present the Planning Board's recommendations and rationale.
3. Staff from the Executive Branch as well as from Rockville and Gaithersburg will share their respective positions or thoughts, should they so choose.
4. Council staff will offer brief remarks and recommendations.
5. Discussion among the Councilmembers and staffs, with the Committee developing detailed recommendations as to the Locally Preferred Alternative.



**MONTGOMERY COUNTY PLANNING DEPARTMENT**  
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

June 26, 2009

**MEMORANDUM**

**TO:** Montgomery County Planning Board

**VIA:** Rollin Stanley, Director, Planning Department *RS*  
Glenn Kreger, Acting Chief – Vision/Community-Based Planning *GK*  
Division  
Mary Dolan, Master Plan Supervisor, Green/ Environmental *MD*  
Planning Division  
Sue Edwards, Supervisor – Vision/Community-Based Planning *SE*  
Division  
Dan Hardy, Chief – Move/Transportation Planning Division *DH*

**FROM:** Tom Autrey (301-495-4533), Master Plan Supervisor, *TA*  
Move/Transportation Planning Division

**SUBJECT:** I-270 / U.S. 15 / Corridor Cities Transitway (CCT) Multi-Modal  
Corridor Study Alternatives Analysis / Environmental Assessment  
(AA/EA) – Study Review and Recommendation On Locally  
Preferred Alternative (LPA)

**STAFF**

**RECOMMENDATION:** Transmit Comments to the Montgomery County Council

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This memorandum is prepared for the Planning Board's July 6, 2009 public hearing worksession on the Maryland Department of Transportation (MDOT) AA/EA. The AA/EA is an update of a May 2002 Alternatives Analysis / Draft Environmental Impact Statement (AA/DEIS) that examines impacts related to various approaches to improving highway and transit service levels in the I-270 corridor.

Staff proposes to make a short presentation on our recommendations before taking public testimony. Thereafter, we will ask the Planning Board for recommendations. Our staff and MDOT staff will be available to answer questions as you proceed through the decision – making process.

Staff requests the Planning Board to vote on five categories, in the following order:

- transit mode
- transit alignment
- highway alternative

- further analysis for MDOT to include in subsequent project planning for both highway and transit improvements
- recommended further actions for Montgomery County government

Planning Board recommendations will be sent to the County Council for their considerations the Transportation, Infrastructure, Energy, and Environment Committee is scheduled to discuss this matter on July 13, 2009. We also intend to send a copy of your recommendations to MDOT.

Below is a summary of staff recommendations, intended as a guide for your decision making. The attached staff report provides study background and highlights the issues and rationale for the staff recommendations.

Staff recommends Planning Board support for the following elements of the I-270 / US 15 / CCT Multi-Modal Study:

#### **Transit Mode**

1. Select Bus Rapid Transit (BRT) for the CCT

#### **CCT Alignment and Station Locations**

2. Select the Master Plan alignment with adjacent hiker biker trail with the following modifications:
  - a. Augment the existing master plan alignment with the preferred alignment through the Life Sciences Center that is included in the pending Planning Board Draft of the Gaithersburg West Master Plan.
  - b. Replace the conceptual alignment through Crown Farm with the alignment along Fields Road that is consistent with the Crown Farm Project Plan approved by the City of Gaithersburg.
  - c. Include only one station on Crown Farm and drop from further consideration the stations at School Drive and Middlebrook Road.
  - d. Defer to the City of Gaithersburg on any recommendation to the proposed relocation of the alignment to the west side of Great Seneca Highway to better serve the Kentlands.
  - e. Locate the Operations and Maintenance facility at Metropolitan Grove Site 6.
  - f. Consider reducing the planned number of park-and-ride spaces at CCT stations.

## Highway Alternative

3. Select “Modified” Alternative 7 – Two Express Toll Lanes (ETL) in each direction but:
  - a. Limit the number of through lanes (i.e. General Purpose and Managed Lanes) north of MD 121 to no more than six.
  - b. Incorporate preferential treatments for High Occupancy Vehicle (HOV) and transit into the design.
  - c. Consider a reversible lane system north of MD 121 as a means to minimize costs and resource impacts.

## Further Analysis

4. Provide additional detail on on-going mitigation efforts throughout the next phases of the project planning for both the highway and transit components.
5. Provide additional detail on the financial profile of the project. Additional and updated information is needed on assumptions related to toll rates, the estimated revenue to be generated, the extent to which the highway component of the project is expected to help defray capital and operating costs, and the extent the project may be expected to fund transit improvements.
6. Examine the potential for providing more frequent access to the managed lanes through the use of more open area or slip ramps where appropriate. The feasibility of providing direct access ramps from HOT lanes to the Life Science Area needs to be examined.
7. Consider closing the MD 109 interchange.
8. Additional information or data is needed in subsequent project planning in the following specific technical areas:
  - a. Traffic Volumes and Level of Service (LOS) By Lane Type
  - b. Intersection LOS in format similar to 2002 AA/DEIS
  - c. Roadway Travel Time Data
9. During project development, the following resource impact minimization and mitigation efforts should be expedited:
  - Section 106 coordination to address master planned development on the Banks / Belward Farm historic site facilitating establishment of the CCT alignment to a planned community with five million square feet of commercial development potential.
  - Development of linear stormwater management techniques in sensitive areas such as Use IV subwatersheds, the Clarksburg Special Protection Area, and the stream/parkland crossings of Great Seneca Creek and Little Seneca Creek.

- Continuing coordination between federal, state, and local environmental mitigation requirements with particular attention to noise attenuation, wildlife exclusion fencing, the introduction of non-native invasive species, and the protection of rare, threatened, and endangered species such as the comely shiner.
- Developing a project delivery mechanism that provides continuing opportunities to minimize resource impacts, including the use of contractual financial incentives.
- Identifying a conceptual Section 4(f) mitigation proposal to address parkland impacts such as potential impacts to Little Bennett Regional Park and Black Hill Regional Park

### **Recommended Further Action by Montgomery County**

10. Establish a working group to examine methods of accelerating the funding and implementation of the CCT and providing necessary funding for the operation, maintenance, rehabilitation, and expansion our existing public transit services – including Metrorail, Metrobus, and Ride On – as well as the planned Purple Line.
11. Before I-270 improvements (other than new interchange access points) are designed for mandatory referral submission, the County Council should develop a position on the combined purpose and need for additional roadway capacity in the corridor, considering the combined mobility provided by:
  - I-270 north of I-370 (improvements resulting from this AA/EA)
  - Extended managed lanes to be evaluated in the SHA West Side Mobility Study
  - A countywide BRT network, for County study in FY 10
  - Midcounty Highway Extended (M-83), currently under County study

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- Attachment A: MDOT Public Hearing Brochure
- Attachment B: HOV/ETC Sensitivity Analysis
- Attachment C: I-270 Volume-to-Capacity Ratios
- Attachment D: Environmental Planning Staff Memorandum

## 1. BACKGROUND

The I-270 / U.S. 15 / Corridor Cities Transitway (CCT) Multi-Modal Corridor Study AA/EA was released by the Maryland Department of Transportation (MDOT) and its federal partners – the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) – on May 29, 2009.<sup>1</sup> The purpose of this hearing and work session is to review selected issues related to the study and develop recommendations on a Locally Preferred Alternative for both the highway and transit components of the study. The Planning Board’s recommendation will be forwarded to the County Council. The County Council Transportation, Infrastructure, Energy, & Environment (T&E) Committee is scheduled to consider the study on July 13, 2009.

### a. Overview

The public hearing brochure describing the project is included as Attachment A.

#### Purpose and Need

The study purpose as identified in the recently released document is to:

“... investigate options to address congestion and improve safety conditions in the I-270 / US 15 Corridor.”

The need for the project results from the:

“... mobility challenges from the growing traffic congestion in the I-270 and US 15 corridors. Population and employment growth in Montgomery and Frederick counties is expected to cause peak period travel congestion along the I-270 / US 15 Corridor to worsen.”

#### Two Studies – May 2002 and May 2009

The recently released study is both an update and expansion of earlier work completed in May 2002. The May 2002 study also evaluated combinations of highway alternatives and transit alternatives. The highway alternatives included different combinations of General Purpose (GP) and High Occupancy Vehicle (HOV) lanes. The transit alternatives included three different alternatives (Premium Bus, Bus Rapid Transit (BRT), and Light Rail (LRT)). This more recent study was required in large part as a result of MDOT determining a need to examine the potential for Express Toll Lanes (ETL) on I-270. ETL lanes largely differ from HOV lanes in that a single occupant vehicle can use an ETL by paying a toll at highway speeds that will vary in price throughout the day - so as to insure a level of service exists in that lane that attracts users and helps allocate the roadway capacity in as efficient manner as possible while at the same time generating revenue to pay off construction bonds or support operating costs.

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<sup>1</sup> See the project web site at: <http://www.i270multimodalstudy.com/> for access to the complete document.

**b. Alternatives Description**

There are two tables in the study that summarize the alternatives under consideration. The alternatives in the 2002 study are shown below in Table 1 and the alternatives in the 2009 study are shown in Table 2:

**Table 1- Alternatives in 2002 DEIS**

ALTERNATIVE	DESCRIPTION
1	No-Build Alternative
2	TSM/TDM Alternative
3A	Master Plan <sup>1</sup> HOV/LRT Alternative
3B	Master Plan <sup>1</sup> HOV/BRT Alternative
4A	Master Plan <sup>1</sup> General-Purpose/LRT Alternative
4B	Master Plan <sup>1</sup> General-Purpose/BRT Alternative
5A	Enhanced <sup>2</sup> Master Plan HOV/General-Purpose/LRT Alternative
5B	Enhanced <sup>2</sup> Master Plan HOV/General-Purpose/BRT Alternative
5C	Enhanced <sup>2</sup> Master Plan HOV/General-Purpose/Premium Bus Alternative

<sup>1</sup> Master Plan refers to proposed alignments along I-270 and US 15 included in the current Frederick and Montgomery County approved master plans

<sup>2</sup> Enhanced Master Plan refers to proposed improvements that are greater than those called for in the Montgomery County/Clarksburg Area

Source: I- 270 US 15 CCT AA/EA May 2009 - Table II-1, Page II-2

Some key aspects of the alternatives retained for analysis in the 2002 study include the following:

- Alternatives 3 through 5 are the “build alternatives”. Alternatives 1 and 2 are required to be reviewed as part of the study methodology.
- While not stated, alternative 3 includes the addition of GP lanes as well.
- An extensive expansion of bus service operating within the I-270 HOV lanes but not over a (CCT) transitway is included as Alternative 5C.
- Alternative 5 is not consistent with existing adopted Master Plans (see footnote to table).

**Table 2- Alternatives in 2009 AA/EA**

ALTERNATIVE	DESCRIPTION
1: No-Build	No-Build Alternative carried from the 2002 DEIS; includes latest Metropolitan Planning Organization (MPO) demographic forecasts
6A	Master Plan <sup>1</sup> ETL/LRT Alternative
6B	Master Plan <sup>1</sup> ETL/BRT Alternative
7A	Enhanced <sup>2</sup> Master Plan ETL / LRT Alternative
7B	Enhanced <sup>2</sup> Master Plan ETL / BRT Alternative

<sup>1</sup> Master Plan refers to alignments along I-270 & US 15 included in current Frederick and Montgomery County approved master plans.

<sup>2</sup> Enhanced Master Plan refers to proposed improvements that are greater than called for in the Montgomery County/Clarksburg Area Master Plan

Important specifics related to this chart include the following:

The demographic forecast has been updated from the 2002 study and now includes Round 6.4 of the Council of Governments (COG) Cooperative forecast.

- Alternative 7 is not consistent with existing adopted Master Plans (see footnote to table).

Source: I- 270 US 15 CCT AA/EA May 2009 - Table II-2, Page II-7

**c. Costs and Impacts**

Costs

A summary of the capital costs (2007) associated with the alternatives examined in the 2009 AA/EA are presented below in Table 3.

**Table 3- Capital Cost Summary – Alternatives 6 and 7**

<b>COST COMPONENT</b>	<b>ALTERNATIVE 6-TSM</b>	<b>ALTERNATIVE 6A OR 7A</b>	<b>ALTERNATIVE 6B OR 7B</b>
<b>Highway</b>			
Project Planning	\$17.37	\$17.37	\$17.37
Engineering Design	\$476.03	\$476.03	\$476.03
Right-of-Way	\$378.65	\$378.65	\$378.65
Construction	\$3,006.85	\$3,006.85	\$3,006.85
<b>Subtotal – Highway</b>	<b>\$3,878.90</b>	<b>\$3,878.90</b>	<b>\$3,878.90</b>
<b>Transit</b>			
Construction	\$49.22	\$455.82	\$281.93
Right-of-Way	\$7.38	\$35.00	\$35.00
Vehicles	\$11.36	\$112.20	\$25.66
Other*	\$18.90	\$174.51	\$107.33
<b>Subtotal – Transit</b>	<b>\$86.86</b>	<b>\$777.53</b>	<b>\$449.92</b>
<b>TOTAL COST</b>	<b>\$3,965.76</b>	<b>\$4,656.43</b>	<b>\$4,328.82</b>

\* Includes professional services and contingency.

Cost estimates in \$million 2007

Costs represent a "snapshot" in time for comparison. Project costs are subject to change based on world and local financial markets.

Source: I- 270 US 15 CCT AA/EA  
May 2009 - Table S-8, Page S-16

Alternative 6 – TSM as shown in Table 3 is an alternative that is required by the Federal Transit Administration to be analyzed as part of any alternatives analysis of transit options. It essentially consists of enhanced transit service that does not require significant investments in new infrastructure. The capital cost shown for the highway component under Alternative 6 – TSM is essentially a placeholder (i.e., there is no corresponding alternative for the highway component).

For comparison purposes, the capital costs (2001) associated with the alternatives examined in the 2002 AA/DEIS are shown below in Table 4.

**Table 4- Capital Cost Summary – Alternatives 3, 4, and 5**

Cost Component	Alternate 2	Alternate 3A	Alternate 3B	Alternate 4A	Alternate 4B	Alternate 5A	Alternate 5B	Alternate 5C
<i>Highway Capital Costs</i>								
Project Planning	-	\$9	\$9	\$9	\$9	\$9	\$9	\$9
Preliminary Engineering	-	\$216	\$216	\$216	\$216	\$255	\$255	\$271
Right-of-Way	-	\$139	\$139	\$139	\$139	\$139	\$139	\$139
Construction	-	\$1,441	\$1,441	\$1,441	\$1,441	\$1,695	\$1,695	\$1,804
Subtotal Highway	-	\$1,805	\$1,805	\$1,805	\$1,805	\$2,098	\$2,098	\$2,223
<i>Transit Capital Costs</i>								
Subtotal Transit	\$33	\$857	\$792	\$857	\$792	\$857	\$792	\$296
Total Cost of Alternate	\$33	\$2,662	\$2,597	\$2,662	\$2,597	\$2,955	\$2,890	\$2,519

*Note: Based on the Maryland Department of Transportation's 2003 to 2008 Consolidated Transportation Program cost estimate.*

*Source: Rummel, Klepper & Kahl, LLP, March 2002 (Highway Capital Costs) and Parsons, Brinckerhoff, Quade & Douglas, Inc., February 2002 (Transit Capital and O&M Costs).*

Source: I- 270 US 15 CCT DEIS May 2002 - Table S-3, Page S-19

Impacts

A summary of the impacts of the respective alternatives is present in Table 5. In general, the following observations can be made with respect to the impacts:

- The highway components of Alternatives 6 & 7 require the greatest amount of right of way and therefore have greater impacts.
- The highway “footprints” of alternatives 3 & 4 are identical and the footprints of 6 & 7 are the same.
- The estimate of displacements in the table does not reflect reductions in the number of displacements expected to occur as a result of minimization efforts. More information on the minimization efforts is presented in Section 5 of this staff memo.

Table 5- Summary of Impacts

RESOURCE	ALTERNATIVES 3A/B/	ALTERNATIVES 4A/B/	ALTERNATIVES 5A/B/	ALTERNATIVE 5C/	ALTERNATIVES 6A/B/	ALTERNATIVES 7A/B/	NOTE:
<b>Natural Environment</b>							
Total Limit of Disturbance (Lg) of Private to new ROW:							
Highway Component							
Transway Component							
<b>Prime Farmland/Soil</b>							
Total	384.6 acres	384.6 acres	384.6 acres	387.7 acres	387.7 acres	387.7 acres	
Highway component	196.8 acres						
Transway component	58.8 acres						
<b>Soils of Statewide Importance</b>							
Total	387.3 acres						
Highway component							
Transway component							
<b>Number of Wetlands</b>							
Active Farmland (Acres)	133 acres						
<b>Floodplains - Total</b>							
Highway component	23 acres						
Transway component	23 acres						
<b>Forest - Total</b>							
Highway component	153 acres						
Transway component	156 acres						
<b>State Treasured and Outstanding Species</b>							
Waters of the US - Total (Acres)	14,187 linear feet (stream)						
Waters of the US - Total (Acres)	10.7 acres wetlands						
Stream	11,308 linear feet						
Epifaunal channels	9.1 acres						
Wetlands	2,630 linear feet						
<b>Cultural Resources</b>							
Historic Resources							
Highway component (number/acre)	3 properties						
Transway component (number/acre)							
<b>Socioeconomic Resources</b>							
Public Parks - Total							
Highway component (number/acre)	11 parks/37 acres						
Transway component (number/acre)							
<b>Right-of-Way - Total</b>							
Highway component	522 acres						
Transway component	392 acres						
<b>Residential Displacements - Total</b>							
Highway component	64-127	64-127	64-127	64-127	64-127	64-127	
Transway component							
<b>Business Displacements - Total</b>							
Highway component	4-11	4-11	4-11	4-11	4-11	4-11	
Transway component (not including O&M facility)							
<b>Air Quality - Number of receptors with O3 violations</b>							
Highway	3	3	3	3	3	3	
Transway							
<b>Noise - Total monitored/ modeled locations</b>							
Highway	26 residential impacts						
Transway	10 non-residential impacts						
<b>Other</b>							
Highway	12 residential impacts with non noise (LFT)						
Transway	7 residential impacts without non noise (LFT)						
<b>Recreation Material - Number of affected properties</b>							
Highway	5-12 highway, 2 transway						
Transway							

Source: I- 270 US 15 CCT AA/EA May 2009 - Table S-2, Page S-6

**d. Benefits**

A summary of the impacts on the level of service (LOS) in on I-270 is presented below in Table 6.

**Table 6– Summary of Level of Service**

	ALTERNATIVE 1: NO-BUILD	ALTERNATIVE 6A/B	ALTERNATIVE 7A/B
Total Miles of Roadway Lanes	64	64	64
Number of Miles with LOS F (peak direction)	43	31	17
Total Roadway Segments Analyzed	42	48	48
Number of Segments with LOS F	23	14	7

Source: I-270 US 15 CCT AA/EA May 2009 – Table S-1 Page S-5

The analysis in Table 6 is a comparison of Alternatives 6 & 7 with the No-Build Alternative for 2030. Additional analysis comparing the alternatives examined in the 2002 study is presented in Section 5 of this staff memo.

Letters (A through F) are used to categorize the extent of congestion based upon the following general descriptors:

- LOS A – D denotes free or stable flow with reduced speeds as you approach LOS D
- LOS E – Indicates facility operating at capacity
- LOS F – Congested – stop and go conditions

As noted above, the number of miles operating under LOS F is significantly less under the build alternatives – especially Alternative 7. The LOS is based upon the combined level of service in the general purpose and ETL lanes. The ETL Lane tolls would be set to assure travel speeds that are close to free-flow conditions while maximizing throughput at or near Level of Service E.

**e. Prior Planning Board Briefings and Actions**

The I-270/US 15 and CCT project planning studies have been ongoing for more than a decade. The Planning Board last submitted formal comments to the County Council in 2003 in response to the 2002 DEIS. MDOT representatives have briefed the Planning Board in 2009 as the current AA/EA was being developed as noted below.

June 11, 2009

Russ Anderson SHA Project and Rick Kiegel, MTA Project Manager for the I-270 US 15 Corridor Cities Transitway (CCT) Alternative Analysis/Environmental Assessment (AA/EE) presented a brief overview of the document. The Planning Department staff, along with the SHA and MTA project team members, reviewed various issues with the Planning Board in a worksession setting that is a precursor to the July 6, 2009 Planning Board hearing on the AA/EE.

April 30, 2009

The Planning Board was briefed on this project on April 30, 2009. The briefing included a project overview and slide presentation. The slide presentation is available for review at:

<http://www.montgomeryplanning.org/Transportation/projects/corridor.shtm>

October 2, 2003

This briefing included an update on the status of the project. The staff memo can be found at:

[http://www.montgomeryplanningboard.org/meetings\\_archive/03\\_meeting\\_archive/agenda\\_1002\\_03/item16\\_100203\\_opt.pdf](http://www.montgomeryplanningboard.org/meetings_archive/03_meeting_archive/agenda_1002_03/item16_100203_opt.pdf)

Representative issues examined at that time included:

- The anticipated selection of a Locally Preferred Alternative in later that same calendar year.
- The need to develop a managed lane concept that is consistent with adopted master plans.

July 18, 2002

This briefing also included an update on the status of the project. The staff memo can be found at:

[http://www.montgomeryplanningboard.org/meetings\\_archive/02\\_meeting\\_archive/agenda\\_0718\\_02/item15\\_071802.pdf](http://www.montgomeryplanningboard.org/meetings_archive/02_meeting_archive/agenda_0718_02/item15_071802.pdf)

- Key issues examined at that briefing included the following:
- Travel forecasts and cost estimates that do not point conclusively to either BRT or LRT being the preferred mode.
- How far north should the respective components of the build alternatives be extended?
- How should the impacts be mitigated?
- Will Master Plan amendments be required to accommodate the recommended alternative?
- How suitable is the COMSAT site as a terminal station?
- How should the recommended improvement program be phased?
- Where should the yard and shop be located?

It is important to note that while the process to date has not resulted in any recommendation on a Locally Preferred Alternative, the Planning Board has (through the Transportation Policy Report and subsequent review of the alternatives) generally indicated support for HOV lanes as the preferred managed lane concept and locating the northern terminus of the CCT at Clarksburg Town Center instead of COMSAT.<sup>2</sup> The Planning Board has not in the past formally indicated a preference for either BRT or LRT.

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<sup>2</sup> As discussed in Section 5 (under Master Plan Consistency) of this report, an April 2004 Amendment to the Master Plan of Highways endorses HOV lanes from the American Legion Bridge to the west spur of I-270 and notes that HOT would be an acceptable approach if Virginia decided to implement HOT lanes.

## 2. PREFERRED ALTERNATIVE

Interstate 270 is the backbone of the communities known collectively as the I-270 Corridor, from North Bethesda to Clarksburg. The I-270 Corridor is the focal point for much of the County's future growth. To the south of Shady Grove, Metrorail provides existing line-haul transit capacity. Between Shady Grove and Clarksburg, the CCT is the principal transit facility in the corridor, connecting growth and activity centers in the Life Sciences Center, Metropolitan Grove, Germantown, and Clarksburg.

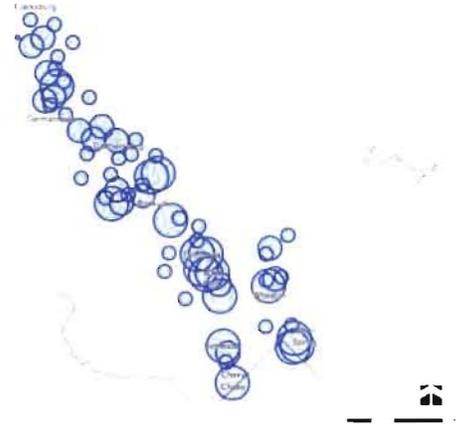
The Locally Preferred Alternative for I-270 and the CCT should accomplish the following objectives:

- Improve transportation choices, mobility, and accessibility.
- Contribute to travel demand management by encouraging transit use, ridesharing, and a shifting of demand from peak travel periods to off-peak periods.
- Promote the orderly development of planned land use in the I-270 corridor.

The staff recommendations achieve these objectives as follows:

- Developing the CCT as a Bus Rapid Transit system along a dedicated, fixed guideway provides a branded transit priority service for activity centers in the corridor while maximizing flexibility for through-routing by other transit routes.
- Selecting BRT for the CCT also increases opportunities for innovative funding and phasing proposals, allowing the CCT to be implemented more quickly and efficiently.
- Adjusting the CCT alignment to serve planned nodes at the Crown Farm and the Life Sciences Center reflects the need to locate transit stations where the greatest number of potential riders will live and work.
- Removing planned CCT stations at areas with lower density development improves CCT travel speeds, and therefore transit accessibility, between the higher density development nodes.
- Dedicating High-Occupancy-Toll (HOT) lanes along I-270 with a variable toll, or "value pricing" system (with higher tolls when the system is busy) encourages longer-distance commuting by transit and carpooling to the Metrorail system and downcounty locations and a more even distribution of travel demand by all users throughout the day. Value

Figure 1. Location of housing growth through 2030



pricing on HOT lanes also ensures a reliable travel time for transit, HOV, and tolled vehicles.

- Limiting the total number of travel lanes on I-270 through the Agricultural Reserve to the addition of two HOT lanes provides roadway capacity that mirrors the land use patterns. Developing those lanes as a reversible roadway system (2 general purpose lanes in each direction and 2 reversible HOT lanes in the median) reflects forecasted radial travel demand and contributes to a recognition of the balancing between housing and transportation affordability
- Selecting a Locally Preferred Alternative for both I-270 and the CCT concurrently fulfills the need to address major transportation investments in the corridor in a multimodal fashion.
- Accelerating CCT approvals and implementation as a “transit-first” implementation program, while continuing development of I-270 HOT lane options, demonstrates a commitment to move forward quickly with the most affordable solutions. Multimodal access points between the CCT and I-270 at Little Seneca Parkway and Watkins Mill/Metropolitan Grove Road need to be part of the transit-first solution.

### 3. CCT MODE

The analysis of a preferred mode for the CCT takes into account the overall vision for the corridor as well as the potential for federal funding.

The Planning Department's work program over the past few years has included a number of initiatives related to the CCT. These include:

- Shady Grove Sector Plan
- I-270 MD 355 Corridor Study
- Germantown Employment Area Sector Plan
- Gaithersburg West Master Plan

As part of these efforts, a relatively detailed look at the station area densities – along with more recent research on the impact Transit Oriented Development (TOD) can have in reducing trips made by auto – have resulted in proposals to increase densities around planned station areas.

The first question to be addressed is whether or not the land use types and densities are sufficient to support the master planned fixed-guideway transit services by either BRT or LRT modes. Both state and local staff have repeatedly confirmed that this answer is, “yes, **the land uses along the master-planned CCT alignment are generally transit-supportive**”. The second question is whether LRT or BRT should be the preferred mode. Land use densities are one indicative factor in this decision.

A generally accepted minimum threshold for jobs per acre in a transit supportive TOD like station area (within ½ mile of the station) is around 25-50. For households, the corresponding range is 10-15 per acre. In the CCT corridor, there are station areas like King Farm, Crown Farm, and Shady Grove where the densities for jobs and/or households are within – or above – those minimum thresholds. While it not necessary to have every station area obtain those densities, our approach has been to develop proposals that take advantage of the CCT where it makes sense. As a result there are proposals to increase the densities at Germantown Town Center, Cloverleaf, Manekin, and Dorsey Mill stations, as well as in the Life Sciences area and at the Kentlands and Metropolitan Grove in the City of Gaithersburg.

The densities around some other station areas are not necessarily “transit supportive”. One example is at NIST. While located near a major employer and an important station, the area is not transit oriented development and station area densities in 2030 are expected to still be well below the thresholds discussed above.

There are other areas within the corridor that will also continue to have densities well below those generally considered consistent with TOD and therefore more efficiently served by high quality bus service. One indication of this can be found in the 2002 study – specifically in the productivity of Alternative 5C – the Premium Bus Alternative. The Premium Bus Alternative consists of a network of routes providing frequent limited stop service and accessing the HOV lanes via direct access ramps in essentially the same location at the ETL ramps included in Alternatives 6 & 7. Table \_ is presented below and summarizes the relative cost-effectiveness of the transit alternatives.

**Table 7- FTA Cost Effectiveness Comparison – 2002 AA/DEIS**

Alternative	Change in O&M Costs from No-Build (000's)	Change in O&M Costs from TSM/TDM (000's)	Change in Equivalent Annual Capital Costs from No-Build (000's)	Change in EAC from TSM/TDM (000's)	Change in Annual Riders from No-Build (000's)	Change in Annual Riders from TSM/TDM (000's)	C/E Relative to No-Build <sup>1</sup>	C/E Relative to TSM/TDM <sup>1</sup>
TSM/TDM	\$27,800	-	\$4,100	-	5,100	-	-	-
5A LRT	\$24,800	-\$3,000	\$68,400	\$64,300	8,500	3,400	\$10.94	\$17.99
5B BRT	\$63,900	\$36,100	\$65,700	\$61,600	12,400	7,300	\$10.45	\$13.40
5C Premium Bus	\$32,050	\$4,250	\$27,450	\$23,350	11,750	6,650	\$5.07	\$4.16

Note: 1 The lower the cost effectiveness number, the more cost effective the alternate

Source: I-270 US 15 CCT DEIS May 2002 - Table S-5, Page S-21

A review of the table shows that Alternative 5C was the most cost-effective of the transit alternatives and resulted in almost has many new transit riders as the BRT alternative operating along the CCT alignment. The results further support the approach that implementation of the CCT with TOD station areas and managed lanes, complemented with a well designed bus network comprised of routes that collect riders in areas of relatively lower densities in the morning and then enter either the CCT alignment or the managed lanes on I-270, is the most efficient and effective way to serve the corridor.

The 2009 study also examined the relative cost effectiveness of Alternatives 6 & 7. The results of this analysis are presented in Table 8.

**Table 8- FTA Cost Effectiveness Comparison – 2009 AA/EA**

	ALTERNATIVE 6-TSM	ALTERNATIVE 6A	ALTERNATIVE 6B	ALTERNATIVE 7A	ALTERNATIVE 7B
Capital Costs	\$86,860,000	\$777,530,000	\$449,920,000	\$777,530,000	\$449,920,000
Equivalent Annual Capital Costs*	\$7,440,700	\$62,202,400	\$36,443,900	\$62,202,400	\$36,443,900
Equivalent Annual Capital Costs above TSM		\$54,761,700	\$29,002,800	\$54,761,700	\$29,002,800
Net Change in Operating Costs	\$14,793,000	\$28,129,000	\$26,859,000	\$28,129,000	\$26,859,000
Operating Costs above TSM		\$13,336,000	\$12,066,000	\$13,336,000	\$12,066,000
Daily User Benefit Hours	6,300	13,200	13,700	13,300	12,800
Benefit Hours above TSM		6,900	7,400	7,000	6,500
Annual Benefit Hours		2,070,000	2,220,000	2,100,000	2,250,000
Cost-Effectiveness Index		\$22.90	\$18.50	\$32.43	\$18.25

\* These are the one-time capital costs expressed in an annualized stream of payments over 20 years, much as the value of a mortgage can be expressed in terms of annual payments

Costs represent a "snapshot" in time for comparison. Project costs are subject to change based on world and local financial markets and will be reevaluated for the Final Environmental Impact Statement

Source: I-270 US 15 CCT AA/EA May 2009 – Table S-10 Page S-17.

The Cost-Effectiveness Index is an important element of determining project viability for federal funding, which is typically between 35% and 50% of the project capital cost. For FY 2009, the

Federal Transit Administration assesses a “medium” cost-effectiveness rating for projects that have a Cost-Effectiveness Index of less than \$24 per hour of transportation system user benefits. The CCT LRT alternative (Alternatives 6A and 7A) has a Cost-Effectiveness Index of \$32.43 and the CCT BRT alternative (Alternatives 6B and 7B) has a Cost-Effectiveness Index of \$18.25.

The cost effectiveness index for LRT in both Alternatives 6A and 7A exceed the thresholds currently considered to be competitive for federal funding participation. The resulting cost effectiveness numbers are largely the result of the higher capital costs associated with the LRT alternative.

In summary, staff recommends that **BRT should therefore be selected as the preferred mode for the CCT.**

BRT is preferred as it:

- Provides slightly greater traveler benefits in the corridor than LRT
- Has a lower capital cost and annual operating cost
- By virtue of the first two elements, BRT is substantially more cost-effective than LRT for the CCT corridor, meeting the FTA cost-effectiveness criteria whereas the LRT option does not.
- Improves implementation flexibility; the “minimum operable segment” can be much smaller than for LRT and the maintenance yard need not be physically connected to the right-of-way by rail tracks.
- Improves operating flexibility; certain buses can be “through-routed” on the CCT; using the CCT for part of the route to bypass congestion and then leaving the CCT alignment to serve neighborhoods on local streets.

The primary critique of BRT is that many feel it lacks the “permanence” of investment that LRT conveys. There are additional considerations that should be taken into account with respect to this recommendation. These include the following:

- The traffic operations analysis for major intersections within the corridor needs to be updated to determine if there are any locations where there are potential conflicts that would impede bus travel in particular.
- The BRT system ultimately deployed over the CCT alignment needs to be of high quality.
  - The buses need to feature the latest technology reasonably available to ensure the cleanest, safest, and most efficient operation. The stations need to be accessible, oriented in every key aspect to the pedestrian, and generally designed in a way that is consistent with all applicable standards and objectives set forth in adopted master plans.

- The TOD envisioned for the station areas will likely only occur alongside a sustained commitment to, and eventual implementation of, a BRT system that is rail like in virtually every physical and operational characteristic.

#### **4. CCT ALIGNMENT**

This section of the report examines issues related to the alignment of the CCT – in the context of the alignment included in the 2002 and 2009 studies as well as the proposed modifications as a result of more recent plans for Crown Farm, Gaithersburg West and the Kentlands. A review of the proposed sites for the CCT Operations and Maintenance facility is presented at the end of this section.

##### **a. Description**

A map of the CCT alignment as included in the 2002 DEIS and the 2009 AA/EA is depicted in Figure 2. The CCT has been in County Master Plans for over 30 years. The alignment in the study area extends from the Shady Grove Metrorail Station at its southern terminus, north to COMSAT. It is unlikely the entire segment would be constructed at one time. The MTA has indicated in the past that a first phase might include (as an example) the segment from Shady Grove to Metropolitan Grove.

It is also important to note the following with respect to the alignment:

- The alignment in the study does not include a segment north of COMSAT to the Clarksburg Town Center and a segment east of I-270 in the Seneca Meadows area, both of which are in the County master plans.
- The alignment in the study area does not include proposed modifications to the alignment through Crown Farm, the Life Sciences Area, and near the Kentlands. In addition, certain station locations are not included in the proposed modifications. More information is provided on the specific aspects of these proposed changes later in this section.

Figure 2. CCT Alignment

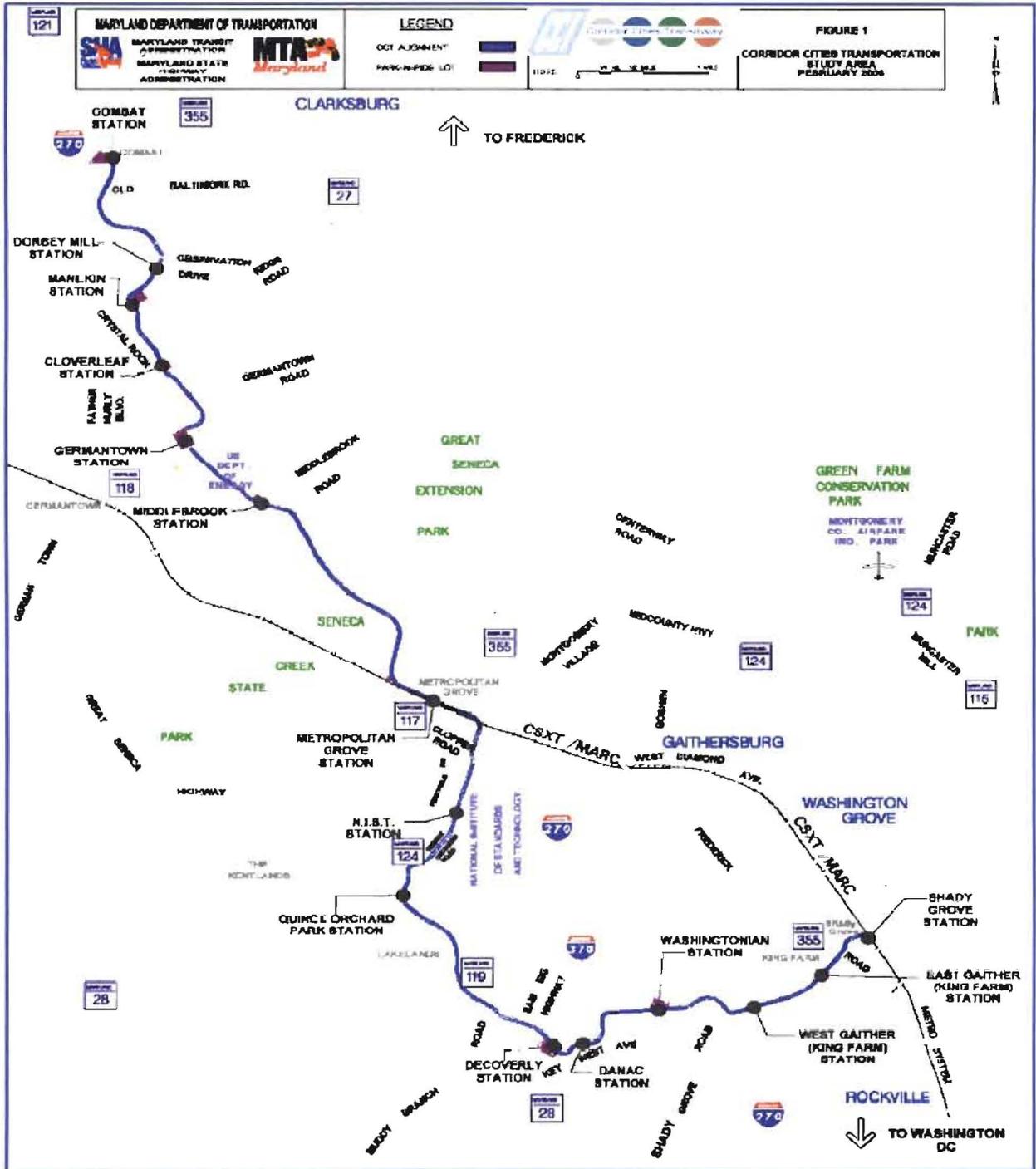


Figure 2. CCT Alignment

Source: I-270 US 15 CCT AA/EA May 2009 – Detailed Definitions of Alternatives – October 2007 – page 3.

## Operating Characteristics

The CCT as developed for the study analysis would provide service every six minutes in the peak periods on weekdays. Under the LRT alternative, an extensive network of feeder bus service (similar to that used to serve Metrorail now) would be used to bring riders to and from the CCT stations. As previously noted, there would also be a concentrated effort to develop station area plans that facilitated walk and bike access. That same emphasis on walk and bike access would apply to the BRT stations. There would, however, be less transferring taking place under the BRT alternative at the CCT stations as some buses would first collect riders in neighborhoods and then access the transitway stopping only at stations inbound to Shady Grove (as an example).

Travel time between selected stations are shown in the study and provided below as Table 9.

**Table 9- CCT Travel Times**

ALTERNATIVE	COMSAT TO SHADY GROVE	COMSAT TO GERMANTOWN	GERMANTOWN TO NIST	NIST TO DANAC	DANAC TO SHADY GROVE
Alternative 6.2: Transit TSM	60 min	11.3 min	19.9 min	11.8 min	16.6 min
Alternative 6A/7A (LRT)	36 min	10.6 min	9.1 min	8.3 min	8.1 min
Alternative 6B/7B (BRT)	38 min	11.1 min	9.3 min	8.6 min	8.9 min

*Note: Travel times reflect travel and station dwell times. Overall travel corridor travel times for LRT are marginally faster but station-to-station times depend on operational conditions.*

Source: I-270 US 15 CCT AA/EA May 2009 – Table III-4, Page III-3

It is important to note that compared to the TSM alternative, the CCT reduces the travel time between COMSAT and Shady Grove by almost in half. Another interesting aspect of this analysis is that the greatest time savings is realized in the segment from Germantown south to Shady Grove.

**Table 10- Station Parking Assumptions**

### Station Parking

The AA/EA includes assumptions related to station parking that identifies the total number of spaces by segment and not specific station as noted in the parking demand forecasts shown in Table 10. Additional clarification on these assumptions is needed.

STATION LOCATION		PARKING CAPACITY	PARKING DEMAND BY ALTERNATIVE			
FIRST STATION	LAST STATION		ALTERNATIVE 6A (LRT)	ALTERNATIVE 6B (BRT)	ALTERNATIVE 7A (LRT)	ALTERNATIVE 7B (BRT)
Shady Grove	Shady Grove	N/A	150	150	150	150
East Gaither (King Farm)	Washingtonian	450	700	750	700	800
DANAC	Decoverly	250	350	250	350	300
Quince Orchard	Metropolitan Grove	1,500	1,050	1,000	1,300	950
Germantown	Cloverleaf	1,100	500	500	600	450
Dorsey Mill	COMSAT	1,500	500	600	550	650
<b>Total</b>		<b>4,800</b>	<b>3,150</b>	<b>3,250</b>	<b>3,350</b>	<b>3,300</b>

<sup>1</sup> Shady Grove Metrorail Station parking will be accommodated by expanded Metrorail parking. Cannot determine access mode since station shares parking with Metrorail.

<sup>2</sup> Metropolitan Grove CCT Station parking capacity of 1,000 spaces excludes the existing 350 spaces at the Metropolitan Grove MAB Station. Source: Phase I Year 2030 Washington Area Model, I-270/US 15 Multi-Modal Corridor Study Corridor Case: Transitory Detailed Depiction of Alternatives (October 2007)

It appears from the analysis that there is an oversupply of parking that would be devoted specifically to the CCT.

Ridership Estimates By Station

A summary of the estimated weekday ridership by station and alternative is shown below in Table 11.

**Table 11- Daily CCT Station Boardings**

STATION NAME	ALTERNATIVE 6.2 TRANSIT TSM	ALTERNATIVE 6A	ALTERNATIVE 6B	ALTERNATIVE 7A	ALTERNATIVE 7B
CCMSAT	130	2,625	1,230	2,620	1,530
Dorsey Mill	200	585	520	595	530
Cloverleaf	440	800	685	730	680
Germantown	770	2,915	2,235	2,860	2,215
Metropolitan Grove	600	2,215	2,210	2,435	2,180
MST	685	635	1,305	630	1,215
Quince Orchard	515	2,570	2,495	2,795	2,375
Decoverly	315	1,135	925	1,155	930
DANAC	330	990	595	990	600
Washingtonian	565	2,735	2,705	2,785	2,800
West Gaither	330	2,635	2,755	2,645	2,765
East Gaither	495	930	900	930	900
Shady Grove	1,580	9,050	7,930	9,130	8,180
<b>Total</b>	<b>7,445</b>	<b>30,135</b>	<b>26,490</b>	<b>30,365</b>	<b>26,905</b>

Source: I-270 US 15 CCT AA/EA May 2009 – Table III-6, Page III-3

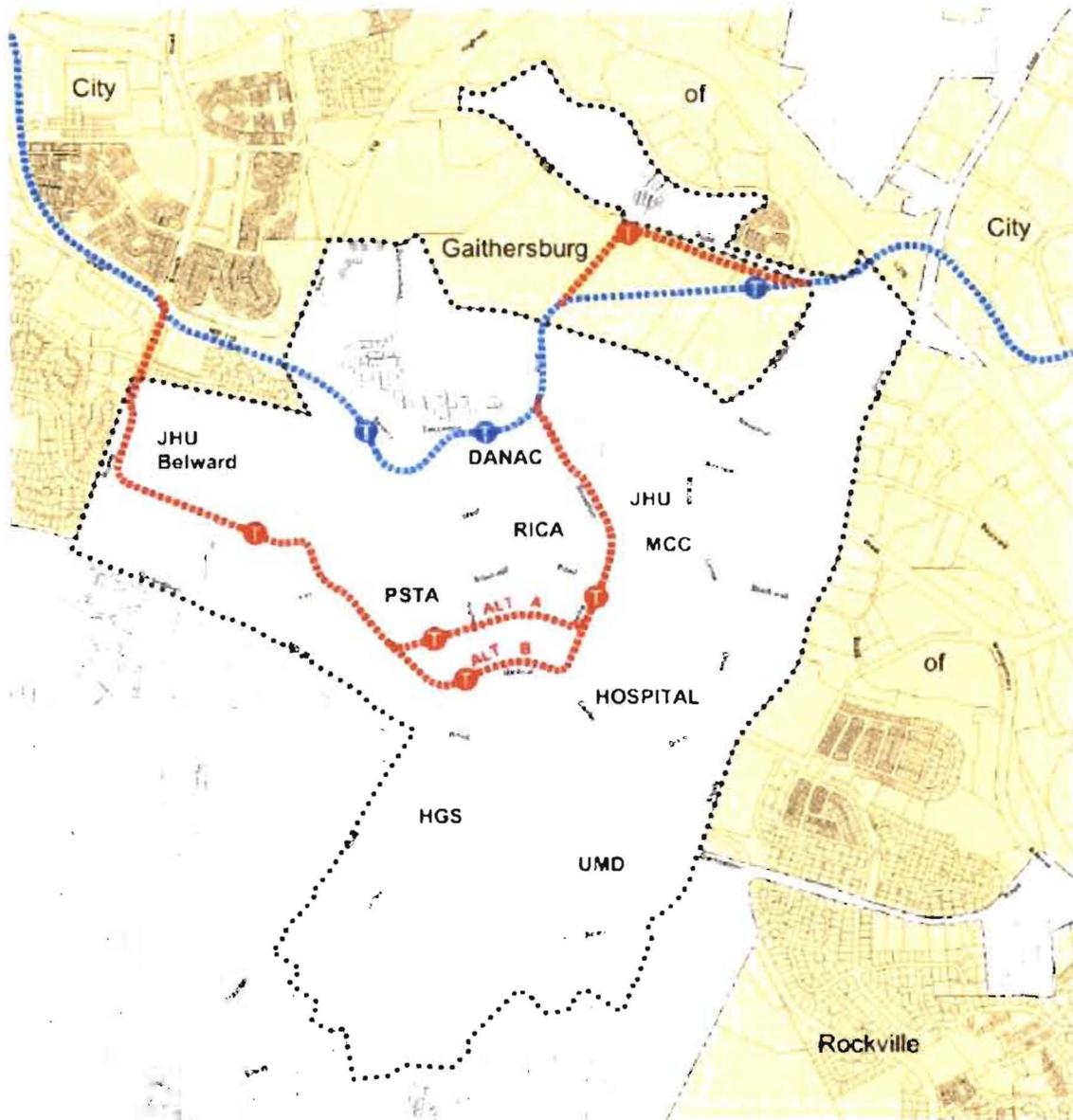
**b. Sensitivity Analysis**

The MTA is currently conducting a sensitivity analysis as a means of evaluating the proposed modification of the alignment of the CCT to accommodate recent approved and proposed changes in densities in the Life Sciences Area, Crown Farm, and the Kentlands.

Life Sciences Alignment

The Planning Board Draft version of the Gaithersburg West Master Plan includes a proposal to modify the alignment of the CCT in the Life Sciences Area to serve the area south of Key West Highway (see Table 12).

Figure 3. Proposed Realignment of CCT in Life Sciences Area and Crown Farm



- Life Sciences Center Study Area
- City of Gaithersburg, City of Rockville
- Current Corridor Cities  
Transitway and Stations
- Alternate Corridor Cities  
Transitway and Stations

The proposed alignment is expected to add three stations in the Life Sciences Area and result in the relocation of the DANAC station.

The staff has conducted a preliminary sketch analysis of the impact of this modification. The findings suggest about 6,000 additional weekday riders would use the CCT in 2030 with the new alignment. The MTA is expected to complete its analysis later this summer or early this fall. The results of the analysis are to be used to inform the state decision on the LPA. This alignment is included as the recommended alignment in the Gaithersburg West Plan and the staff is recommending that the Planning Board confirm that master plan recommendation in recommendation.

It should be noted that (aside from the forthcoming MTA analysis of the proposed realignment) there are other remaining issues that will need to be addressed:

- Belward Farm is eligible for the National Register of Historic Places. The proposed realignment of the transitway will bring the transitway closer to the farm than the master plan alignment that is in the AA/EA.
- The selection of the alternative alignment as the LPA will likely result in the need to update the EA. The MTA project staff estimates that the update could take 12-18 months.
- The realignment is dependent upon the eventual relocation of the Public Safety Training Academy (PSTA).

#### Crown Farm Alignment

The MTA is also including in its sensitivity analysis an updated alignment for Crown Farm. Crown Farm has been annexed into the City of Gaithersburg and there is an approved project plan for the site that includes a relocated alignment and station. The updated alignment is also included in the preceding table. It is not expected that the alignment change will have a material effect on the CCT running time or any other operational aspect of the project. The ridership estimates may go up.

#### Kentlands

The City of Gaithersburg has developed plans to increase the density in the Kentland commercial area. The MTA is including in the sensitivity analysis a modification to the alignment in this area that would bring the CCT to the west side of Great Seneca Highway before turning onto Quince Orchard Road. It is not expected that the change will have a material effect on the CCT running time or any other operational aspects of the project. The ridership estimates may go up. The Kentlands realignment is not depicted in the previous table.

### c. Station Changes

There are changes to the station locations depicted in Figure 2 and Table 11 that should be noted. These include in the following:

- The “Washingtonian” Station is now more generally referred to as the Crown Farm station and as noted above and in Table 11 is to be relocated to the vicinity of Decoverly Drive extended and Fields Road.
- The Middlebrook Station is not included in Table \_ that depicts ridership by station because it is considered a later phase (beyond 2025) station by MTA. The Planning Board Draft of the Germantown Sector Plan for the Employment Corridor recommends that this station be dropped from further consideration.
- Some material related to the AA/EA depicts a station on Great Seneca Highway at School Drive. This station has been dropped by the MTA due to encroachment by development.
- The Manekin Station is another station that is considered a later phase (beyond 2025) station.
- The First Field Station on Quince Orchard Road is considered a later phase station and is not shown on the map.
- The Quince Orchard Park Station would be relocated to the west side of Great Seneca Highway and become the Kentlands Station under the proposed realignment in this area.
- The DANAC station may be moved east toward Diamondback Drive as part of the proposed realignment through the Life Sciences Area.
- The Decoverly Station is to be eliminated as a result of the proposed realignment through the Life Sciences Area.

### d. Operations and Maintenance (O&M) Facility

The AA/EA includes an analysis of two sites in the Shady Grove area, two sites in Metropolitan Grove, and one site near COMSAT as potential locations for an Operations and Maintenance Facility to support the CCT.

Locating an Operations and Maintenance facility is difficult. Much of the County is developed, the site requirements are relatively large (15-20 acres for a project of the scope of the CCT) and the operating and cost parameters argue strongly for a site near the corridor and preferably within any segment that may be part of a first phase of operation.

A summary of the impacts of the potential sites is presented in Table 13.

**Table 12- Summary of Impacts of Potential O&M Sites**

SITE	SHADY GROVE AREA SITES			METROPOLITAN GROVE AREA SITES			COMSAT AREA SITE	RANGE OF IMPACTS
	REDLAND ROAD LRT (1D)	REDLAND ROAD BRT (1D)	CRABBS BRANCH WAY BRT (6)	PEPCO LRT (A/5)	POLICE VEHICLE IMPOUND LOT LRT (6)	POLICE VEHICLE IMPOUND LOT BRT (6)	OBSERVATION DRIVE BRT (5)	
Total Right-of-Way, acres	17.7	16	12	22	16.7	18.7	40	12-40
Prime Farmland Soils, acres	7.4	5.89	8.23	2.68	12.48	12.48	6.29	2.68-12.48
Soils of Statewide Importance, acres	7.4	0	0.72	12.03	1.92	0.55	5.74	0.55-12.03
Floodplains, acres	0	0	0	0	0	0	0	0
Wetlands, acres	0	0	0	0	0	0	0	0
Streams, linear feet	0	0	0	660	486	486	0	0-660
Forest, acres	0	0	0	15.7	10.2	10.2	0.5	0-15.7
Historic Properties, number	0	0	0	0	0	0	0	0
Public Parks, number	0	0	0	0	0	0	0	0
Residential Displacements, number	0	0	0	4	0	0	1	0-4
Business Displacements, number	9	9	0	0	1	1	0	0-9

*NOTE: Only one site will be chosen for an O&M Site. Any of the appropriate O&M sites (LRT sites for alternatives 'A' and BRT sites for alternatives 'B') could be constructed with any of the build alternatives (5A/B, 6A/B, 5A/B, 6A/B, or 7A/B)*

Source: I-270 US 15 CCT AA/EA May 2009 – Table S-3, Page S-7.

Operationally, the sites in Shady Grove and Metropolitan Grove are preferable to the COMSAT area site which would more likely be along a segment that would not be operational until a later phase of the project. There are land use compatibility issues with the Redland Road and Observation Drive sites and the Crabbs Branch Way site is being considered as a SHA maintenance facility in support of the ICC. The Observation Drive site is in the Clarksburg Special Protection Area. The Metropolitan Grove sites would require the loss of between 10 to 18 acres of forest land. In summary, there are no good options to provide the needed space to improve transit service without causing natural environmental resource impacts. The staff recommends the Police Vehicle Impound Lot at Site 6 as preferred alternative, as a result of extensive coordination by study team members including the Montgomery County Police and the City of Gaithersburg.

A more detailed summary table from the applicable Technical Report is provided below.

**Table 13-Summary of Impacts of Potential O&M Sites – Technical Report**

Resources	Site 1D - BRT	Site 1D - LRT	Crabbs Branch Way - BRT	Site 4/5 - LRT	Site 5 - BRT	Site 6 - LRT (minimization)	Observation Drive - BRT
Residential Displacements	None	None	None	4	None	None	1
Business Displacements	29	29	None	None	Police Impound Lot/Future Forensics Lab	Police Impound Lot/Future Forensics Lab	None
Soils	PF - 6.68 acres	PF - 7.40 acres	PF - 8.23 acres SI - 0.72 acres	PF - 2.88 acres SI - 12.03 acres	PF - 12.48 acres SI - 0.55 acres	PF - 15.05 acres SI - 1.92 acres	PF - 6.26 acres SI - 5.74 acres
Floodplain Impacts	None	None	None	None	None	None	None
Stream Impacts	None	None	None	850 linear feet	328 linear feet	488 linear feet	None
Wetland and Buffer Impacts	None	None	0.4 acres	None	None	None	None
Forest Impacts	None	None	None	18.72 acres	7.8 acres	9.87 acres	0.84 acres
Significant trees	None	None	None	11	72	51	4
Specimen trees	None	None	None	87	90	79	1
Hazardous Waste potential	Low - no hazardous wastes onsite; four high contaminant value sites located within 0.10 miles	Low - no hazardous wastes onsite; four high contaminant value sites located within 0.10 miles	Low - no hazardous wastes onsite; one high contaminant value site located within 0.18 miles	Low - no hazardous wastes onsite or in the immediate vicinity	Low - no hazardous wastes onsite; one high contaminant value site located within 0.11 miles	Low - no hazardous wastes onsite; one high contaminant value site located within 0.11 miles	Low - no hazardous wastes onsite; one high contaminant value site located within 0.5 miles
Existing Land Use	Commercial/Industrial	Commercial/Industrial	Undeveloped	Rural Residential	Commercial/Industrial	Commercial/Industrial	Undeveloped
Compatible with Future Planned Land Use	No	No	Yes	Yes	Yes	Yes	No
Park Impacts	No	No	No	No	No	No	No
Environmental Justice Impacts*	33% minority	33% minority	64% minority	49% minority	49% minority	49% minority	None

PF=Prime Farmland

SI= Farmland of Statewide Importance

\*If the block group percentage is at least 50% greater than the county average with regard to the percent of minority or low-income populations, the block group was identified as having a "meaningfully greater" amount and, therefore, counted as an EJ area. In the project area, the "meaningfully greater" percentage threshold is 50.9%.

Source: I-270 US 15 CCT AA/EA O&M Facility Site Selection Technical Report May 2007 – Table 2, Page 30.

## 5. HIGHWAY ALTERNATIVES

### a. Description

A summary of the alternatives under consideration is again shown below as Tables 14 and 15.

**Table 14- Alternatives From AA/DEIS (2002)**

ALTERNATIVE	DESCRIPTION
1	No-Build Alternative
2	TSM/TDMA Alternative
3A	Master Plan <sup>1</sup> HOV/LRT Alternative
3B	Master Plan <sup>1</sup> HOV/BRT Alternative
4A	Master Plan <sup>1</sup> General-Purpose/LRT Alternative
4B	Master Plan <sup>1</sup> General-Purpose/BRT Alternative
5A	Enhanced <sup>2</sup> Master Plan HOV/General-Purpose/ LRT Alternative
5B	Enhanced <sup>2</sup> Master Plan HOV/General-Purpose/ BRT Alternative
5C	Enhanced <sup>2</sup> Master Plan HOV/General-Purpose/ Premium Bus Alternative

<sup>1</sup> Master Plan refers to proposed alignments along I-270 and US 15 included in the current Frederick and Montgomery County approved master plans.

<sup>2</sup> Enhanced Master Plan refers to proposed improvements that are greater than those called for in the Montgomery County Clarksburg Area Master Plan.

**Table 15- Alternatives From AA/EA (2009)**

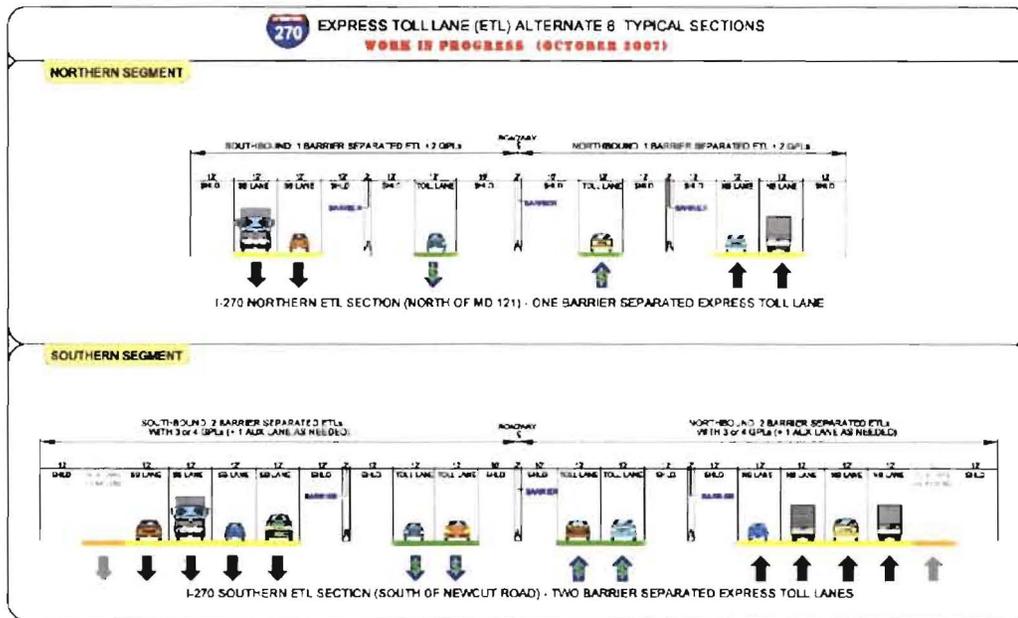
ALTERNATIVE	DESCRIPTION
1: No-Build	No-Build Alternative carried from the 2002 DEIS; includes latest Metropolitan Planning Organization (MPO) demographic forecasts
6A	Master Plan <sup>1</sup> ETL/LRT Alternative
6B	Master Plan <sup>1</sup> ETL/BRT Alternative
7A	Enhanced <sup>2</sup> Master Plan ETL / LRT Alternative
7B	Enhanced <sup>2</sup> Master Plan ETL / BRT Alternative

<sup>1</sup> Master Plan refers to alignments along I-270 & US 15 included in current Frederick and Montgomery County approved master plans.

<sup>2</sup> Enhanced Master Plan refers to proposed improvements that are greater than called for in the Montgomery County Clarksburg Area Master Plan.

A typical section of one of the ETL alternatives is presented below as Figure 4. The barrier separation between each set of lanes increases safety but requires substantial right of way and impervious surface with more lateral space dedicated to shoulders than to moving lanes north of MD 121.

**Figure 4. ETL Section For Highway Alternative 6**



**b. Mobility Performance Measures**

Overview

The highway alternatives under consideration span two studies and seven years. The results are therefore comparable with respect to some variables but not necessarily all variables. The State Highway Administration (SHA) has indicated it will be addressing some of the issues related to the need for updated information in subsequent phases of project planning. Some areas where the analysis is different in the two studies include the following:

- The 2002 study uses a target year of 2025 and the 2009 study uses a target year of 2030.
- The Intercounty Connector (ICC) was not part of the coded transportation network for the 2002 study.
- Different “rounds” of the COG Cooperative Forecast were used in the analysis. Round 6.2 was used for the 2002 study and Round 6.4a was used for the 2009 study.
- An updated version of the COG travel demand model was used for the 2009 study. The updated version of the model has been observed by SHA to be more refined as a result of the model structure and other characteristics.

- There was a detailed analysis of the impact on intersections adjacent to the I-270 corridor in the 2002 study. There is no similar analysis contained in the 2009 study.
- Different approaches to managed lanes are used. In the 2002 study, the focus is on HOV lanes. In the 2009 study, the focus is on ETL's.

The SHA recently issued a supplemental "sensitivity analysis" that examines the question of the extent to which the two studies are comparable.<sup>3</sup> The sensitivity analysis, included as Attachment B, was performed to...

*"provide a travel demand forecast of similar DEIS (2002) and AA/EA (2009) alternatives at a common horizon year using the same COG travel demand model and the latest regional cooperative land use forecasts."*

In conducting the analysis, SHA essentially examined Alternative 3 of the 2002 study at the level of the alternatives in the 2009 study. This was accomplished by using the more recent COG travel demand model with input from the Round 7.0 land use and the region's 2006 Constrained Long Range Plan (that includes the ICC).

The analysis compared the travel demand characteristics using average daily traffic volumes and total person through-put and finding little difference, concluded that while it is not appropriate to make a direct comparison using the different set of models, there is a basis for using the results to select an LPA with the caveat that an updated traffic operations analysis will be required to support the decision on an LPA.

Given those qualifications and the fact that further delay in addressing the corridor's mobility issues is unacceptable, we have examined the highway alternatives in the following areas:

- Level of Service
- Impacts/Mitigation
- Master Plan Conformance
- Other Area's Experience With Managed Lanes

#### Level of Service (LOS)

The level of service on I-270 in 2025 and 2030 under the various alternatives is expressed in terms of traffic volume in one direction as a percentage of the capacity provided in that same direction. Letters (A through F) are used to categorize the extent of congestion based upon the following general descriptors:

LOS A – D denotes free or stable flow with reduced speeds as you approach LOS D  
 LOS E – Indicates facility operating at capacity

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<sup>3</sup> The sensitivity analysis is titled "HOV versus Express Toll Lane: Travel Demand Sensitivity Analysis". It was distributed at a staff level team meeting on June 2, 2009 and is included as Attachment B to this staff report. As of this writing, the sensitivity analysis has not been issued as part of the AA/EA and has not been posted on the project website.

LOS F – Congested – stop and go conditions

The LOS as presented in the studies is a measurement of the combined level of service in both the general purpose and managed lanes (HOV or ETL).

The No-Build Option

It is about 18 miles from Park Mills Road north of MD 80 to the I-370 interchange with I-270. The traffic model used in the AA/EA indicates that if nothing is done the only segments of I-270 that would not be operating at LOS F during the morning peak hour in 2030 would be between Father Hurley Boulevard (MD 27) and Germantown Road (MD 118) - a distance of about a mile - and between Quince Orchard Road / Montgomery Village Avenue (MD 124) and Clopper Road / West Diamond Avenue (MD 117) – a distance of about one half of a mile.

The No-Build Option with the CCT

While not explicitly tested as an alternative, there is nothing in the model results to suggest that building the CCT and not improving I-270 would in any way alleviate future congestion on I-270. The 2002 study forecasts LOS F during the morning peak hour in 2025 from Germantown Road south to I-370 under any of the build alternatives (each alternative assumes an operational CCT). The current daily vehicle traffic volumes on I-270 are six to seven times the projected CCT daily ridership in 2030.

Travel Forecasts

A series of tables follow that present the travel model results for the two studies by corridor segment. The tables depict the LOS for each segment. The dominant peak hour directions are **highlighted in bold** in the tables. Table 17 below depicts the abbreviations and terms that are used in the tables:

**Table 16- Abbreviations Used**

Abbreviation	Full Term	Definition
ETL	Express Toll Lane	Lane requiring payment of toll for every vehicle other than public transit vehicles. The toll varies throughout the day according to the level of congestion as a means of optimizing level of service provided in the lane.
HOV	High Occupancy Vehicle Lane	Toll free lane restricted to use by vehicles occupied by a driver and at least two other people (HOV 3+). Motorcycles can also use HOV lanes.
GP	General Purpose Lane	Toll free regular lanes for all vehicles.
Aux	Auxiliary Lane	Lanes between interchanges that allow vehicles to transition to and from main through lanes
C/D	Collector / Distributor or Local Lanes	One way travel lanes on the side of the main lanes for shorter trips and for collecting traffic entering and exiting interchanges
	Direct Access Ramp	Barrier separated access to managed lanes

**Table 17- LOS Analysis – Park Mills Road To MD 27**

From	To	No-Build (2025)	No-Build (2030)	Highway Alt. 3 (2025)	Highway Alt. 4 (2025)	Highway Alt. 5 (2025)	Highway Alt. 6 (2030)	Highway Alt. 7 (2030)	Notes	Est. Cumulative Distance
Park Mills Road (North of MD 80)	MD 121	2 GP Lanes AM SB – F PM NB – F AM NB – D PM SB – E	2 GP Lanes AM SB – F PM NB – F AM NB – C/D PM SB – D	2 GP Lanes & 1 HOV in Each Direction AM SB – F PM NB – F AM NB – C PM SB – D	3 GP Lanes in Each Direction AM SB – E PM NB – F AM NB – C PM SB – D	3 GP & 1 HOV in Each Direction AM SB – E PM NB – F AM NB – C PM SB – C	2 GP Lanes & 1 ETL in Each Direction AM SB – F PM NB – F AM NB – C PM SB – C	2 GP Lanes & 2 ETL Lanes in Each Direction AM SB – D/E PM NB – F AM NB – C PM SB – C	ETL's terminate north of MD 80 in vicinity of Park Mills Road – ETL Open Access South of MD 80 & South of MD 109	8.8 Miles
MD 121	Proposed Newcut Road	3 GP Lanes SB & 2 GP Lanes & 1 HOV Lane NB AM SB – F PM NB – F AM NB – D PM SB – E	3 GP Lanes SB & 2 GP Lanes & 1 HOV Lane NB AM SB – F PM NB – F AM NB – C PM SB – D	4 GP & 1 HOV in Each Direction AM SB – E PM NB – E AM NB – B PM SB – C	4 GP & 1 HOV in Each Direction AM SB – E PM NB – E AM NB – B PM SB – C	4 GP & 1 HOV in Each Direction AM SB – E PM NB – E AM NB – B PM SB – C	3 GP Lanes & 1 ETL in Each Direction AM SB – F PM NB – F AM NB – B PM SB – C	3 GP Lanes & 2 ETL Lanes in Each Direction AM SB – E PM NB – E AM NB – B PM SB – C	CCT Northern Terminus @ COMSAT	10.0 Miles
Proposed Newcut Road	MD 27 / Father Hurley Blvd	3 GP Lanes SB & 2 GP Lanes & 1 HOV Lane NB AM SB – F PM NB – F AM NB – D PM SB – E	3 GP Lanes SB & 2 GP Lanes & 1 HOV Lane NB AM SB – F PM NB – F AM NB – C PM SB – D	4 GP & 1 HOV in Each Direction AM SB – E PM NB – E AM NB – B PM SB – B	4 GP & 1 HOV in Each Direction AM SB – E PM NB – E AM NB – B PM SB – B	4 GP & 1 HOV in Each Direction AM SB – E PM NB – E AM NB – B PM SB – B	3 GP Lanes & 1 ETL Lanes in Each Direction AM SB – F PM NB – E AM NB – B PM SB – C	3 GP Lanes & 2 ETL Lanes in Each Direction AM SB – E PM NB – E AM NB – B PM SB – C	Direct Access Ramp To ETL @ Newcut Road	11.5 Miles

**Table 18- LOS Analysis – MD 27 / Father Hurley To Watkins Mill Road**

From	To	No-Build (2025)	No-Build (2030)	Highway Alt. 3 (2025)	Highway Alt. 4 (2025)	Highway Alt. 5 (2025)	Highway Alt. 6 (2030)	Highway Alt. 7 (2030)	Notes	Est. Cumulative Distance
MD 27 / Father Hurley Blvd	MD 118 / Germantown Road	4 GP Lanes SB & 3 GP Lanes & 1 HOV NB AM SB – E PM NB – F AM NB – C PM SB – E	4 GP Lanes SB & 3 GP Lanes & 1 HOV NB AM SB – E PM NB – D AM NB – B PM SB – B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 2 Aux Lanes NB AM SB – E PM NB – E AM NB – B PM SB – B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 2 Aux Lanes NB AM SB – E PM NB – E AM NB – B PM SB – B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 2 Aux Lanes NB AM SB – F PM NB – E AM NB – B PM SB – B	4 GP Lanes & 2 ETL Lanes in Each Direction AM SB – E PM NB – C AM NB – A PM SB – B	4 GP Lanes & 2 ETL Lanes in Each Direction AM SB – D PM NB – C AM NB – A PM SB – B		12.5 Miles
MD 118 / Germantown Road	Middlebrook Road	3 GP Lanes SB and 3 GP Lanes and 1 HOV NB AM SB – F PM NB – F AM NB – C PM SB – D	3 GP Lanes SB and 3 GP Lanes and 1 HOV NB AM SB – F PM NB – E AM NB – B PM SB – C	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction AM SB – F PM NB – E AM NB – B PM SB – B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction AM SB – F PM NB – E AM NB – B PM SB – B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction AM SB – F PM NB – E AM NB – B PM SB – B	4 GP Lanes & 2 ETL Lanes in Each Direction AM SB – E PM NB – D AM NB – B PM SB – C	4 GP Lanes & 2 ETL Lanes in Each Direction AM SB – D PM NB – D AM NB – B PM SB – B	Direct Access Ramp To ETL @ MD 118	13.3 Miles
Middlebrook Road	Watkins Mill Road	4 GP Lanes SB and 3 GP Lanes and 1 HOV NB AM SB – F PM NB – F AM NB – D PM SB – D	4 GP Lanes SB and 3 GP Lanes and 1 HOV NB AM SB – F PM NB – F AM NB – B PM SB – C	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction AM SB – F PM NB – E AM NB – A PM SB – B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction AM SB – F PM NB – E AM NB – A PM SB – B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction AM SB – F PM NB – E AM NB – A PM SB – B	4 GP Lanes & 2 ETL Lanes in Each Direction AM SB – D PM NB – F AM NB – B PM SB – B	4 GP Lanes & 2 ETL Lanes in Each Direction AM SB – D PM NB – E AM NB – B PM SB – B		15.1 Miles

Table 19- LOS Analysis – Watkins Mill Rd. To I-370

From	To	No-Build (2025)	No-Build (2030)	Highway Alt. 3 (2025)	Highway Alt. 4 (2025)	Highway Alt. 5 (2025)	Highway Alt. 6 (2030)	Highway Alt. 7 (2030)	Notes	Est. Cumulative Distance
Watkins Mill Road	MD 124 / Quince Orchard Rd. / Montgomery Village Ave	4 GP Lanes SB and 3 GP Lanes & 1 HOV Lane NB - 1 C/D Lane NB - 2 Aux Lanes NB  AM SB - F PM NB - F  AM NB - D PM SB - D	4 GP Lanes SB and 3 GP Lanes & 1 HOV Lane NB - 1 C/D Lane NB - 2 Aux Lanes NB  AM SB - F PM NB - E  AM NB - B PM SB - C	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction  AM SB - F PM NB - F  AM NB - B PM SB - B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction  AM SB - F PM NB - E  AM NB - B PM SB - B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane in Each Direction  AM SB - F PM NB - F  AM NB - B PM SB - B	4 GP Lanes NB & 3 SB - 2 ETL Lanes in Each Direction  AM SB - E PM NB - C  AM NB - B PM SB - C	4 GP Lanes NB & 3 SB - 2 ETL Lanes in Each Direction  AM SB - F PM NB - C  AM NB - B PM SB - C	Direct Access Ramp To ETL @ Metropolitan Grove - Potential Phase 1 Northern Terminus of CCT @ Metropolitan Grove	15.5 Miles
MD 114 / Quince Orchard Rd. / Montgomery Village Ave	MD 117 / Clopper Road / West Diamond Ave.	4 GP Lanes SB and 3 GP Lanes & 1 HOV Lane NB - 2 C/D Lanes NB - 2 Aux Lanes NB  AM SB - F PM NB - F  AM NB - C PM SB - D	4 GP Lanes SB and 3 GP Lanes & 1 HOV Lane NB - 2 C/D Lanes NB - 2 Aux Lanes NB  AM SB - E PM NB - C  AM NB - A PM SB - B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane SB  AM SB - F PM NB - F  AM NB - B PM SB - B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane SB  AM SB - F PM NB - E  AM NB - B PM SB - B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane  AM SB - F PM NB - F  AM NB - B PM SB - B	4 GP Lanes & 2 ETL Lanes in Each Direction  AM SB - C PM NB - C  AM NB - A PM SB - B	4 GP Lanes & 2 ETL Lanes in Each Direction  AM SB - C PM NB - C  AM NB - A PM SB - A	Potential Direct Access Ramp To ETL @ MD 117	16.4 Miles
MD 117 / Clopper Road / West Diamond Ave	I-370	4 GP Lanes and 1 HOV in Each Direction - 2 C/D Lanes NB - 2 Aux Lanes NB  AM SB - F PM NB - F  AM NB - C PM SB - D	4 GP Lanes and 1 HOV in Each Direction - 2 C/D Lanes NB - 2 Aux Lanes NB  AM SB - F PM NB - D  AM NB - B PM SB - C	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane NB & 2 SB  AM SB - F PM NB - F  AM NB - B PM SB - B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 1 Aux Lane NB & 2 SB  AM SB - F PM NB - F  AM NB - B PM SB - B	3 GP, 1 HOV in Each Direction - 2 C/D Lanes in Each Direction - 2 Aux Lane NB & 2 SB  AM SB - F PM NB - F  AM NB - B PM SB - B	4 GP Lanes SB & 5 SB - 2 ETL's in Each Direction  AM SB - D PM NB - E  AM NB - B PM SB - B	4 GP Lanes NB & 5 SB - 2 ETL's in Each Direction  AM SB - D PM NB - E  AM NB - B PM SB - B	ETL's southern terminus is Shady Grove Road - Direct Access Ramp To ETL @ I-370 - CCT Southern Terminus @ Shady Grove Metrorail Station	17.9 Miles

The following observations can be made about the results in the tables:

- The No-Build Alternatives for both 2025 and 2030 result in stop and go conditions in peak hour for virtually the entire length of the study area in the County.
- The 2030 No Build reflects a slightly better level of service than the 2025 No Build during peak hour from Father Hurley south to I-370.
- South of Germantown Road, the ETL alternatives generally provide more improvement in peak hour flow than the HOV alternatives – relative to the applicable No Build alternative (i.e., 2025 for the HOV alternatives and 2030 for the ETL alternatives).
- South of Germantown Road, the HOV alternatives in 2025 offer little in the way of congestion relief – compared to the applicable no-build – southbound in the morning.
- In general, the ETL alternatives provide a better average level of service, by virtue of selling remaining HOV lane capacity, thereby increasing the proportion of motorists traveling at or near free-flow speeds.

#### Reversible Lanes

The AA/EA does not include peak hour traffic volumes, but a sense of the directional split can be obtained from the levels of congestion forecast along the facility. Table III-8, included as Attachment C indicates that the Volume-to-Capacity (V/C) ratio for Alternatives 6 and 7 in the peak direction (southbound in the morning and northbound in the evening) is generally twice as high as it is in the off-peak direction for most segments in the corridor. For instance, north of MD 121, the V/C ratio for Alternative 7A/B during the AM peak period is 0.98 in the peak direction and 0.51 in the off-peak direction. During the PM peak period the V/C ratios are 1.02 in the peak direction and 0.52 in the off-peak direction.

These V/C ratios suggest that roughly twice as many motorists (and therefore an expected higher ratio of persons) are traveling in the peak direction as in the off-peak direction, a finding consistent with our independent travel demand modeling for master plans. **These findings suggest that reversible lane facilities should be an appropriate solution in the corridor,** given both the American Association of State Highway and Transportation Officials (AASHTO) guidance to consider reversible lanes when directional peaking is at least 65% as well as the fact that toll revenues and travel demand management expectations should be low if the general purpose lanes are not particularly congested. The reversible lane system would reduce the number of barrier separated roadways from four to three, thereby reducing the amount of right-of-way and pavement. The use of a reversible lane system in a radial corridor at the edge of a major metropolitan area is well established, and is the preferred alternative for the extension and expansion of HOT lanes along the I-95 (Shirley Highway) corridor in Virginia.

### Access Points to Managed Lanes

The ETL alternatives include a limited number of access points in Montgomery County, including an open area for merging/diverging north of MD 121 and direct access ramps at Newcut Road (Little Seneca Parkway), MD 118, MD 117, and I-370. Some degree of access limitation is necessary to provide safe access and egress and prevent merging and weaving operations from reducing managed lane travel speed and reliability.

Some stakeholders have expressed the concern that a limited number of access points may limit the ability of Montgomery County residents to choose the ETL (or HOT) lane options if their travel patterns don't jive with the direct access ramps. The AA/EA does not contain travel volume data that would permit the calculation of local versus longer-distance travelers that can use the ETL lanes. The AA/EA notes that providing the ETLs for longer distance trips does result in some shifting of traffic from the General Purpose lanes, yet the offer of speedier, reliable travel may be limited for County residents.

Staff suggests that the access point options be revisited during the design process, with two particular areas of interest:

- Direct access ramps are proposed from I-270 north to I-370/ICC for value-priced facility connectivity. A similar set of direct access ramps should be considered between I-270 north and Sam Eig Highway to facilitate transit vehicle, carpool, and tolled vehicle connections to the greater development densities being considered in the Gaithersburg West master plan.
- The I-270 crossing of Great Seneca Creek is an area where an open area for merging/diverging could be considered based on interchange spacing and the interest to reduce the facility width (by eliminating the intermediate shoulder areas necessitated by barrier-separated lanes) and minimize parkland/natural resource impacts as I-270 crosses the Great Seneca Creek stream valley.

### Access to MD 109

The Clarksburg Master Plan recommends that the I-270 interchange with MD 109 (Old Hundred Road) be closed after the MD 75 interchange in Frederick County is opened. This proposal should be considered during detailed design.

### **c. Impacts / Mitigation / Minimization**

As previously noted in Table 5, the highway component of Alternatives 6 and 7 is significant with respect to increased impacts (relative to the other original build alternatives) in the following specific categories:

- Prime Farmland Soils
- Forest Cover
- Streams
- Total Right of Way

- Residential Displacements
- Business Displacements

Mitigation efforts (largely the use of retaining walls and the narrowing of shoulder lanes) result in the minimization of impacts. The scope of the minimization efforts is evident when comparing the summary tables on residential and business displacements in the two studies. Further minimization and mitigation should be sought in the design of the improvements.

A summary of the residential displacements for the highway alternatives in the 2002 study is presented below in Table 20.

**Table 20- Mitigation of Impacts On Residential Locations – 2002 AA/DEIS**

Location	Plan Number*	Alternates	Displacements without Retaining Wall <sup>1</sup>	Displacements with Retaining Wall <sup>1</sup>
<i>Highway Residential Displacements</i>				
I-270 Southbound North of I-370 Brighton West Townhouses	HWY 1	3A B, 4A B, 5A B C	61-81 residences	50-81 residences
I-270 Northbound North of I-370 (with I-370 direct access ramp)	HWY 1	5C	87-144 residences	68-120 residences
I-270 Northbound South of MD 117	HWY 1, 2	5C	32-117 residences	0 residences
I-270 Southbound South of Great Seneca Creek Game Preserve Rd	HWY 2	3A B, 4A B, 5A B C	1 residence <sup>2</sup>	0 residences <sup>2</sup>
I-270 Northbound South of Middlebrook Road interchange along Staleybridge Road	HWY 3	3A B, 4A B, 5A B C	26-35 residences	9-13 residences
I-270 Northbound South of Conus Road	HWY 6	3A B, 4A B	1 residence	0 residences
I-270 Northbound South of Conus Road	HWY 6	5A B C	1-2 residences	0 residences
I-270 Southbound South of Conus Road	HWY 6	3A B, 4A B, 5A B C	1 residence	0 residences
I-270 Southbound North of MD 80 interchange Fingerboard Road Residence	HWY 9	3A B, 4A B, 5A B C	0-1 residence	0 residences
US 15 Northbound South of Rosemont Ave Mercer Place Residence	HWY 13	3A B, 4A B, 5A B C	0-2 residences	0-2 residences
US 15 Southbound North of Rosemont Avenue along Biggs Avenue	HWY 13	3A B, 4A B, 5A B C	1 residence	0 residences
<i>Total Highway Residential Displacements</i>	N/A	3A B, 4A B	91-135 residences	50-90 residences
<i>Total Highway Residential Displacements</i>		5A B	91-124 residences	50-90 residences
<i>Total Highway Residential Displacements</i>		5C	210-355 residences	127-210 residences

Source: I-270 US 15 Multi Modal Study AA/DEIS May 2002 – Table III – 10, page III-28

The corresponding table from the 2009 AA/EA for Alternatives 6 and 7 is presented below.

**Table 21- Mitigation of Impacts On Residential Locations – 2009 AA/EA**

LOCATION	PLAN SHEET COUNTY Appendix A	MAXIMUM DISPLACEMENTS WITHOUT MINIMIZATION	MINIMIZED DISPLACEMENTS WITH MINIMIZED SHOULDERS AND/OR RETAINING WALLS <sup>1</sup>
<b>Highway Residential Displacements</b>			
I-270 Southbound, North of I-370 Brighton West Townhouses	HAWY 1 (Montgomery)	51 residences	6 - 10 residences
I-270 Northbound, North of I-370 (with I-370 direct access ramps) Fireside Condominiums	HAWY 1 (Montgomery)	0 residences <sup>1</sup>	0 residences <sup>1</sup>
I-270 Northbound, South of MD 117 London Derry Apartments/ Montgomery Club	HAWY 2 (Montgomery)	150 residences	0 - 61 residences <sup>1</sup>
I-270 Southbound, South of Great Seneca Creek/ Game Preserve Road	HAWY 2 (Montgomery)	1 residence <sup>1</sup>	0 residences
I-270 Northbound, North of Great Seneca Creek Fox Chapel	HAWY 3 (Montgomery)	0 residences <sup>1</sup> (retaining wall included in conceptual design)	0 residences <sup>1</sup>
I-270 Northbound, South of Conus Road	HAWY 6 (Montgomery)	2 residences	1 residence
I-270 Southbound, South of Conus Road	HAWY 6 (Montgomery)	1 residence	1 residence
I-270 Southbound, North of MD 80 interchange Fingerboard Road Residence	HAWY 9 (Frederick)	1 residence	1 residence
I-270 Southbound, South of I-70 Princeton Court Apartments	HAWY 11 (Frederick)	12 residences	0 residences
US 15 Northbound, South of Rosemont Ave. Mercer Place Residences	HAWY 13 (Frederick)	2 residences	0 residences
US 15 Southbound, North of Rosemont Avenue along Biggs Avenue	HAWY 13 (Frederick)	1 residence	0 residences
<b>Total Highway Residential Displacements</b>		<b>251 residences</b>	<b>9 - 74 residences</b>

Source: I-270 US 15 CCT Multi Modal Study AA/EA May 2009 – Table IV-11, page IV-30.

As noted in the above table, the primary locations of residential displacements with the ETL alternatives are the Brighton West Townhouses and the London Derry Apartments.

An aerial view of the Brighton West Townhouses and the Fireside Condominiums is shown below<sup>4</sup>:

**Figure 5. Residential Displacements in Brighton West Vicinity**



As previously noted, mitigation efforts have continued through the development of the AA/EA and will continue after the selection of the LPA and through the balance of project planning. The staff attended the public hearing on June 16, 2009 where a number of residents expressed frustration at not having been contacted regarding the project's potential impact. There is a need for greater documentation of the minimization as well as proactive expanded outreach efforts as the project planning advances.

A summary of the potential business displacements as included in the 2002 study is shown below.

**Table 22- Mitigation of Impacts On Business Locations – 2002 AA/DEIS**

Location	Plan Number*	Alternates	Displacements without Retaining Wall <sup>1</sup>	Displacements with Retaining Wall <sup>1</sup>
<i>Highway Business Displacements</i>				
I-270 southbound, north of I-370 (Festival at Muddy Branch Shopping Center)	HWY 1	3A B, 4A B, 5A B C	2 businesses	0-2 businesses
I-270 southbound, north of I-370 with I-370 direct access ramps (Festival at Muddy Branch Shopping Center)	HWY 1	5C	1 business	1 business
I-270 southbound, north of MD 117	HWY 2	3A B, 4A B, 5A B C	1 business	0
I-270 northbound, north of Conus Road	HWY 6	5A B C	0-1 business	0
I-270 southbound at proposed MD 75 interchange	HWY 7	3A B, 4A B, 5A B C	1 business	1 business
I-270 southbound, south of MD 85	HWY 11	3A B, 4A B, 5A B C	1 business	0
I-270 southbound, south of MD 85	HWY 11	5C	0-1 business	0
I-270 northbound, northeast quadrant of MD 85 interchange	HWY 11	3A B, 4A B, 5A B C	N/A <sup>2</sup>	0 <sup>2</sup>
I-270 northbound, north of MD 85 interchange	HWY 11	3A B, 4A B, 5A B C	N/A <sup>3</sup>	0 <sup>3</sup>
I-270 northbound, south of I-70 interchange	HWY 11	3A B, 4A B, 5A B C	N/A <sup>4</sup>	0 <sup>4</sup>
US 15 southbound, north of MD 26 interchange along Thomas Johnson Dr	HWY 14	3A B, 4A B, 5A B C	2-3 businesses	0
<i>Total Highway Business Displacements</i>	N/A	3A B, 4A B	7-8 businesses	1-3 businesses
		5A B	7-9 businesses	1-3 businesses
		5C	8-11 businesses	2-4 businesses

Source: I-270 US 15 Multi Modal Study AA/DEIS May 2002 – Table III – 11, page III-33

The corresponding table from the 2009 AA/EA for Alternatives 6 and 7 is presented below:

**Table 23- Mitigation of Impacts On Business Locations – 2009 AA/EA**

LOCATION	PLAN SHEET COUNTY Appendix A	MAXIMUM DISPLACEMENTS WITHOUT MINIMIZATION	MINIMIZED DISPLACEMENTS WITH RETAINING WALLS <sup>1</sup>
<b>Highway Business Displacements</b>			
I-270 northbound, south of I-370 (beginning of ETL facility)	HWY 1 (Montgomery)	1 business	0 businesses
I-270 southbound, north of I-370 (Festival at Muddy Branch Shopping Center)	HWY 1 (Montgomery)	3 businesses	0 - 2 businesses
I-270 southbound, north of MD 117	HWY 2 (Montgomery)	1 business	0 businesses
I-270 northbound, north of Comus Road	HWY 6 (Montgomery)	1 business	1 business
I-270 southbound at proposed MD 75 interchange	HWY 7 (Frederick)	1 business	1 business
I-270 southbound, south of MD 85	HWY 11 (Frederick)	1 business	0 businesses
US 15 southbound, north of MD 26 interchange along Thomas Johnson Drive	HWY 14 (Frederick)	2 - 3 businesses	0 businesses
<b>Total Highway Business Displacements</b>		<b>10 - 11 businesses</b>	<b>2 - 4 businesses</b>

Source: I-270 US 15 CCT Multi Modal Study AA/EA May 2009 – Table IV-12, page IV-31.

**d. Master Plan Consistency**

Alternatives 5 and 7 are not consistent with the recommendations in the Clarksburg Master Plan regarding the number of through lanes for the segment north of Comus Road. There is a long standing County policy to limit the width of roadway sections in the Agriculture Reserve. The staff recommends that consideration be given to utilizing reversable lanes along this northern segment of I-270 in the area south generally north of MD 121.

In addition to community based plans, the County adopted *An Amendment To The Master Plan of Highways (Transportation) Within Montgomery County – April 2004*. This plan essentially provided for the introduction of HOV lanes between the American Legion Bridge and the West Spur of I-270. Key aspects of this plan related to the I-270 corridor include the following:

- One HOV lane in each direction, adjacent to the median, with direct connections to the HOV lanes to the north and south.
- HOV lanes on the American Legion Bridge.
- Acceptance of High Occupancy Toll Lanes (HOT) on the Maryland segments if Virginia decided to use HOT lanes.

With respect to the last bullet, the SHA is conducting a “West Side Mobility Study” to examine the introduction of managed lanes between the northern terminuses of the Virginia HOT lane project, the southern limit of the I-270 US 15 Multi-Modal project, and the ICC.<sup>5</sup> The coordination of these projects needs to be incorporated in both the alternatives selection and project phasing processes.

#### **e. Managed Lanes Nationally**

“Managed lanes” is a term that covers a wide variety of travel demand and transportation systems management including HOV lanes and Express Toll lanes.

HOV lanes are the most common application and in use regionally on roads such as I-270, I-66, and I-95/I-395. There is no toll with HOV lanes. The primary restriction is the number of passengers in the vehicle (typically a minimum of 2 or 3 including the driver). Concerns are sometimes expressed about unused capacity and high violation rates with these types of lanes.

HOT lanes are gaining acceptance nationally. These are lanes that typically allow a carpool (again usually a minimum of 2 or 3) to operate in the lane without charge but require a toll (that varies by the level of congestion) of any vehicle with a single occupant. The toll is collected via a transponder attached to the vehicle – there are no toll booths. In some areas, tolls are also collected for carpools and people mistakenly entering the lanes by taking photos of license plates. Some locations are requiring car pools to register to assist with enforcement activities.

Concerns are sometimes expressed with high violation rates and perceived inequities created by allowing someone (that presumably can afford it) to buy their way out of a congested trip. This “Lexus Lane” concern is not borne out by studies of value priced facilities that have been constructed. Generally, most motorists who pay a toll on value priced facilities do not do so on a daily basis, and the income distribution of those using the HOT lanes mirror the income distribution of those electing to remain in the untolled, slower lanes. This results reflects the fact that the value of travel time varies for nearly all users; someone of limited means may still choose to pay a premium price for reliable travel time on a managed lane when the alternative cost (late fees for daycare services as a common pecuniary example; catching an airport flight as another more qualitative example) of delay is higher to the user on that particular day than the toll charged.

As previously noted, Virginia is currently constructing HOT lanes on I-495 that will essentially end just south of the American Legion Bridge.

Variable tolling on entire roadways is another approach that is sometimes used. In this case, all vehicles are required to pay a toll that varies according to the level of congestion. This is the approach that will be used on the ICC when it opens.

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<sup>5</sup> See page S-4 of the Executive Summary of the 2009 AA/EA. More information on the Virginia HOT Lane Project can be found at: <http://virginiahotlanes.com/>. Additional information on the ICC project can be found at: <http://www.iccproject.com/>

Another approach sometimes used is the more conventional distance based tolling for the entire roadway. This is an approach in use on both the Dulles Toll Road and the Dulles Greenway.

Express Toll Lanes is term that is being used in some areas to distinguish between a toll lane and an HOV lane in areas where the non-toll vehicles travel in a lane adjacent to the toll paying vehicles. In the state of Maryland, Express Toll Lanes are lanes where every vehicle in the lane must pay a toll – with the toll varying by the level of congestion in the General Purpose lanes. One advantage of Express Toll Lanes is that it makes enforcement much more efficient. One disadvantage is that it may discourage some carpooling. In this region (as previously noted), the issue of coordination with the Virginia HOT lane project needed.

HOT lanes and Express Toll Lanes have become more popular as toll collection technology has advanced to the point where pricing can be used to more efficiently allocate a scarce resource – capacity on a major roadway. Most (if not all) locations that have introduced HOT lanes have done so at the time of an increase in the capacity of the roadway. There is some thought that states that have implemented HOT lanes view the projects as the beginning of an eventual network of Express Toll Lanes.<sup>6</sup> If so, this may be in part an acknowledgement that we simply cannot (and may not want to) keep building roads and that pricing roadway capacity is one way to influence any number of decisions related to trip-making and the efficient allocation of scarce resources – both man-made and natural.

More information on selected locations that have introduced managed lanes can be found on the following web sites:

I-95 Express Toll Lanes – Miami FL. - <http://www.95express.com/>

SR 167 HOT Lanes – Seattle WA. - <http://www.wsdot.wa.gov/Projects/SR167/HOTLanes/>

I-25 Express Lanes – Denver CO. - <http://www.dot.state.co.us/cte/expresslanes/tollmain.cfm>

I-394 HOT Lanes – Minneapolis MN - <http://www.mnpass.org/>

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<sup>6</sup> See “So You Want To Make A HOT Lane? The Project Manager’s Guide For An HOV To HOT Lane Conversion”, David Ungemah, Texas Transportation Institute, and Myron Swisher, Colorado DOT, March 2006, page 8.

## 6. Next Steps

The I-270 / US 15 multimodal study has been ongoing for more than a decade. The planning and design process for a major multimodal investment such as I-270 and the CCT require considerable state and federal agency coordination. The analyses have now been completed to bring this study to conclusion with the establishment of a consolidated, multimodal Locally Preferred Alternative. Staff finds that a general consensus exists within the community that both the construction of the CCT and an expansion of I-270 are needed.

The next steps are to complete the environmental impact statement process in a manner that will allow both modal components to proceed forward as effectively as possible, recognizing that current state and federal agency funding opportunities are scarce and federal surface transportation authorization is likely to be both modified and delayed during the next 18 months. These anticipated changes in the federal arena provide an opportunity for state and local government to position the improvements to be as competitive as possible.

The next steps in the environmental impact statement process include:

- Selection of a Locally Preferred Alternative, including MTA and SHA Administrator concurrence, in fall 2009
- Receive Location approvals from the FHWA and FTA plus Design approvals from the MTA and SHA Administrators in spring 2010.

The recommended mode and alignment for the CCT include Bus Rapid Transit on an alignment modified from the current master plan to serve new development at the Life Sciences Center as proposed in the Planning Board's pending Gaithersburg West master plan amendment. Concurrent alignment alternatives are proposed for the Crown Farm and Quince Orchard (Kentlands) station areas. These alignment concepts remains under study by the Maryland Transit Administration and would likely require supplemental environmental study for impacts to be documented in a Final Environmental Impact Statement.

More analysis is required to define design details for the I-270 alternatives. The ETL alternatives provide a conservative estimate of costs and resource impacts, but three policy concerns require further attention:

- Both community and natural resource impacts require further minimization efforts, some of which have already been conducted.
- Staff finds that pursuit of a reversible lane system, particularly north of MD 121, would be an effective way to address forecasted peak period, peak direction mobility constraints while reducing both implementation costs and impacts.
- Transit and high-occupancy vehicle priority treatments need to be incorporated to pursue reductions in VMT.

The general concepts promoted in Alternative 7B should be modified so that the subsequent design phase addresses all three of the policy concerns outlined above.

The County can streamline CCT implementation by developing a funding proposal for the CCT at the same time that the CCT supplemental environmental analyses are being completed. The County Council should also develop needs and priorities for the series of proposed major transportation investments in the corridor, considering their combined effects:

- I-270 north of I-370 (improvements resulting from this AA/EA)
- Extended managed lanes to be evaluated in the SHA West Side Mobility Study
- A countywide BRT network, for County study in FY 10
- Midcounty Highway Extended (M-83), currently under County study

Even with substantial minimization techniques, the full I-270 improvements project is likely to exceed \$3 billion. Local interchanges at Newcut Road, Watkins Mill Road, and Metropolitan Grove Road are needed in the near term for both access to corridor development and multimodal connections to the CCT. These improvements should continue to move forward under the Alternative 7B footprint in the near term.

The selection of BRT for the CCT increases flexibility for defining logical implementation segments and pursuing a variety of financing options, including private sector participation. The County should establish a CCT funding strategy that reflects the evolution of the federal surface transportation authorization process so that in twelve to eighteen months the CCT design process and the federal, local, and private sector funding opportunities can be brought back into the same schedule to move from planning toward design and construction.

