AGENDA ITEM #6 (and #9)
July 21, 2009
Action

MEMORANDUM

July 15, 2009

TO: County Council

FROM: Glenn Orlin, Deputy Council Staff Director

SUBJECT: **Action**—I-270/Corridor Cities Transitway (CCT) Project Planning Study, recommendation of Locally Preferred Alternative

The T&E Committee met on July 13 and 16. Councilmembers Floreen and Berliner recommend that the Locally Preferred Alternative include the following elements:

- **Bus Rapid Transit (BRT) is the preferred transit mode for the CCT. The Committee is willing to revisit this recommendation, however, once both Gaithersburg West Master Plan and Germantown Employment Area Sector Plans are adopted and the State has recalculated the ridership and cost-effectiveness of both BRT and Light Rail Transit (LRT).**
- **The preferred alignment for the CCT includes shifts in the Kentlands and Crown Farm recommended by the City of Gaithersburg, and in the Hopkins/Life Sciences Center area.**
- **The preferred CCT yard and shop location is Metropolitan Grove Site 6 (the current Department of Police vehicle impound lot). If the selected transit mode is BRT, then the State is also encouraged to examine other, off-line sites. If Site 6 is selected for the yard and shop, then a new location for the impound lot must be found.**
- **The preferred cross-section for widening I-270 is Alternative 7—adding four managed lanes (two in each direction) to Frederick County—or adding four managed lanes to MD 121 and two reversible managed lanes north of MD 121 to Frederick County.**
- **The new managed lanes on I-270 should be High Occupancy Toll (HOT) lanes, allowing buses, carpools and vanpools to use them free of charge.**

* * *

Introduction. 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 hearing transcripts and major correspondence have been forwarded to Councilmembers under separate cover.

Options. The purpose of this worksession is for the Council 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 main issues and options are listed below:

CCT mode of transit

1. ___ No build
2. ___ Bus rapid transit (BRT)
3. ___ Light rail transit (LRT)

Alignment

1. ___ Master planned alignment
2. ___ Master planned alignment w/Kentlands and Crown Farm shifts
3. ___ Master planned alignment w/Kentlands, Crown Farm, and Hopkins /LSC shifts

Location of yard & shop (if BRT)

1. ___ Redland Road (Shady Grove)
2. ___ Crabbs Branch Way (Shady Grove)
3. ___ Police vehicle impound lot (Metropolitan Grove)
4. ___ Observation Drive (COMSAT)
5. ___ off-line (location TBD)

Location of yard & shop (if LRT)

1. ___ Redland Road (Shady Grove)
2. ___ PEPCO (Metropolitan Grove)
3. ___ Police vehicle impound lot (Metropolitan Grove)

I-270 options (see ©33-35, and those shown below)

1. ___ Alternative 1 - no build
2. ___ Alternative 2 - TSM/TDM
3. ___ Alternative 3 - Master Plan/HOV Lanes (©56-57)
4. ___ Alternative 4 - Master Plan/General Use Lanes (GPL) (©56-57)
5. ___ Alternative 5 - 'Enhanced' Master Plan/HOV + GPL (©57-58)
6. ___ Alternative 6 - 'Enhanced' Master Plan/2 managed lanes (©59-60)
7. ___ Alternative 7 - 'Enhanced' Master Plan/4 managed lanes (©60-61)
8. ___ Alternative 7 with 2 reversible managed lanes (©77)

Type of managed lanes

1. ___ HOV (carpools, vanpools, & buses only)
2. ___ HOT (HOVs free; others tolled)
3. ___ ETL (buses free; carpools, vanpools & others tolled)

Testimony. Most of the testimony has been about the CCT's mode. Elected officials and organizations who addressed this matter generally preferred LRT, but most also noted that BRT was acceptable; the most important point is that a CCT of some type be built as soon as possible. More individuals who spoke at the hearing or sent in written comments support LRT.

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 vehicle impound 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 managed lanes running southbound in the morning peak and northbound in the evening peak.
- The managed lanes would be High Occupancy Toll (HOT) lanes, meaning that carpools, vanpools, and buses 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. Excerpts are attached from the July 13 presentations by MTA regarding the CCT (©49-55) and by SHA regarding I-270 (©56-65). Planning staff's presentation is on ©66-96.

Executive's recommendations. The County Executive's recommendations are expressed in his memo of July 10 (©F-G). He recommends LRT as a better economic catalyst in the corridor. He believes it will be more cost effective if the proposed higher densities in Gaithersburg West and Germantown are considered, and that it would be even more cost effective in the years beyond the design year of 2030. He also recommends Alternative 3 for the I-270 improvements, believing they will better serve Montgomery County residents commuting in the corridor.

Other local government recommendations. The City of Gaithersburg's recommendations are expressed in the Mayor's letter of July 10 (©H-I). Gaithersburg prefers LRT, but if the cost-effectiveness rating would not make it eligible for Federal funding, it would

be supportive of BRT. Gaithersburg advocates alignment shifts in the Kentlands and the Crown Farm. It opposes locating a yard and shop at the police impound lot in Metropolitan Grove. On other aspects of the AA/EA Gaithersburg will form recommendations after the close of the comment period.

The City of Rockville has not yet formed a position. Its Mayor and Council are scheduled to meet on July 27 to take up the matter.

Councilmember Floreen attended the July 16 SHA/MTA briefing to the Frederick County Commission and the mayors of several municipalities in Frederick County. The Commissioners noted that they would be making their recommendations to the State in late August.

The Council's most recent position. The last time the Council took a position on the CCT was in Resolution #16-05, adopted by the Council on December 12, 2006. In that resolution the Council endorsed a largely at-grade LRT for both the CCT and the Purple Line (see ©J-K).

Council staff analysis and 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 T&E 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. Attached is a chapter from the National Academy of Sciences/Transportation Research Board's TCRP Report 118, Bus Rapid Transit Practitioner's Guide (©97-118). On ©100 is a summary of the reported land development benefits of BRT, and on ©101-113 are examples of how transit-oriented development (TOD) is being pursued at BRT stations in Boston, Pittsburgh, and Ottawa.

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; a high-end BRT line, as envisioned in the AA/EA, possesses all these characteristics. 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 (2007 dollars), 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 in 2007 dollars.) BRT can also be built incrementally, so that not as much capital has to be programmed at one time to make progress. Finally, while LRT has to have a yard and shop next 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—either in 2030 or in the longer-term future—that cannot be served handily by the capacity of this BRT line.

CCT 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.

CCT operations and maintenance facility. As noted above, the Planning Board recommends the existing Police Department's vehicle impound 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 impound lot. However, no site has yet been identified for the relocated impound lot.

Another advantage of BRT is that the impound 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.

The other yard and shop locations have difficult issues. In the Shady Grove Master Plan (2004) the Council stated that the yard and shop should be located outside of the Shady Grove Planning Area, thus ruling out the Redland and Crabbs Branch sites. The PEPCO site would take four homes, have the largest forest and stream impacts, and the Observation Drive site is in the Clarksburg Special Protection Area and would take a home. This leaves only the vehicle impound lot (for either a BRT or LRT yard and shop) or a not-yet-identified site off of the CCT alignment (only for BRT).

I-270 widening. The cost of the I-270 improvements dwarfs the cost of the CCT; it constitutes 83-90% of the total cost. Of the $4.58 billion cost of the highway improvements, $2.64 billion are in Montgomery County and $1.94 billion are in Frederick County or City. But the fact that the improvements in Montgomery County would be managed 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 congestion relief for those paying a toll and even modest relief for low-occupancy vehicles not opting to pay the toll. The managed lanes should be thought as primarily transit and ridesharing priority lanes, providing the ability for buses, vanpools and carpools to bypass congestion entirely. With an extension onto the existing managed lanes south of Shady Grove on I-270 and the planned managed lanes on I-495 connecting to the HOT lanes under construction on the Virginia portion of the Beltway, one can envision a regional bus/ridesharing system that would obviate the need for another Potomac River crossing.

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 managed 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 managed lane.

The Clarksburg Master Plan adopted in 1994 would specifically limit the number of through lanes on I-270 north of MD 121 in 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 managed lanes rather than one managed lane 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.

A comparison of Alternatives 3 (proposed by the Executive) and 7 (recommended by the T&E Committee) is shown below. There is little data for Alternative 7 modified (recommended by the Planning Board), but it would be nearly that of Alternative 7, with somewhat less environmental impact.

	Alt. 3 (Exec)	**Alt. 7 (T&E)**
Total through lanes (lanes added) south of MD 121	10 (4)	10 (4)
Total managed lanes south of MD 121	1 in each direction	2 in each direction
General purpose lanes south of MD 121	4 in each direction	3 in each direction
Total through lanes (lanes added) north of MD 121	6 (2)	8 (4)*
Total managed lanes north of MD 121	1 in each direction	2 in each direction*
General purpose lanes north of MD 121	2 in each direction	2 in each direction
Consistency with the master plan	Yes	No**
Right-of-way	392 acres	578 acres
Residential displacements without retaining walls	91-123 units	251 units
Residential displacements with retaining walls	59-96 units	9-74 units
Business displacements without retaining walls	7-8 businesses	10-11 businesses
Business displacements with retaining walls	1-3 businesses	2-4 businesses
Floodplains	20 acres	25.6 acres
Prime farmland soils	195.8 acres	642 acres
Forest	156 acres	258.6 acres
Wetlands	10.7 acres	15.6 acres
Historic properties	7	7

* Under Alternative 7 Modified, there would be 6 total lanes: 2 reversible managed lanes and 4 general purpose lanes.

** Alternative 7 Modified is consistent with the master plan.

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MONTGOMERY COUNTY PLANNING BOARD
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

OFFICE OF THE CHAIRMAN

July 8, 2009

Councilmember Nancy Floreen
Chair – Transportation, Infrastructure, Energy and Environment Committee
Montgomery County Council
100 Maryland Avenue
Rockville, Maryland 20850

Dear Ms. Floreen:

The Montgomery County Planning Board at its meeting Monday evening, July 6, voted to recommend that the Council endorse Bus Rapid Transit (BRT) as the Locally Preferred Alternative for the Corridor Cities Transitway (CCT). The consensus of the Board was that the flexibility of BRT offers advantages from phasing, operational and cost standpoints – making it the logical choice based on information available at this time. The Maryland Transit Administration (MTA) is currently examining the feasibility of both Light Rail Transit (LRT) and BRT on the Planning Board's preferred alternative alignment to serve the Life Sciences Center within the Gaithersburg West Master Plan area. The Board recognizes that the question of the preferred mode for the CCT would be revisited if the MTA analysis this fall indicates that the cost-effectiveness of LRT would improve to the point where it would be competitive for federal funding. However, there is no basis to suggest that the MTA results of the Life Sciences Center alignment will show a different relationship between the performance of LRT and BRT modes. We expect that the BRT advantages summarized above will be confirmed by the subsequent MTA analysis.

With respect to alignment, the Planning Board supports the alternate alignment through the Life Sciences Center that is included in the current Public Hearing Draft of the Gaithersburg West Master Plan. We believe it is important – absent any analysis to the contrary – that this alignment with a dedicated transitway be included as the preferred approach to accommodating the planned growth in this area. The Board is not opposed to a secondary, or limited express, bus service along the current Master Plan alignment but that alignment should be clearly identified at this time as supplemental and not the preferred alignment.

The Board also recommends that the Council endorse a modified Alternative 7 as the locally preferred highway alternative. This recommendation should be viewed as a qualified recommendation. Some Board members are reluctant to endorse any widening of I-270. The Board, however, feels the combination of (1) moving forward with the CCT and (2) introducing value pricing or variable tolling on I-270 are key elements of moving us away from dependence on additional roadway capacity and that the trade-offs in play (including the potential for

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significantly worsening congestion) warrant moving ahead with a "build alternative." The Board, the Maryland Department of Transportation (MDOT) Project team, and our staff all agree, however, that additional information is needed in order to make the case for this highway alternative. There is also a need to continue work on mitigation of impacts – which in some cases are significant.

A summary of all of the Planning Board recommendations related to the I-270 / U.S. 15 Corridor Cities Transitway Alternatives Analysis/Environmental Assessment is enclosed. We want to take this opportunity to thank the MDOT Project Team and the Montgomery County Department of Transportation for their responsiveness and assistance throughout this process. It is a critically important project and we look forward to seeing it advance in a manner consistent with our goals for providing enhanced mobility throughout the County.

Our staff will be present at the Committee's deliberations on July 13 to answer any questions you or other Committee members may have. Should you have any questions in advance, please do not hesitate to contact Dan Hardy (301-495-4530) or Tom Autrey (301-495-4533) of our Transportation Planning Division.

Sincerely,

Royce Hanson
Chairman

Enclosure

(B)

Planning Board Recommendations on I-270 / U.S. 15 / Corridor Cities Transitway (CCT) Alternative Analysis / Environmental Assessment
Adopted July 6, 2009

Transit Mode

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

CCT Alignment

2. Select the Master Plan alignment with adjacent hiker biker trail with the following modifications:

    a. Replace the existing master plan alignment with the 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.

Highway Alternative

3. Based upon the information currently available, 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) at the Frederick County line to no more than six.
    b. Incorporate preferential treatments for High Occupancy Vehicle (HOV) and transit into the design (i.e., High Occupancy Toll or HOT lanes instead of Express Toll Lanes).
    c. Consider a reversible lane system between MD 121 and the Monocacy Battlefield 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 of 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 identify the priority of all major roadways and transit projects in the corridor through the County CIP and state CTP

process. Existing or potential projects of significance in the corridor include the following:

- 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

Isiah Leggett
County Executive

OFFICE OF THE COUNTY EXECUTIVE
ROCKVILLE, MARYLAND 20850

MEMORANDUM

July 10, 2009

TO: Phil Andrews, President
Montgomery County Council

FROM: Isiah Leggett, County Executive

SUBJECT: I-270/US 15 Multi-modal Corridor Study

The Maryland Department of Transportation (MDOT) released in June the I-270/US 15 Alternative Analysis/Environmental Assessment (AA/EA) for the multi-modal corridor. This document is based on the earlier 2002 Draft Environmental Impact Statement (DEIS) with updates to the Corridor Cities Transitway (CCT) to reflect the current Federal Transit Administration guidance on major transit capital projects. The update also adds consideration of express toll lane (ETL) alternatives for I-270 along with the high occupancy vehicle (HOV) lane concept from the DEIS. The release of the AA/EA is an important step in the planning process.

Prior to the Transportation, Infrastructure, Energy and Environment Committee's work session on the I-270/US 15 Multi-modal Corridor Study, I would like to convey my position on the preferred transit and highway options.

My position is based on my belief in treating different areas of the County equally; input I have received from individuals, community and civic organizations, businesses and elected officials; and from recommendations from the County's Department of Transportation. **I recommend light rail transit for the CCT and Alternative 3 for I-270** for the following reasons:

1. Light rail transit will provide the greatest transportation benefit of highest ridership and fastest corridor travel times. I believe that a light rail transit system will advance smart growth better than the bus rapid transit (BRT) alternative and can better serve a growing corridor well into the future, beyond the twenty year period analyzed in the AA/EA. The BRT alternative is very competitive and would also support smart growth, but light rail is preferred because it will be a greater economic catalyst and a stronger signal to businesses and the general public that we are committed to achieve the balanced development envisioned in our master plans. Due to the current rules in place for the State analysis, the current study did not take into consideration the proposed increased densities being proposed along the corridor for Gaithersburg West and Germantown. We should not close our eyes to those efforts and need to think beyond the 20 year horizon used in the State's study.

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2. The CCT is the transit backbone in two Master Plans currently being considered by the Planning Board and County Council, Gaithersburg West and Germantown, and the approved Clarksburg plan. The CCT remains a critical element required to achieve smart growth in these master plans, and improvements to I-270 will address one of the major sources of traffic congestion in the County. I support MDOT studying an alternative alignment for the CCT that is consistent with the proposed Gaithersburg West Master Plan that routes the CCT through the Life Sciences Center, the Public Safety Training Academy, and the Belward Farm. MDOT indicates that this CCT routing analysis should be available in two months. I am willing to review my position and recommendation once that effort is completed; but at this point, I must support the long range vision and benefit of a light rail system over bus rapid transit.

3. Completing HOV lanes to Frederick County, as described in Alternative 3, is the best choice to increase person throughput along I-270 with the least neighborhood and environmental disruption. As with the CCT, Alternative 3 is consistent with master plans that call for an HOV system. I-270 continues to experience significant congestion and this congestion is expected to worsen as the region continues to grow. In 2004, MDOT expanded the range of alternatives for consideration to include managed lanes, ETLs. While I generally agree that managed lanes is an alternative, we need to consider for major highway improvements in the future, I do not support applying this concept to the I-270 corridor in Montgomery County. Montgomery County residents typically only travel a short distance along I-270 and will see limited use of the express toll lanes. Montgomery County travelers will not have easy and convenient use of the ramps to the express toll lanes and will have the number of regular lanes reduced. I do not believe that it is in the best interest of our residents to limit their access to I-270, lose a lane of travel, absorb major disruption to their land during construction and then having to pay to use the ETL's. I am not opposed for users having to pay for additional lane capacity, so as Alternative 3 advances, I recommend that MDOT also consider converting the HOV lanes to high occupancy toll lanes or HOT lanes. This approach will also be most compatible to the activities under way on the Virginia Interstate System along I-495.

My staff and I will continue to work with the State, the Council, the affected municipalities, and the Planning Board to ensure that as these important projects proceed through planning and construction, the needs and concerns of our residents are considered to the maximum extent possible, and that neighborhood and environmental concerns continue to be addressed.

AH:lh

Gaithersburg
A CHARACTER COUNTS! CITY

July 10, 2009

The Honorable Nancy Floreen
Chair of Transportation, Infrastructure,
Energy, and Environment
100 Maryland Avenue
Rockville, MD 20850

Dear Councilmember Floreen, NANCY

It is our understanding that the Transportation, Infrastructure, Energy, and Environment Committee (T&E) will be considering the Montgomery County Planning Board's recommendations on the I270/US15 Multi-Modal Corridor Study at the committee meeting scheduled for July 13, 2009. While the Maryland Transit Administration's (MTA) public comment period does not conclude until July 31, 2009, it is also our understanding that the Montgomery County Council will be making a formal recommendation to the State in the near future. Accordingly, please accept the following comments as they relate to the transit component of the I270/US15 Multi-Modal Corridor Study.

While the City prefers a light rail mode and has strongly advocated light rail as the preferred mode for the Corridor Cities Transitway (CCT) for many years, we understand that based on the current Cost Effective Ratio of the project, light rail would not qualify for federal transit funding. Given that costs associated with light rail inhibit the competitiveness of the project for Federal funding, the City is supportive of a bus rapid transit (BRT) mode.[1]

At the City's request, MTA is currently conducting an Alternative Alignment Study to examine changes to the alignment that would serve both the Crown Farm and Kentlands neighborhoods. In each case, the alternate alignments and stations were vetted through public charrette processes. The City continues to advocate for these alignment modifications, and requests that the County Council support these adjustments.

[1] However, should there be a change in the applicable formulas, available federal resources, or data relied upon (such as ridership, planned densities, etc.), the City would prefer light rail if it becomes feasible in the future.

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The City Council and I are extremely concerned that the Planning Board is recommending that the CCT Operations and Maintenance Facility be located at Site 6 which is located on Metropolitan Grove Road in the immediate vicinity of the proposed transit station that would support the approved Watkins Mill Town Center. While the City's 2003 Master Plan did contemplate Site 6 as a potential site for the Operations and Maintenance Facility, it was assumed at the time that the mode for the CCT would be rail and that it would be essential for the Operations and Maintenance Facility to be located in very close proximity to the transitway. Given that it appears the mode will be BRT, there are now numerous alternatives to the Metropolitan Grove Road location. Accordingly, we urge you to recommend against locating the Facility at Site 6.

Finally, since the public comment period does not conclude until July 31, 2009, the City has not made its formal recommendation to the MTA on all aspects of the I270/US15 Multi-Modal Corridor Study but expects to do so in the fall after additional work sessions with State representatives.

City staff will be attending the July 13, 2009 T&E work session, and will be available to address any questions you may have. In the meantime, please feel free to contact me at 301-258-6310 if you have any questions or want to discuss.

Sincerely,

Sidney A. Katz
Mayor

cc: City Council
Angel Jones, City Manager
Frederick J. Felton, Assistant City Manager
Tony Tomasello, Assistant City Manager
Greg Ossont, Director of Planning and Code Administration

Resolution No.:	16-05
Introduced:	December 5, 2006
Adopted:	December 12, 2006

COUNTY COUNCIL
FOR MONTGOMERY COUNTY, MARYLAND

By: Council Vice-President Knapp and Councilmembers Floreen, Leventhal, Ervin and Berliner

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SUBJECT: Support for the Purple Line, Corridor Cities Transitway, and H.R. 3496

Background

1. The most pressing regional transportation priorities are the Bi-County Transitway (Purple Line), the Corridor Cities Transitway (CCT), and House Resolution 3496 (H.R. 3496), which would guarantee funding for the Washington Metropolitan Area Transit Authority (WMATA).

2. By mid-2007 the Maryland Department of Transportation (MDOT) intends to complete Draft Environmental Impact Statements for:
   - the Bi-County Transitway (Purple Line), a 14-mile transit line from Bethesda to New Carrollton, and also serving Chevy Chase, Silver Spring, Langley Park, the University of Maryland, College Park, and Riverdale; and
   - the Corridor Cities Transitway (CCT), a 13.5-mile transit line between Shady Grove and Clarksburg, and also serving the Research & Development Village, Gaithersburg, and Germantown.

3. H.R. 3496 would provide $1.5 billion of Federal aid over the next ten years for WMATA. This bill also would require Maryland, Virginia, and the District of Columbia together to dedicate a matching $1.5 billion over the same period and would include Federal representatives as members of WMATA's Board of Directors.

4. During the 2006 legislative session, the Maryland General Assembly passed HB 1345 and SB 850 (which the Governor signed) requiring the Maryland Department of Transportation to undertake a comprehensive study of the 20-year estimates for operating and capital costs for transit. The study is to look at funding systems in similar state and local jurisdictions and develop new funding strategies necessary to leverage federal funding. The state has created the Transit Funding Steering Committee in response to this legislation.

Action

The County Council for Montgomery County, Maryland approves the following resolution:

1. The Council expresses its strong support for the Bi-County Transitway (Purple Line) and Corridor Cities Transitway (CCT), and it urges the Maryland Department of Transportation to proceed expeditiously to the design and construction of these projects. For both the Purple Line and Corridor Cities Transitway, the Council supports:
   - a generally at-grade light rail line that is primarily on its own right of way;
   - excellent service linking the places identified in the Background section of this resolution;
   - completion of a hiker-biker trail alongside the Purple Line from Bethesda to Silver Spring and the Corridor Cities Transitway for its entire length; and
   - a community- and environmentally-friendly design that mitigates negative impacts in a cost-effective manner without impeding the speedy implementation of these projects.

2. The Council strongly urges Congress to pass H.R. 3496 or substantially similar legislation to provide WMATA with a desperately needed infusion of revenue to keep up with the maintenance of its existing infrastructure and to acquire enough rail cars and buses to relieve overcrowding.

3. The Council strongly urges the State of Maryland to provide resources for transit that will meet the funding requirements in support of the federal legislation.

4. The Council also recognizes that in order for the State of Maryland to fund the Purple Line, the Corridor Cities Transitway, and other critical transportation infrastructure, significant supplemental revenue sources will be required. The Council intends to work cooperatively with the General Assembly to develop a mix of resources that will provide this necessary funding. From an environmental, energy, and transportation policy perspective, the Council believes that an increase in the state gasoline tax is one appropriate means to provide supplemental transit funding and urges the General Assembly to approve such an increased, as well as other substantial revenue enhancement.

This is a correct copy of Council action.

Linda M. Lauer

Linda M. Lauer, Clerk of the Council

(K)

June 26, 2009

MEMORANDUM

TO: Montgomery County Planning Board

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

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

8787 Georgia Avenue, Silver Spring, Maryland 20910 Director's Office: 301.495.4500 Fax: 301.495.1310
www.MontgomeryPlanning.org

- 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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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.[1] 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.

[1] 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[1] HOV/LRT Alternative
3B	Master Plan[1] HOV/BRT Alternative
4A	Master Plan[1] General-Purpose/LRT Alternative
4B	Master Plan[1] General-Purpose/BRT Alternative
5A	Enhanced[2] Master Plan HOV/General-Purpose/ LRT Alternative
5B	Enhanced[2] Master Plan HOV/General-Purpose/ BRT Alternative
5C	Enhanced[2] Master Plan HOV/General-Purpose/ Premium Bus Alternative

[1] Master Plan refers to proposed alignments along I-270 and US 15 included in the current Frederick and Montgomery County approved master plans.
[2] Enhanced Master Plan refers to proposed improvements that are greater than those called for in the Montgomery County Clarksburg Area.

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).

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

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[1] ETL/LRT Alternative
6B	Master Plan[1] ETL/BRT Alternative
7A	Enhanced[2] Master Plan ETL / LRT Alternative
7B	Enhanced[2] Master Plan ETL / BRT Alternative

[1] Master Plan refers to alignments along I-270 & US 15 included in current Frederick and Montgomery County approved master plans.
[2] 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

COST COMPONENT	ALTERNATIVE 6-TSM	ALTERNATIVE 6A OR 7A	ALTERNATIVE 6B OR 7B
Highway			
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
Subtotal – Highway	***$3,878.90***	***$3,878.90***	***$3,878.90***
Transit			
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
Subtotal – Transit	***$86.86***	***$777.53***	***$449.92***
TOTAL COST	**$3,965.76**	**$4,656.43**	**$4,328.82**

** 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
Highway Capital Costs								
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
Transit Capital Costs								
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[1]	ALTERNATIVES 4A/B[1]	ALTERNATIVES 5A/B[1]	ALTERNATIVE 5C[1]	ALTERNATIVES 6A/B[2]	ALTERNATIVES 7A/B[2]
Natural Environment			**DEIS Alternatives**				**AA/EA Alternatives**	
Total Limit of Disturbance (Edge of Pavement to new ROW)							1,476 acres	1,476 acres
	Highway Component						1,192 acres	1,192 acres
	Transitway Component						284 acres[3]	284 acres[3]
Prime Farmland Soils	Total		284.6 acres	284.6 acres	290.2 acres	207.7 acres	742.6 acres	742.6 acres
	Highway component		195.8 acres	195.8 acres	202.4 acres	207.7 acres	642 acres	642 acres
	Transitway component		88.8 acres	88.8 acres	88.8 acres	n/a	100.6 acres[3]	100.6 acres[3]
Soils of Statewide Importance	Total		367 acres	367 acres	331.3 acres[3]	339.6 acres	488.7 acres	488.7 acres
	Highway component						460 acres	460 acres
	Transitway component						28.7 acres[3]	28.7 acres[3]
Number of farmlands			30	30	30	27	35 parcels	35 parcels
Active Farmland required			133 acres	133 acres	143 acres	106 acres	191 acres	191 acres
Floodplains –	Total		23 acres	23 acres	24 acres	21 acres	28.4 acres	28.4 acres
	Highway component		20 acres	20 acres	21 acres	21 acres	25.6 acres	25.6 acres
	Transitway component		3 acres	3 acres	3 acres	n/a	2.8 acres[3]	2.8 acres[3]
Forest –	Total		183 acres	183 acres	199 acres	180 acres	295.6 acres[3]	295.6 acres[3]
	Highway component		156 acres	156 acres	172 acres	180 acres	268.6 acres	268.6 acres
	Transitway component		27 acres	27 acres	27 acres	n/a	27.2 acres	27.2 acres
Rare, Threatened and Endangered Species							Potential[4]	Potential[4]
Waters of the US – Total Streams[5]			14,195 linear feet streams[6]	14,195 linear feet streams[6]	16,331 linear feet streams[6]	13,407 linear feet streams[6]	24,204 linear feet streams[7]	24,204 linear feet streams[7]
Waters of the US – Total Wetlands			10.7 acres wetlands	10.7 acres wetlands	11.6 acres wetlands	10.7 acres wetlands	15.6 acres wetlands	15.6 acres wetlands
Highway Component								
	Streams		11,245 linear feet	11,245 linear feet	13,391 linear feet	13,407 linear feet	20,198 linear feet	20,198 linear feet
	Ephemeral channels[8]		–	–	–	–	10,812 linear feet[8]	10,812 linear feet[8]
	Wetlands		9.1 acres	9.1 acres	10.0 acres	10.7 acres	13 acres	13 acres
Transitway Component								
	Streams		2,940 linear feet	2,940 linear feet	2,940 linear feet	n/a	4,006 linear feet	4,006 linear feet
	Ephemeral channels[8]		–	–	–	–	1,646 linear feet	1,646 linear feet
	Wetlands		1.6 acres	1.6 acres	1.6 acres	n/a	2.6 acres	2.6 acres
Cultural Resources								
Historic Properties			7 properties[9]	7 properties[9]	7 properties[9]	6 properties[9]	7 properties/43.28 acres[9]	7 properties/43.28 acres[9]
Highway component (number/acres)							5/31.17 acres	5/31.17 acres
Transitway component (number/acres)							3/12.11 acres	3/12.11 acres
Socioeconomic Resources								
Public Parks – Total			11 parks/37 acres	11 parks/37 acres	12 parks/44 acres	13 parks/48 acres	13 parks/42.72 acres	13 parks/42.72 acres
Highway component (number/acres)							13/37.56 acres	13/37.56 acres
Transitway component (number/acres)							1/5.16 acres	1/5.16 acres
Right-of-Way – Total			562 acres	562 acres	592 acres	446 acres	745 acres	745 acres
	Highway component		392 acres	392 acres	422 acres	446 acres	575 acres	575 acres
	Transitway component (not including O&M facility)[11]		170 acres	170 acres	170 acres	n/a	170 acres	170 acres
Residential Displacements – Total			64-127	64-127	64-128	127-385	256-260	256-260
	Highway component						251	251
	Transitway component						5-9	5-9
Business Displacements – Total			4-11	4-11	4-12	2-11	13-43	13-43
	Highway component						10-11	10-11
	Transitway component (not including O&M facility)[11]						3-32	3-32
Air Quality - Number of receptors with CO violations			0	0	0	0	0	0
Noise –	Highway	Total monitored/modeled locations	99 locations	99 locations	99 locations	99 locations	99 locations	99 locations
		Locations exceeding abatement criteria	26 residential impacts 10 non-residential impacts	26 residential impacts 10 non-residential impacts	26 residential impacts 9 non-residential impacts	35 residential impacts 9 non-residential impacts	27 residential impacts 13 non-residential impacts	26 residential impacts 13 non-residential impacts
	Transitway	Total monitored/modeled locations	15 locations	15 locations	15 locations		9 locations	25 locations
		Locations exceeding abatement criteria	13 residential impacts with horn noise (LRT) 7 residential impacts without horn noise (LRT)	13 residential impacts with horn noise (LRT) 7 residential impacts without horn noise (LRT)	13 residential impacts with horn noise (LRT) 7 residential impacts without horn noise (LRT)		4 residential impacts (LRT)	4 residential impacts (LRT)
Hazardous Materials – Number of affected properties			6 (4 highway, 2 transitway)	6 (4 highway, 2 transitway)	6 (4 highway, 2 transitway)	4 (highway)	6 (4 highway, 2 transitway)	6 (4 highway, 2 transitway)

NOTES:

1 Impacts of Alternatives 3A/B, 4A/B, 5A/B and 5C are from the 2002 DEIS

2 Alternatives 6A/B and 7A/B have an identical highway footprint

3 Total includes all soils in Frederick County (including prime farmland and soils of statewide importance) plus soils of statewide importance in Montgomery County (as calculated in the 2002 DEIS)

4 Does not include potential impacts of transit O&M facilities, as only one may be chosen

5 Potential direct and indirect impacts to two fish species (pearl dace and comely shiner)

6 Does not include ephemeral streams

7 Since 2002, the USACE has broadened the definition of waters of the US to include ephemeral channels. Ephemeral channels were not quantified in the 2002 DEIS

8 The Atomic Energy Commission Building was not evaluated for eligibility in the 2002 DEIS and is not included in these numbers. It is presumed that the DEIS alternatives 3A/B, 4A/B and 5A/B would have similar impacts as Alternatives 6A/B and 7A/B. Alternative 5C would only have highway impacts

9 Two resources, Seneca Creek State Park and the Atomic Energy Commission Building, are impacted by both highway and transitway. One additional property is only affected by noise.

10 One park is impacted by both the highway and transit components

11 Highway component for Alternatives 6A/B and 7A/B includes one park and ride lot. Highway component for the 2002 DEIS alternatives includes three park and ride lots

12 Updates to displacements are ongoing

For O&M facility impacts, see Table S-3.

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_100203/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_071802/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?

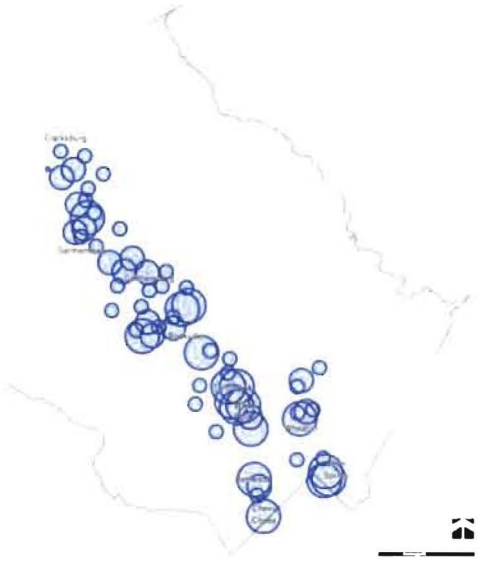
It is important to note that while the process to date has not resulted in any recommendation on a Locally Preferred Alternative, the Planning Board has (through the Transportation Policy Report and subsequent review of the alternatives) generally indicated support for HOV lanes as the preferred managed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

[2] 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.

Figure 1. Location of housing growth through 2030



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

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[1]	C E Relative to TSM/TDM[1]
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	$98,880,000	$777,530,000	$449,920,000	$777,530,000	$449,920,000
Equivalent Annual Capital Costs*	$7,440,700	$62,202,400	$36,443,500	$62,202,400	$36,443,500
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	$28,139,000	$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	13,800
Benefit Hours above TSM		6,900	7,400	7,000	7,500
Annual Benefit Hours		2,070,000	2,220,000	2,100,000	2,250,000
Cost-Effectiveness Index		$32.90	$18.50	$32.43	$18.25

** These are the one-time capital costs expressed as 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

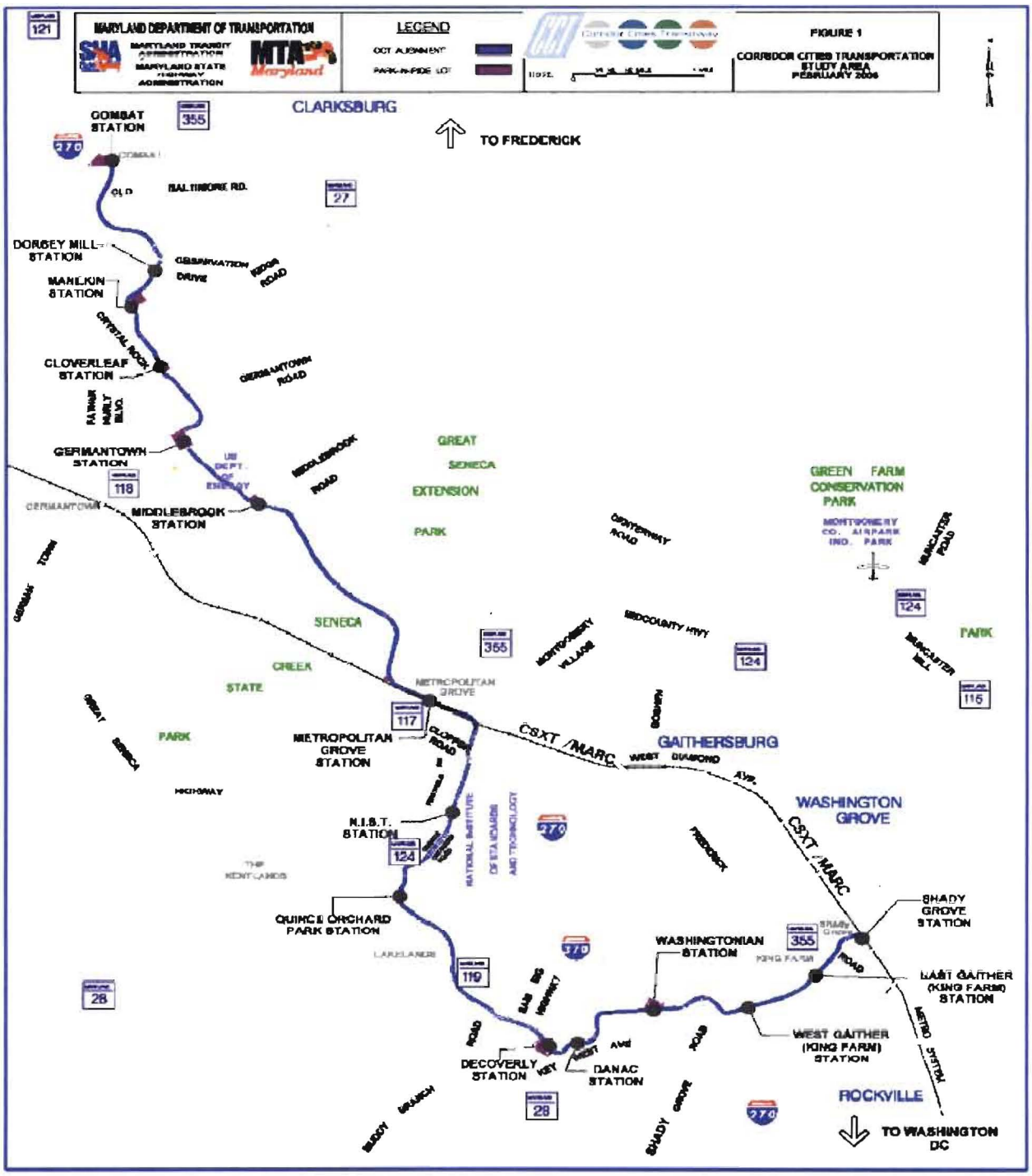


Figure 2. CCT Alignment

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.

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.

Table 10- Station Parking Assumptions

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[2]	1,050	1,000	1,000	950
Germantown	Cloverleaf	1,100	600	900	600	450
Dorsey Mill	COMSAT	1,500	500	600	550	650
Total		**4,800**	**3,150**	**3,250**	**3,350**	**3,300**

[1] *Shady Grove Metrorail Station parking will be accommodated by expanded Metrorail parking. Cannot determine access mode since station shares parking with Metrorail.*

[2] *Metropolitan Grove CCT Station parking capacity of 1,000 spaces excludes the existing 350 spaces at the Metropolitan Grove MARC Station.*

Source: Phase I Year 2030 Washington Area Model, I-270/US 15 Multi-Modal Corridor Study Corridor Cities Transitway Detailed Definition 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
COMSAT	130	2,625	1,230	2,620	1,530
Dorsey Mill	200	585	520	595	530
Cloverleaf	440	800	685	790	680
Germantown	770	2,915	2,235	2,860	2,215
Metropolitan Grove	600	2,215	2,210	2,435	2,180
NIST	685	635	1,305	630	1,215
Quince Orchard	515	2,670	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	830	2,635	2,755	2,645	2,765
East Gaither	495	930	900	930	900
Shady Grove	1,580	9,060	7,930	9,130	8,180
Total	**7,445**	**30,135**	**26,490**	**30,365**	**26,905**

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

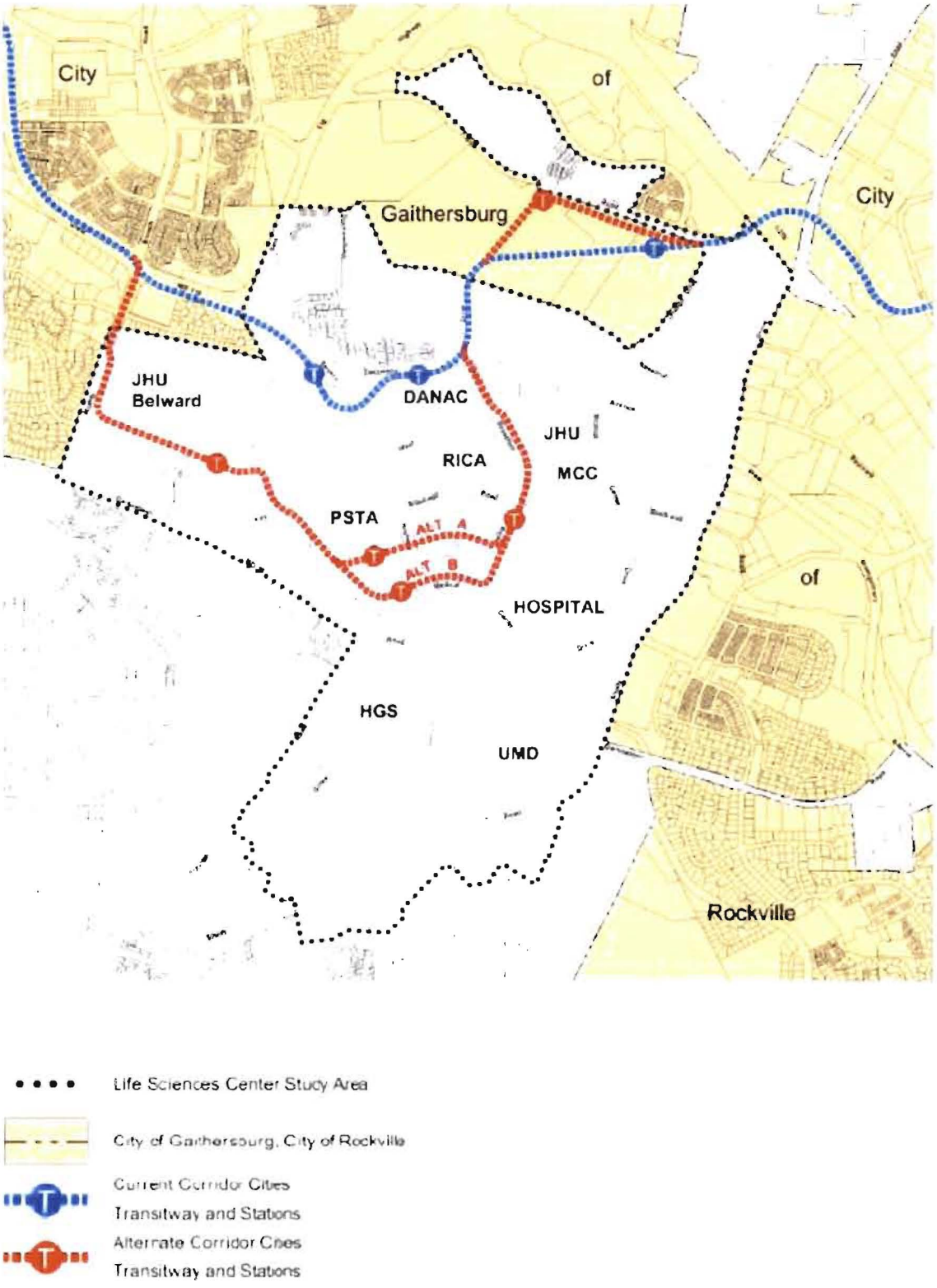
b. Sensitivity Analysis

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



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 (4/5)	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	18.7	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	18.7	10.2	10.2	0.6	0-18.7
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 (3A/B, 4A/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 6 - 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 - 5.68 acres	PF - 7.40 acres	PF - 6.23 acres SI - 0.72 acres	PF - 2.68 acres SI - 12.03 acres	PF - 12.48 acres SI - 0.56 acres	PF - 15.05 acres SI - 1.92 acres	PF - 6.29 acres SI - 5.74 acres
Floodplain Impacts	None	None	None	None	None	None	None
Stream Impacts	None	None	None	660 linear feet	328 linear feet	486 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	111	78	51	4
Specimen trees	None	None	None	87	30	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	54% 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 52.9%

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/TDM Alternative
3A	Master Plan[1] HOV/LRT Alternative
3B	Master Plan[1] HOV/BRT Alternative
4A	Master Plan[1] General-Purpose/LRT Alternative
4B	Master Plan[1] General-Purpose/BRT Alternative
5A	Enhanced[2] Master Plan HOV/General-Purpose/ LRT Alternative
5B	Enhanced[2] Master Plan HOV/General-Purpose/ BRT Alternative
5C	Enhanced[2] Master Plan HOV/General-Purpose/ Premium Bus Alternative

[1] *Master Plan refers to proposed alignments along I-270 and US 15 included in the current Frederick and Montgomery County approved master plans.*
[2] *Enhanced Master Plan refers to proposed improvements that are greater than those called for in the Montgomery County Clarksburg Area.*

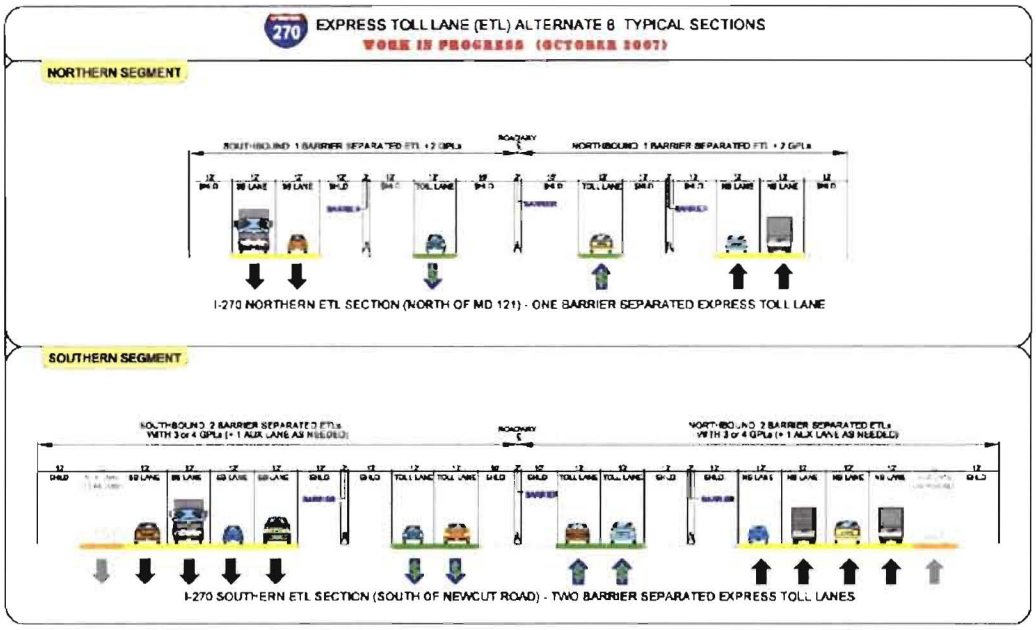
Table 15- Alternatives From AA/EA (2009)

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

[1] *Master Plan refers to alignments along I-270 & US 15 included in current Frederick and Montgomery County approved master plans.*
[2] *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.[3] 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

<u>Level of Service (LOS)</u>

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

[3] 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 in Each Direction **AM SB – F** **PM NB – F** AM NB – D PM SB - E	2 GP Lanes in Each Direction **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 & 2 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

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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	15.8 Miles
MD 124 / 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 - 1 Aux Lane NB & 2 SB **AM SB – F** **PM NB – F** 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	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 a 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[1]	Displacements with Retaining Wall[1]
Highway Residential Displacements				
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 ramps)	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[2]	0 residences [2]
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 Comus Road	HWY 6	3A/B, 4A/B	1 residence	0 residences
I-270 Northbound South of Comus Road	HWY 6	5A/B/C	1-2 residences	0 residences
I-270 Southbound South of Comus 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 Residences	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
Total Highway Residential Displacements	*NA*	*3A/B, 4A/B*	*91-123 residences*	*59-96 residences*
Total Highway Residential Displacements		*5A/B*	*91-124 residences*	*59-96 residences*
Total Highway Residential Displacements		*5C*	*210-385 residences*	*127-216 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[1]
Highway Residential Displacements			
I-270 Southbound, North of I-370 Brighton West Townhouses	HWY 1 (Montgomery)	61 residences	6 - 10 residences
I-270 Northbound, North of I-370 (with I-370 direct access ramps) Fireside Condominiums	HWY 1 (Montgomery)	0 residences[2]	0 residences[2]
I-270 Northbound, South of MD 117 London Derry Apartments/ Montgomery Club	HWY 2 (Montgomery)	150 residences	0 - 61 residences[3]
I-270 Southbound, South of Great Seneca Creek/ Game Preserve Road	HWY 2 (Montgomery)	1 residence[4]	0 residences
I-270 Northbound, North of Great Seneca Creek Fox Chapel	HWY 3 (Montgomery)	0 residences[5] (retaining wall included in conceptual design)	0 residences[5]
I-270 Northbound, South of Comus Road	HWY 6 (Montgomery)	2 residences	1 residence
I-270 Southbound, South of Comus Road	HWY 6 (Montgomery)	1 residence	1 residence
I-270 Southbound, North of MD 80 interchange Fingerboard Road Residence	HWY 9 (Frederick)	1 residence	1 residence
I-270 Southbound, South of I-70 Princeton Court Apartments	HWY 11 (Frederick)	12 residences	0 residences
US 15 Northbound, South of Rosemont Ave. Mercer Place Residences	HWY 13 (Frederick)	2 residences	0 residences
US 15 Southbound, North of Rosemont Avenue along Biggs Avenue	HWY 13 (Frederick)	1 residence	0 residences
Total Highway Residential Displacements		**251 residences**	**9 - 74 residences**

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[4]:

Figure 5. Residential Displacements in Brighton West Vicinity

Source: I-270 US 15 CCT Multi Modal Study AA/EA May 2009 – Highway Plan Sheet 1

An aerial view of the London Derry Apartments is shown below:

Figure 6. Residential Displacements in London Derry Vicinity

Source: I-270 US 15 CCT Multi Modal Study AA/EA May 2009 – Highway Plan Sheet 2

[4] Further engineering work is required to assess the extent of the potential impact on Fireside Condominiums. See footnote 2 in Table IV-11 of the AA/EA for additional detail.

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[1]	Displacements with Retaining Wall[1]
Highway Business Displacements				
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 Comus 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[2]	0[2]
I-270 northbound, north of MD 85 interchange	HWY 11	3A/B, 4A/B, 5A/B/C	N/A[3]	0[3]
I-270 northbound, south of I-70 interchange	HWY 11	3A/B, 4A/B, 5A/B/C	N/A[3]	0[3]
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
Total Highway Business Displacements	*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[1]
Highway Business Displacements			
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
Total Highway Business Displacements		**10 - 11 businesses**	**2 - 4 businesses**

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.[5] 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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[5] 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.[6] 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/

[6] 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.

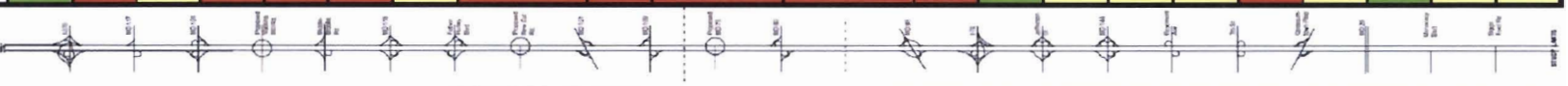
The County can streamline CCT implementation by developing a funding proposal for the CCT at the same time that the CCT supplemental environmental analyses are being completed. The County Council should also develop needs and priorities for the series of proposed major transportation investments in the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

Table III-8: 2030 No-Build and Build Alternatives Peak Hour Mainline LOS and Volume to Capacity (V/C) Ratios Along I-270 and US 15

				Interstate 270														US 15								
SOUTHBOUND I-270 and US 15	PM PEAK HOUR	Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	B 0.41	B 0.42	A 0.26	C 0.51	B 0.43	B 0.49	B 0.38	C 0.56	C 0.56	C 0.52	B 0.46	C 0.53	C 0.54	B 0.43	C 0.59	B 0.45	D 0.78	C 0.64	C 0.52	C 0.47	B 0.36	B 0.42	B 0.39	B 0.36
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	B 0.43	B 0.44	B 0.31	C 0.53	B 0.45	C 0.52	B 0.40	C 0.59	C 0.63	C 0.56	C 0.52	C 0.59	C 0.62	C 0.55	C 0.54	B 0.43	D 0.78	C 0.64	C 0.53	C 0.47	B 0.38	B 0.42	B 0.40	C 0.52
		Alternative 1 - No Build	LOS V/C	B 0.37	C 0.60	B 0.47	C 0.54	C 0.59	C 0.69	B 0.48	D 0.74		D 0.75	D 0.82		E 0.89		F 1.42	C 0.52	E 0.89	E 0.89	E 0.92	D 0.83	D 0.71	C 0.57	C 0.59	C 0.51
	AM PEAK HOUR	Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	D 0.75	D 0.84	C 0.61	F 1.03	D 0.80	D 0.87	C 0.70	E 0.95	E 0.96	E 0.96	D 0.82	E 0.99	F 1.22	F 1.05	D 0.74	C 0.65	D 0.87	D 0.72	C 0.62	C 0.65	C 0.59	D 0.69	D 0.69	E 0.89
		Alternative 5A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	D 0.76	D 0.84	C 0.61	E 1.00	D 0.84	E 0.92	D 0.82	F 1.11	F 1.16	F 1.29	F 1.14	F 1.32	F 1.54	F 1.34	C 0.67	C 0.65	E 0.89	D 0.73	C 0.62	C 0.65	C 0.59	D 0.69	D 0.70	E 0.89
		Alternative 1 - No Build	LOS V/C	C 0.67	F 1.14	E 0.93	F 1.08	F 1.15	F 1.28	E 0.90	F 1.31		F 1.58	F 1.57		F 1.94		F 1.71	D 0.70	E 0.92	E 0.92	E 0.99	F 1.04	E 0.96	D 0.77	E 1.00	E 0.89
		Corridor Segments	Study Limit																							
NORTHBOUND I-270 and US 15	AM PEAK HOUR	Alternative 1 - No Build	LOS V/C	B 0.39	B 0.41	A 0.26	B 0.46	B 0.49	B 0.40	B 0.39	C 0.57		C 0.66	D 0.73		E 0.89		C 0.47	B 0.34	D 0.69	D 0.64	D 0.73	C 0.60	C 0.54	B 0.44	B 0.38	B 0.38
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	B 0.35	B 0.46	A 0.26	B 0.34	B 0.49	B 0.40	A 0.30	B 0.46	B 0.46	C 0.52	B 0.44	C 0.56	C 0.60	C 0.62	C 0.60	B 0.32	C 0.63	C 0.52	B 0.46	B 0.38	B 0.32	B 0.37	B 0.29	B 0.33
		Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	B 0.35	B 0.45	A 0.25	B 0.33	B 0.47	B 0.38	A 0.29	B 0.44	B 0.42	C 0.51	B 0.43	C 0.52	C 0.61	C 0.48	C 0.48	B 0.32	C 0.63	C 0.52	B 0.45	B 0.38	B 0.31	B 0.36	A 0.28	A 0.14
	PM PEAK HOUR	Alternative 1 - No Build	LOS V/C	D 0.86	D 0.86	C 0.58	E 0.97	F 1.07	E 0.91	D 0.84	F 1.32		F 1.65	F 1.70		F 1.99		E 0.90	C 0.56	E 0.93	F 1.14	F 1.04	F 1.10	F 1.03	F 0.93	F 1.05	F 1.05
		Alternative 5A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	D 0.80	E 0.92	C 0.56	C 0.65	F 1.01	D 0.84	C 0.62	E 1.00	F 1.03	F 1.22	F 1.06	F 1.29	F 1.60	F 1.37	E 0.89	C 0.55	E 0.89	D 0.73	C 0.65	D 0.70	C 0.61	D 0.76	D 0.76	E 0.96
		Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	D 0.80	E 0.90	C 0.53	C 0.65	E 0.95	D 0.79	C 0.58	E 0.94	E 0.95	F 1.02	D 0.84	F 1.08	F 1.24	F 1.06	E 0.95	C 0.57	E 0.89	D 0.72	C 0.65	D 0.70	C 0.60	D 0.76	D 0.76	C 0.58

LEGEND

VOL = 2030 Traffic Volume (vehicles per hour)	V/C = Volume-to-Capacity Ratio	V/C Ratio Range (70 mph)	A 0.00 – 0.30	C 0.51 – 0.71	E 0.90 – 1.00	V/C Ratio Range (55 mph)	A 0.00 – 0.29	C 0.49 – 0.65	E 0.89 – 1.00
LOS = Level of Service	A – D = Free or Stable Flow/Reduced Speeds E = Irregular Flow/Speeds/With Occasional Stop-and-Go F = Congested: Stop-and-Go Conditions	South of I-370 to Father Hurley Blvd.	B 0.31 – 0.50	D 0.72 – 0.89	F > 1.00	Father Hurley Blvd. to Biggs Ford Rd.	B 0.30 – 0.47	D 0.69 – 0.88	F > 1.00

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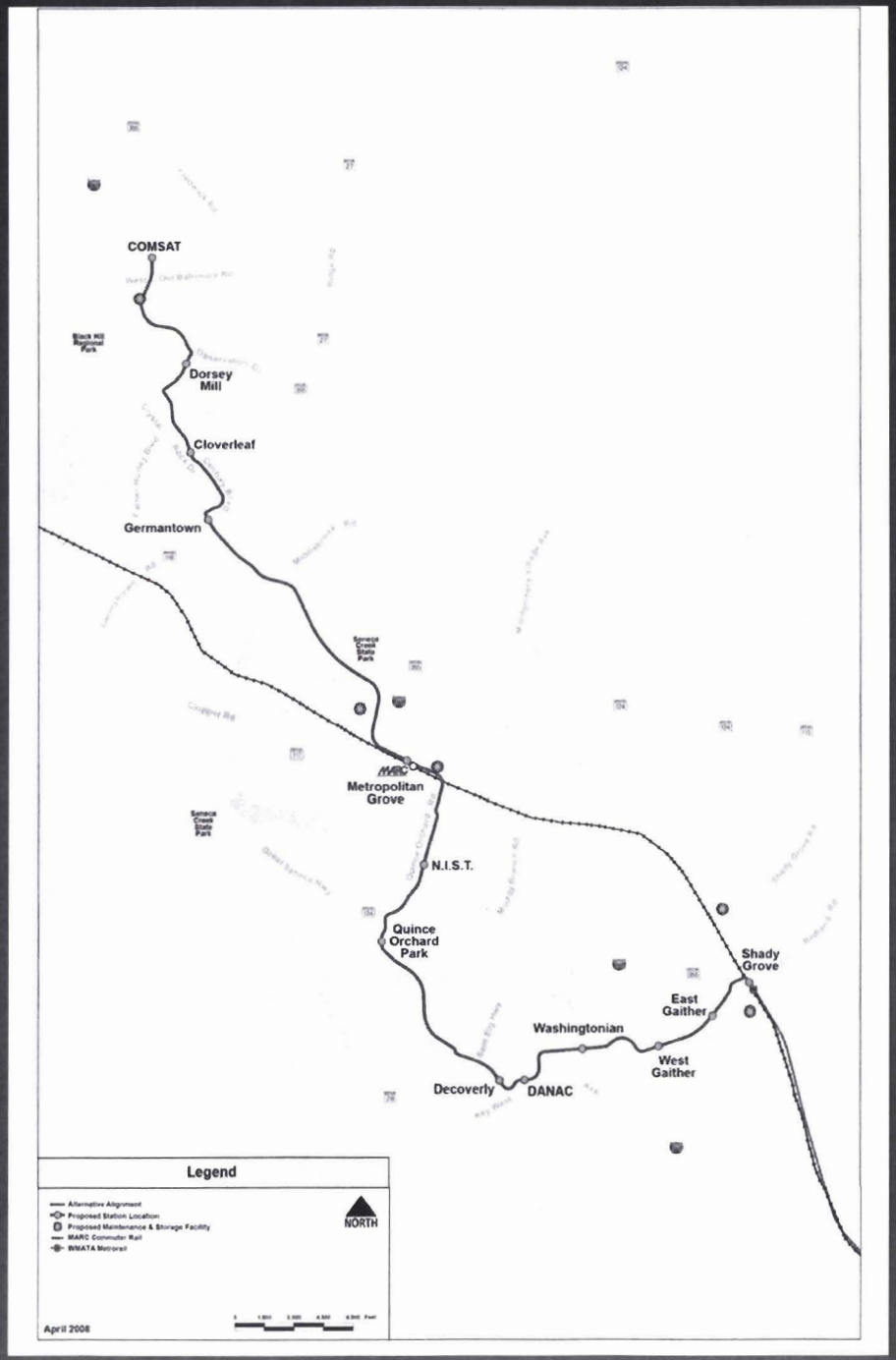
CCT Alignment



CCT Alignment

- 14 miles long
- 17 stations (includes 4 beyond 2030)
- Transit transfers at Germantown (local / express bus), Metropolitan Grove (MARC), Shady Grove (WMATA Red Line)
- Access from local streets, I-270 interchanges, and direct access ramps
- Build Alternatives include Light Rail Transit (LRT), Bus Rapid Transit (BRT)
- Transit TSM Alternative features premium bus on I-270 managed lanes (HOV or ETL) with service to CCT stations

King Farm

Results Table

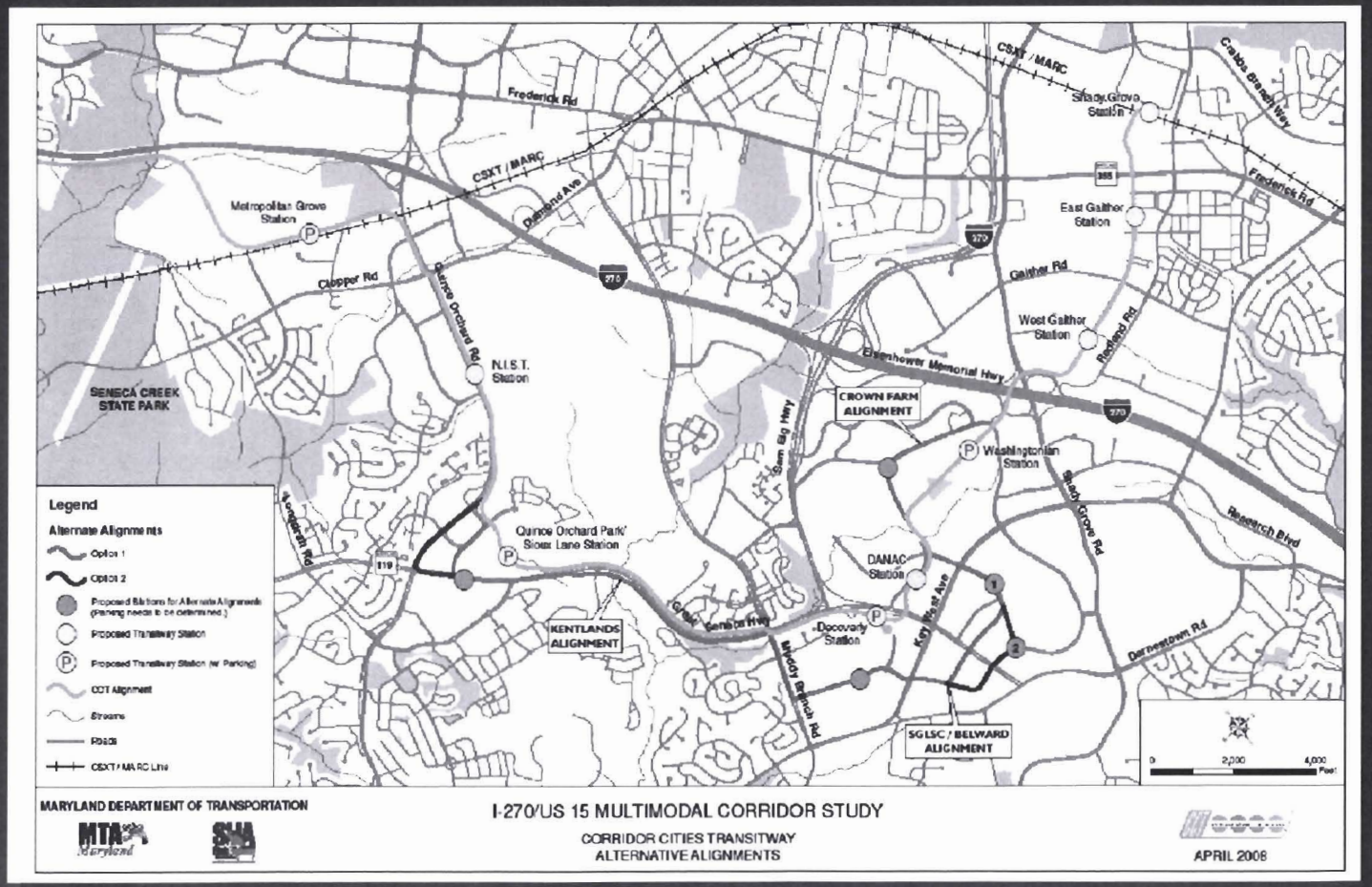
CCT Alternatives Preliminary Travel Demand Forecasts & Cost Estimates				
Transit Alternative	**Travel Time Shady Grove to COMSAT (minutes)**	**Ridership (Daily Boardings - 2030)**	**Capital Cost (millions-2007$)**	**Annual Operations and Maintenance Costs (millions-2007$)**
Alt. 6 and Trans. TSM	60	6,000 - 7,000	$86.9	$14.8
Alt. 6 and Light Rail (A)	36	24,000 - 30,000	$777.5	$28.1
Alt. 6 and Bus Rapid (B)	38	21,000 - 27,000	$449.9	$26.8
Alt. 7 and Light Rail (A)	36	24,000 - 30,000	$777.5	$28.1
Alt. 7 and Bus Rapid (B)	38	21,000 - 27,000	$449.9	$26.8

Cost Effectiveness Results

		A	B	C	D
	Total Capital Costs (2007 dollars)	**Annualized Capital Costs (2007 dollars)**	**Annual Operating Costs (2007 dollars)**	**Annual User Benefit (Hours)**	**Annualized Cost per Hour of User Benefit**
TSM	86,860,000	7,440,700	14,793,000	1,890,000	--
Build Alternatives					
Alternative 6A (LRT)	777,530,000	62,202,400	28,129,000	3,960,000	**$32.90**
Alternative 6B (BRT)	449,920,000	36,443,500	26,859,000	4,110,000	**$18.50**
Alternative 7A (LRT)	777,530,000	62,202,400	28,129,000	3,990,000	**$32.43**
Alternative 7B (BRT)	449,920,000	36,443,500	26,859,000	4,140,000	**$18.25**

CCT Alternative Alignments

- Alternatives to CCT Master Plan alignment
- Crown Farm, Shady Grove Life Sciences Center/Belward Farm, and Kentlands



Corridor Alternatives

DEIS

Alt. 1: No-Build Alternative

Alt. 2: TSM/TDM Alternative

Alt. 3A: MP HOV w/LRT
Alt. 3B: MP HOV w/BRT

Alt. 4A: MP GPL w/LRT
Alt. 4B: MP GPL w/BRT

Alt. 5A: Enhanced MP HOV/GPL w/LRT
Alt. 5B: Enhanced MP HOV/GPL w/BRT
Alt. 5C: Enhanced MP HOV/GPL w/Premium Bus

EA

Alt. 6A: Enhanced MP w/1 ETL/LRT

Alt. 6B: Enhanced MP w/1 ETL/BRT

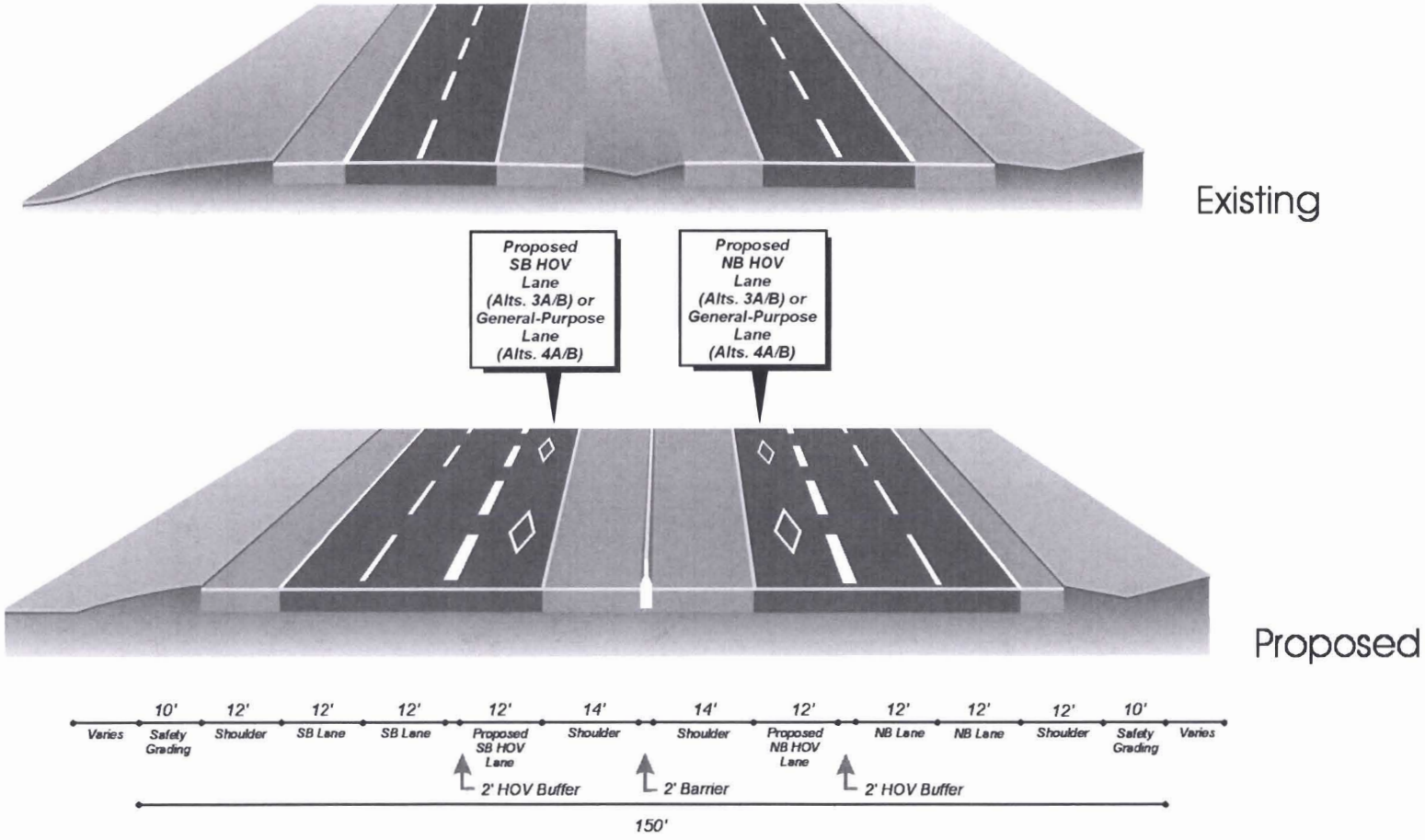
Alt. 7A: Enhanced MP w/2 ETL/LRT
Alt. 7B: Enhanced MP w/2 ETL/BRT

MP = Master Plan

HOV = High Occupancy Vehicle Lane
GPL = General-Purpose Lane

LRT = Light Rail on the CCT
BRT = Bus Rapid Transit on the CCT

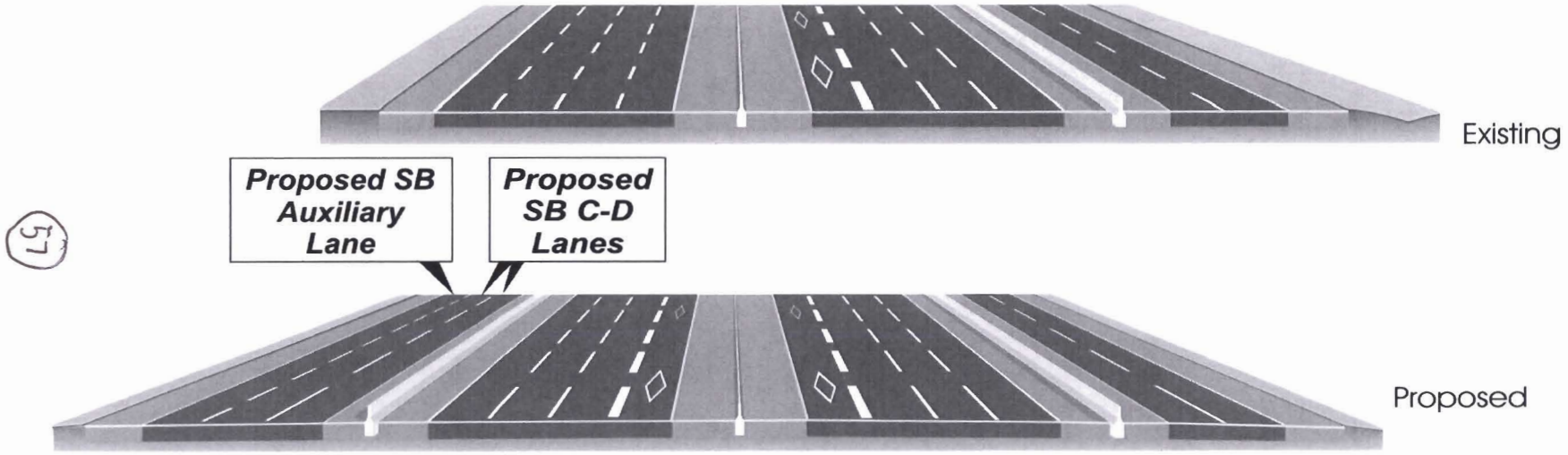
DEIS Alternatives 3A/B and 4A/B



Alternatives 3A/B, 4A/B
I-270 (MD 121 to MD 85)

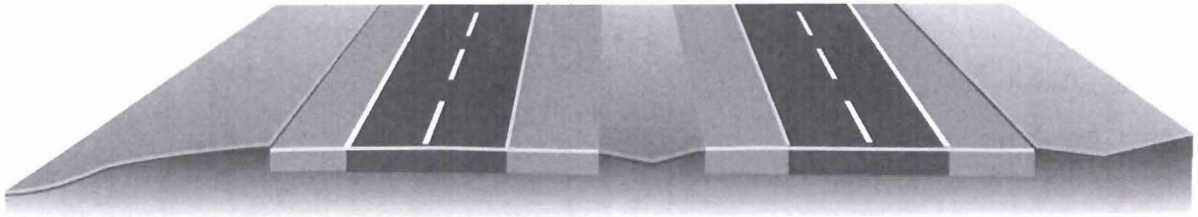
DEIS Alternatives 3A/B and 4A/B

and 5A/B/C

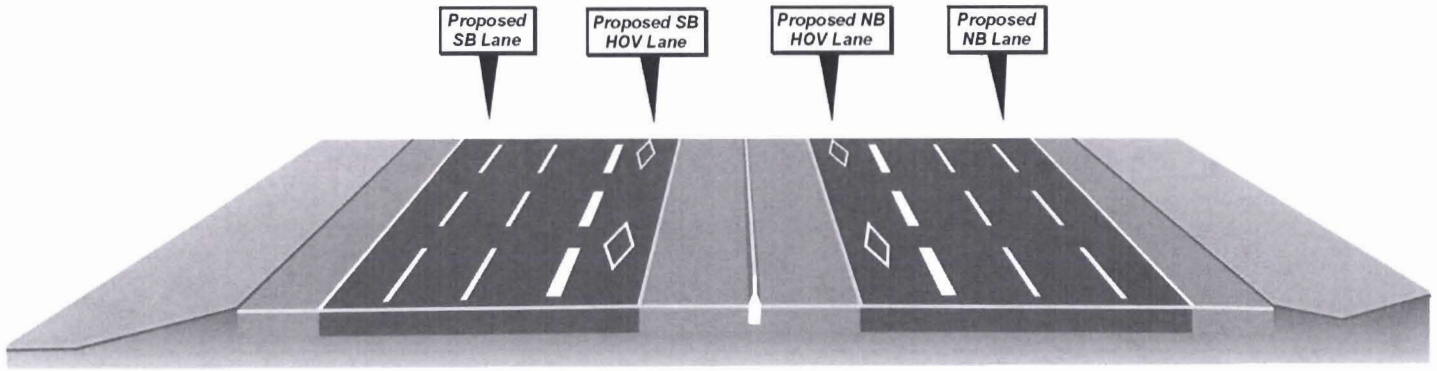


Alternatives 3A/B, 4A/B, 5A/B/C
I-270 (MD 124 to MD 117)

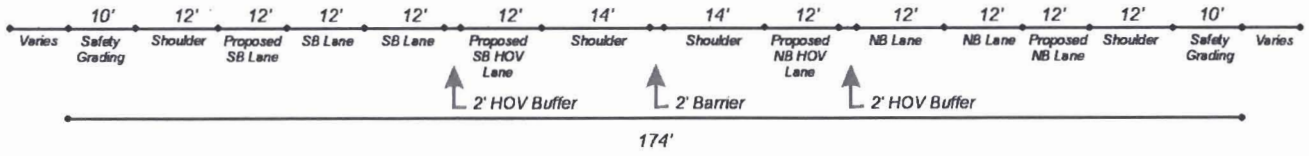
DEIS Alternatives 5A/B and 5C



Existing

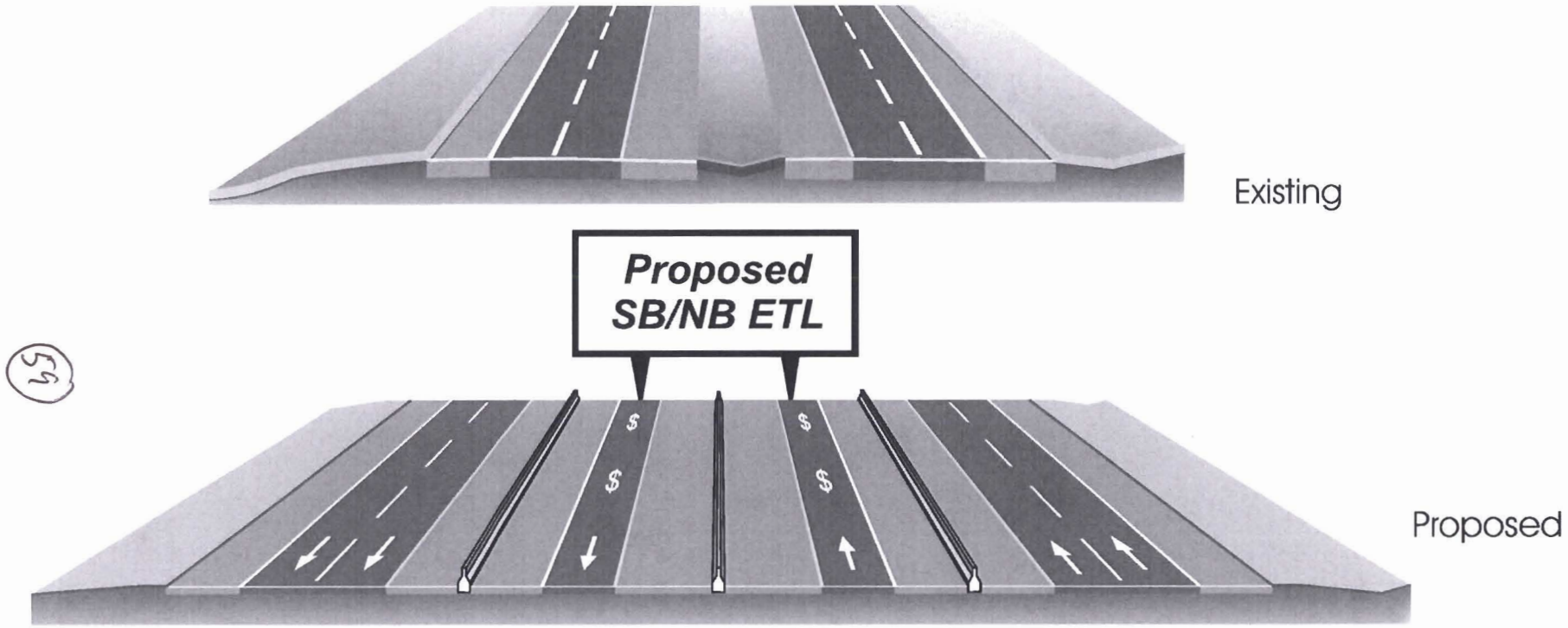


Proposed



Alternatives 5A/B/C
I-270 (MD 121 to MD 85)

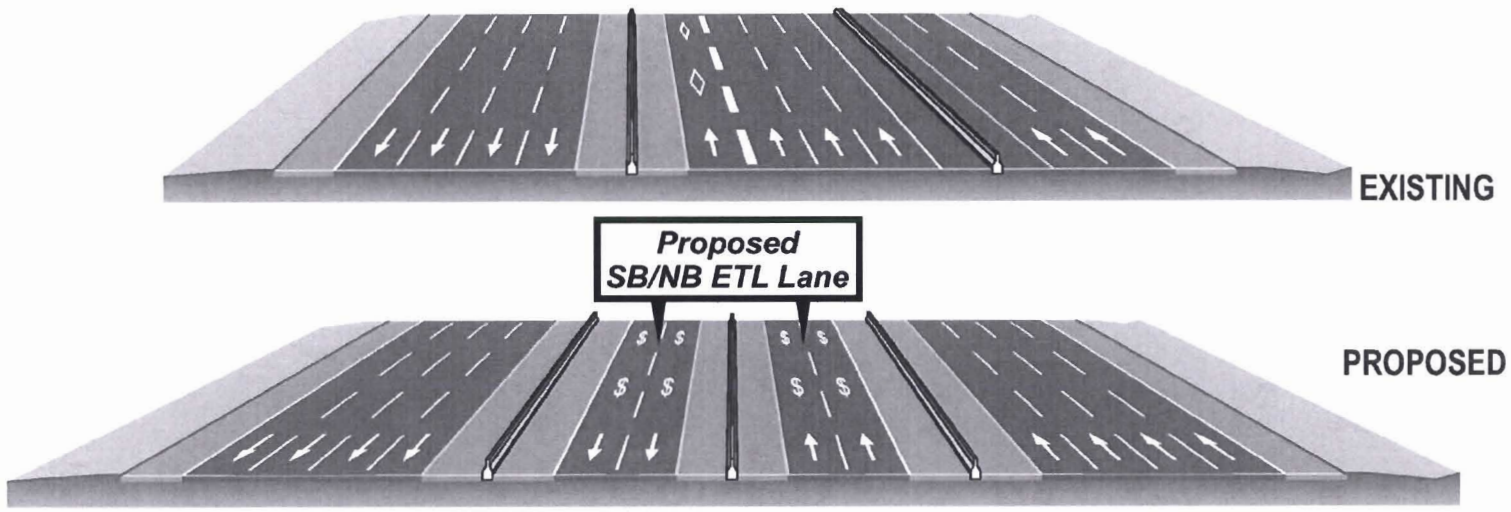
EA Alternatives 6A/B



Alternatives 6A/B
MD 121 to ETL Terminus (North of MD 80)

EA Alternatives 6A/B

and 7A/B



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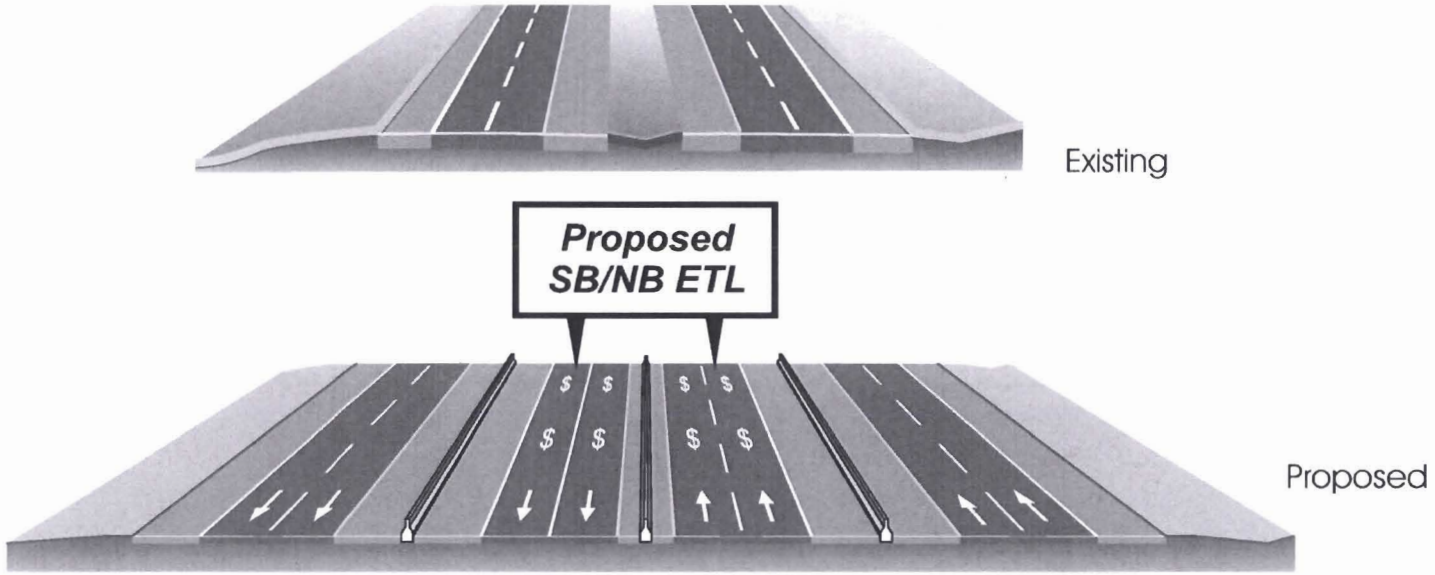
Alternatives 6A/B and 7A/B
MD 117 to MD 124

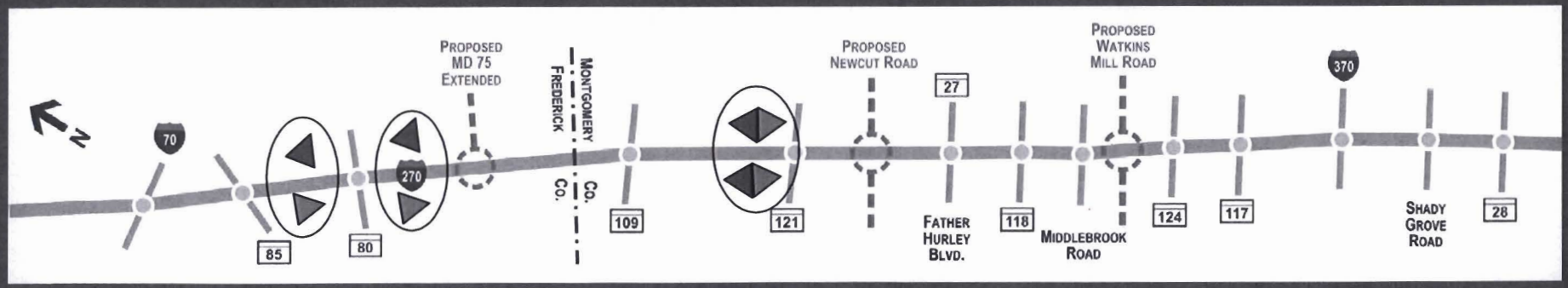
EA Alternatives 7A/B



Alternatives 7 A/B
MD 121 to ETL Terminus (North of MD 80)

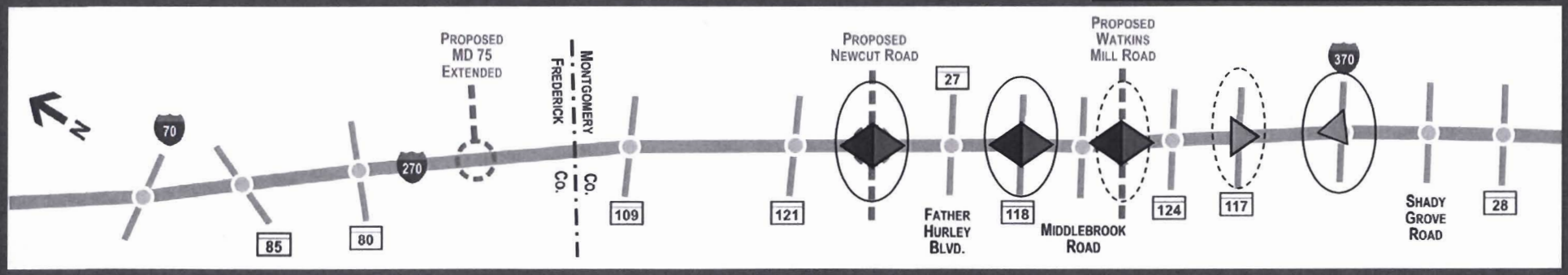
I-270 ETL Northern Access

- Vehicles will access the ETL lanes via open access slip ramps in the following areas:
  - Northern Terminus
  - South of MD 80 (slip ramps)
    - I-270 Southbound GP to ETL (entry)
    - I-270 Northbound ETL to GP (exit)
  - North of MD 121 (slip ramps)
    - I-270 Southbound ETL to GP and GP to ETL
    - I-270 Northbound ETL to GP and GP to ETL



I-270 ETL Southern Access

- Vehicles will access the ETL lanes via **Direct Access Ramps** from these Interchanges:
  - Little Seneca Parkway (NB/SB)
  - MD 118 (NB/SB)
  - Metropolitan Grove Road Area (NB/SB)
  - MD 117 (SB only)
  - I-370/ICC (NB to/from EB)



Highway Capital Costs

- Highway capital costs have been estimated for roadways, interchanges, structures, earthwork, traffic control and environmental mitigation
- Highway capital costs include final design, right-of-way acquisition and construction
- Current estimate completed in early 2009 for Alternatives 6A/B and 7A/B.

Location	Highway Cost
Montgomery County	$ 2,642 M
Frederick County	$ 1,472 M
City of Frederick	$ 464 M

Project Schedule

Public Outreach	Ongoing
AA/EA Completed	May 29, 2009
AA/EA Public Comment	May 29 – July 31, 2009
Public Hearings	June 16 & 18, 2009
Selection of Preferred Alternative	Fall 2009
Highway / Transit Split	Fall 2009 / Winter 2010

Highway Path
- Update and Identify Minimization / Mitigation Opportunities on LPA
- Prepare Tier 1 FEIS / Record of Decision
- Identify Project Segments for Tier 2 Study and Design

Transit Path
- Submit New Starts Application
- Preliminary Engineering and FEIS Preparation
- Final Design
- Secure Funding for Construction

I 270 US 15 CCT Alternatives Analysis / Environmental Assessment

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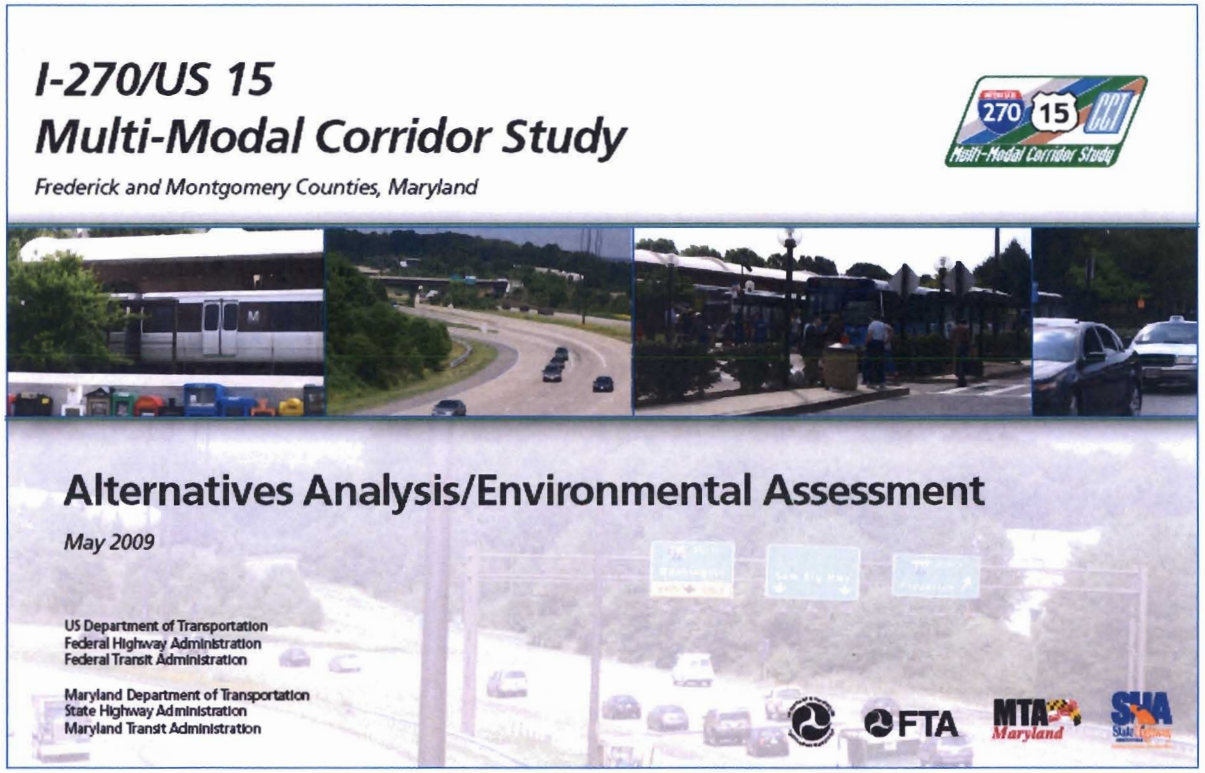
May 2002



Montgomery County Council Transportation,
Infrastructure, Energy, and Environment Committee
July 16, 2009

Recommendations – Transit Mode/Alignment and Highway Alternative

Transit

1. Mode - Bus Rapid Transit

2. Alignment and Station Locations

Modify to serve LSC and Crown Farm

Locate O&M Facility at Metropolitan Grove Site 6.

Highway

3. Select Alternative 7 with modifications

Limit through lanes north of MD 121 to six

Incorporate preferential treatment for HOV and transit – HOT lanes instead of ETL's

Consider reversible lanes north of MD 121

Alternatives 6A/B and 7A/B
MD 117 to MD 124

Why BRT?

- Provides slightly greater travel benefits than LRT
- Has a lower capital and operating costs
- Is substantially more cost-effective – meeting current FTA criteria where LRT does not
- Greater implementation and operating flexibility

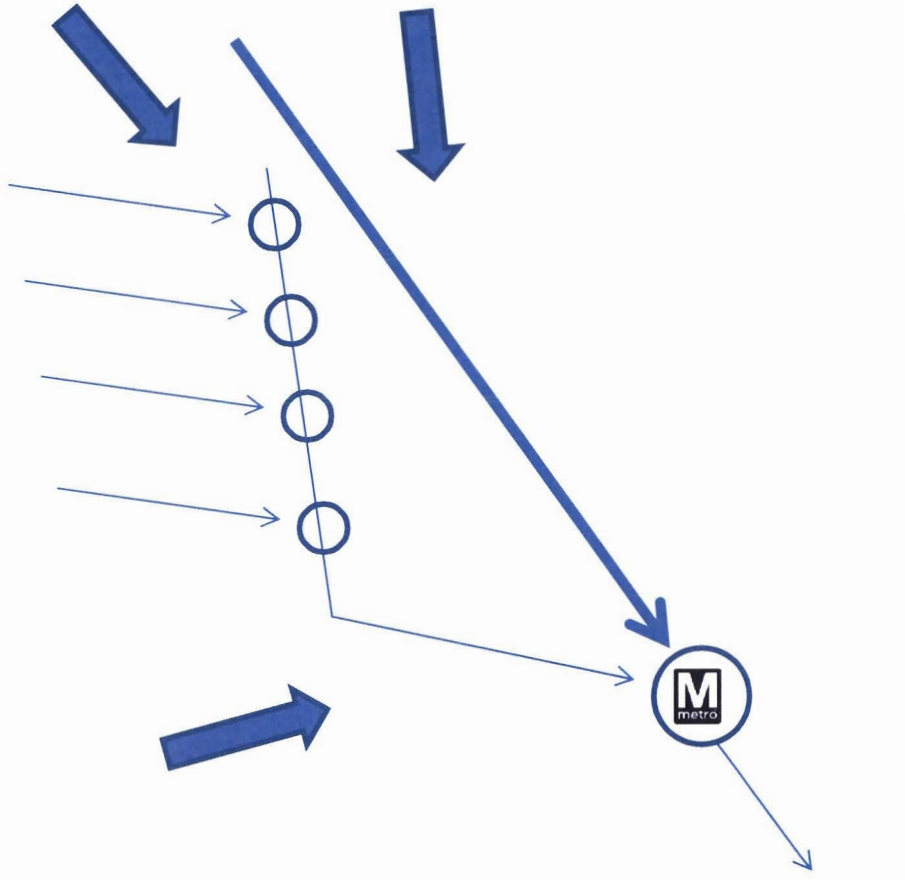


Table S-10: Cost-Effectiveness (costs in 2007 dollars)

	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	$36,443,500	$62,202,400	$36,443,500
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	13,800
Benefit Hours above TSM		6,900	7,400	7,000	7,500
Annual Benefit Hours		2,070,000	2,220,000	2,100,000	2,250.000
Cost-Effectiveness Index		$32.90	$18.50	$32.43	$18.25

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Annual User Benefit Hours (Millions) Over TSM

Project	BRT	LRT	HR
CCT	2.2	2.1	N/A
Purple Line	1.5 – 4.2	3.8 – 5.3	N/A
Dulles Ext.	1.9	N/A	5.3

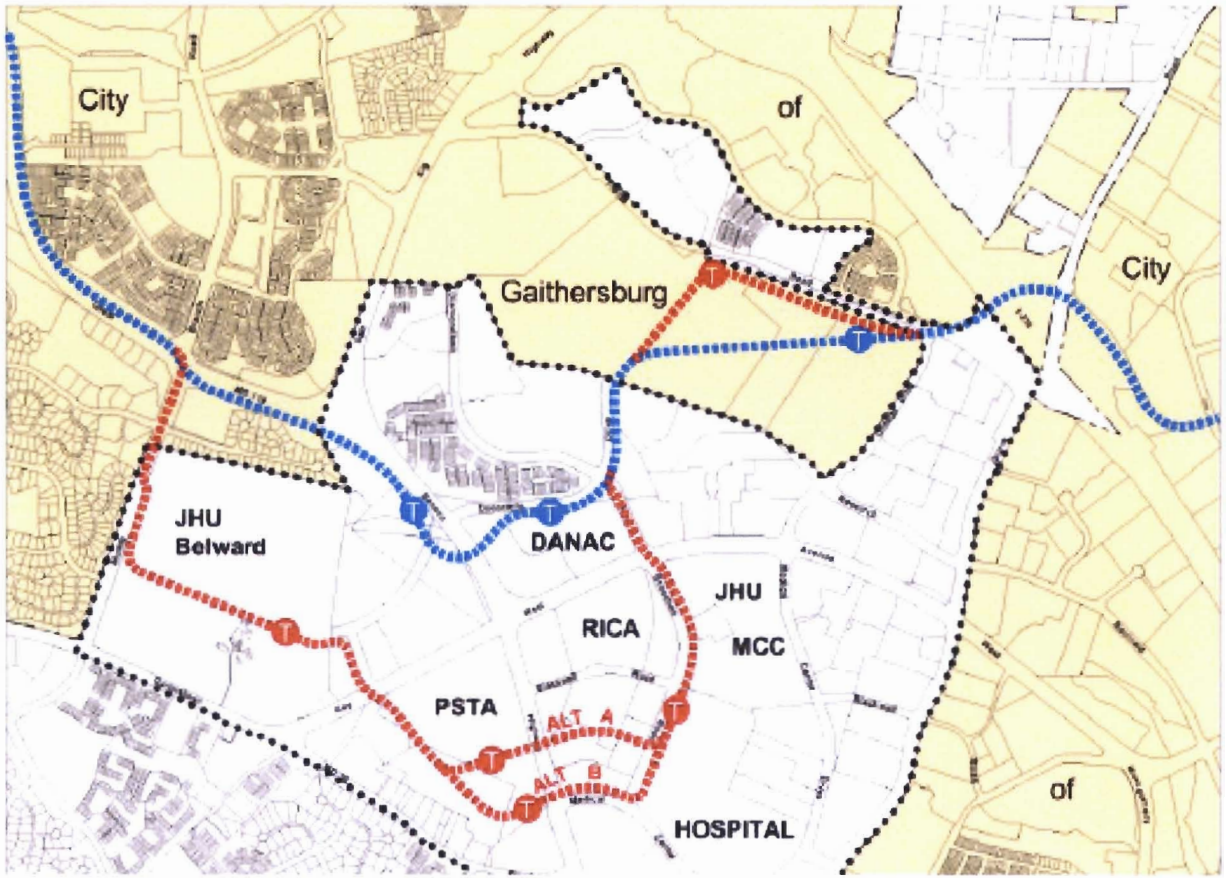
Source For Dulles: FTA Project Profiles of Nov. 2000 and Nov. 2004
Weekday estimate is multiplied by 300 to obtain estimate of annual for HR.

Modify Alignment

- Consistent with Draft Gaithersburg West Plan
- Serves areas where the greatest number of people will live and work.
- Offers potential to still serve Decoverly with alternate trips if demand warrants.

Station Changes In This Area …

- "Washingtonian" Station is "Crown Farm"
- DANAC shifts east toward Diamondback Rd.
- LSC adds 3 stations – Hospital, PSTA, and Belward – and removes Decoverly



Station Summary

Table III-6: Daily CCT Station Boardings

STATION NAME	ALTERNATIVE 6.2: TRANSIT TSM	ALTERNATIVE 6A	ALTERNATIVE 6B	ALTERNATIVE 7A	ALTERNATIVE 7B
COMSAT	130	2,625	1,230	2,620	1,530
Dorsey Mill	200	585	520	595	530
Cloverleaf	440	800	685	790	680
Germantown	770	2,915	2,235	2,860	2,215
Metropolitan Grove	600	2,215	2,210	2,435	2,180
NIST	685	635	1,305	630	1,215
Quince Orchard	515	2,870	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	830	2,635	2,755	2,645	2,765
East Gaither	495	930	900	930	900
Shady Grove	1,580	9,060	7,930	9,130	8,180
Total	**7,445**	**30,135**	**26,490**	**30,365**	**26,905**

Changes via Draft Master Plans or City of Gaithersburg Initiatives

- "Washingtonian" Station is "Crown Farm"
- DANAC shifts east toward Diamondback Rd.
- LSC adds 3 stations – Hospital, PSTA, and Belward – and removes Decoverly
- School Drive (shown on some report MTA maps) no longer under consideration
- Quince Orchard Station moved to west side of Great Seneca to serve Kentlands
- Middlebrook Rd. Station not in Draft Germantown Master Plan by design

- Provides land-use / transportation balance in corridor plans including Germantown and Gaithersburg West

•Where will Frederick County residents work?

- 16,000 in Clarksburg or Germantown
- 13,000 in Gaithersburg or Rockville
- 8,000 in Bethesda or North Bethesda
- 2,000 in DC

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- Served 2006 Damascus Plan rationale to retain two-lane roadway network and no bypass

- Supports longer-distance travel allowing slower target speeds on urban area arterials such as in Clarksburg

2030 Journey-to-Work

Montgomery County Department of Park and Planning
Travel/2 Super Districts

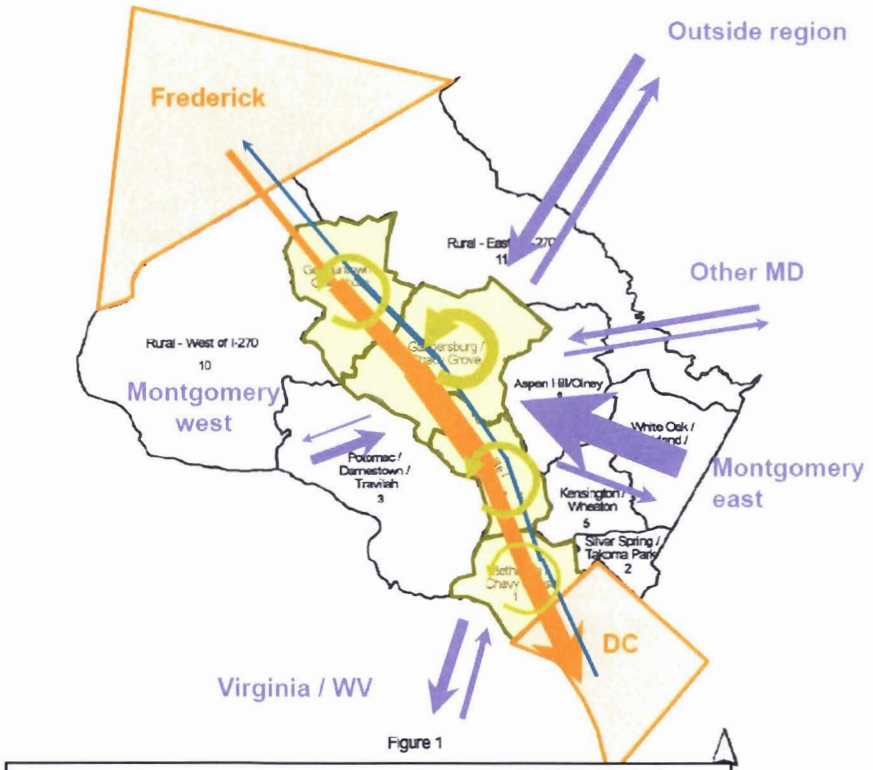


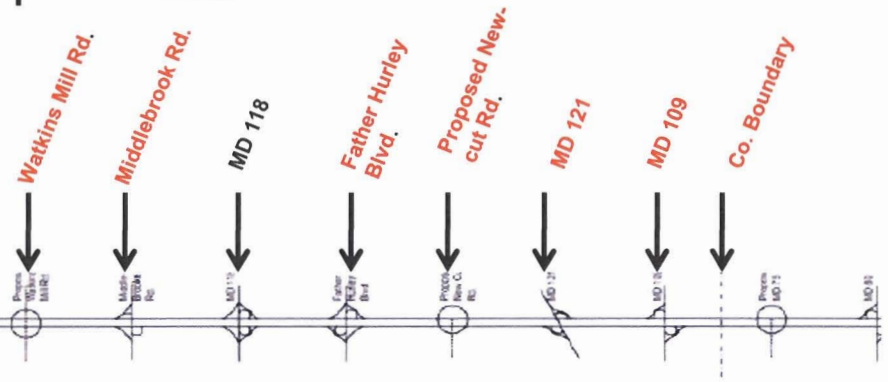
Figure 1

Local = trip stays within "super district"
Peak = journey to work is southbound in the corridor
Reverse = journey to work is northbound in the corridor
Other = journey to work enters or leaves the corridor

Forecast indicates level of service under no-build is problematic.

At County Boundary, 70% of flow is northbound

Northbound Profile



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		Corridor Segments	Study Limit												
NORTHBOUND I-270 and US 15	AM PEAK HOUR	Alternative 1 - No Build	LOS V/C	B 0.39	B 0.41	A 0.26	B 0.46	B 0.49	B 0.40	B 0.39	C 0.57		C 0.68	D 0.73	
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	B 0.35	B 0.46	A 0.26	B 0.34	B 0.49	B 0.40	A 0.30	B 0.46	B 0.46	C 0.52	B 0.44	C 0.55
		Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	B 0.35	B 0.45	A 0.25	B 0.33	B 0.47	B 0.38	A 0.29	B 0.44	B 0.42	C 0.51	B 0.43	C 0.52
	PM PEAK HOUR	Alternative 1 - No Build	LOS V/C	D 0.86	D 0.86	C 0.58	E 0.97	F 1.07	E 0.91	D 0.84	F 1.32		F 1.65	F 1.70	
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	D 0.80	E 0.92	C 0.56	C 0.65	F 1.01	D 0.84	C 0.62	E 1.00	F 1.03	F 1.22	F 1.06	F 1.29
		Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	D 0.80	E 0.90	C 0.53	C 0.65	E 0.95	D 0.79	C 0.58	E 0.94	E 0.95	F 1.02	D 0.84	F 1.06

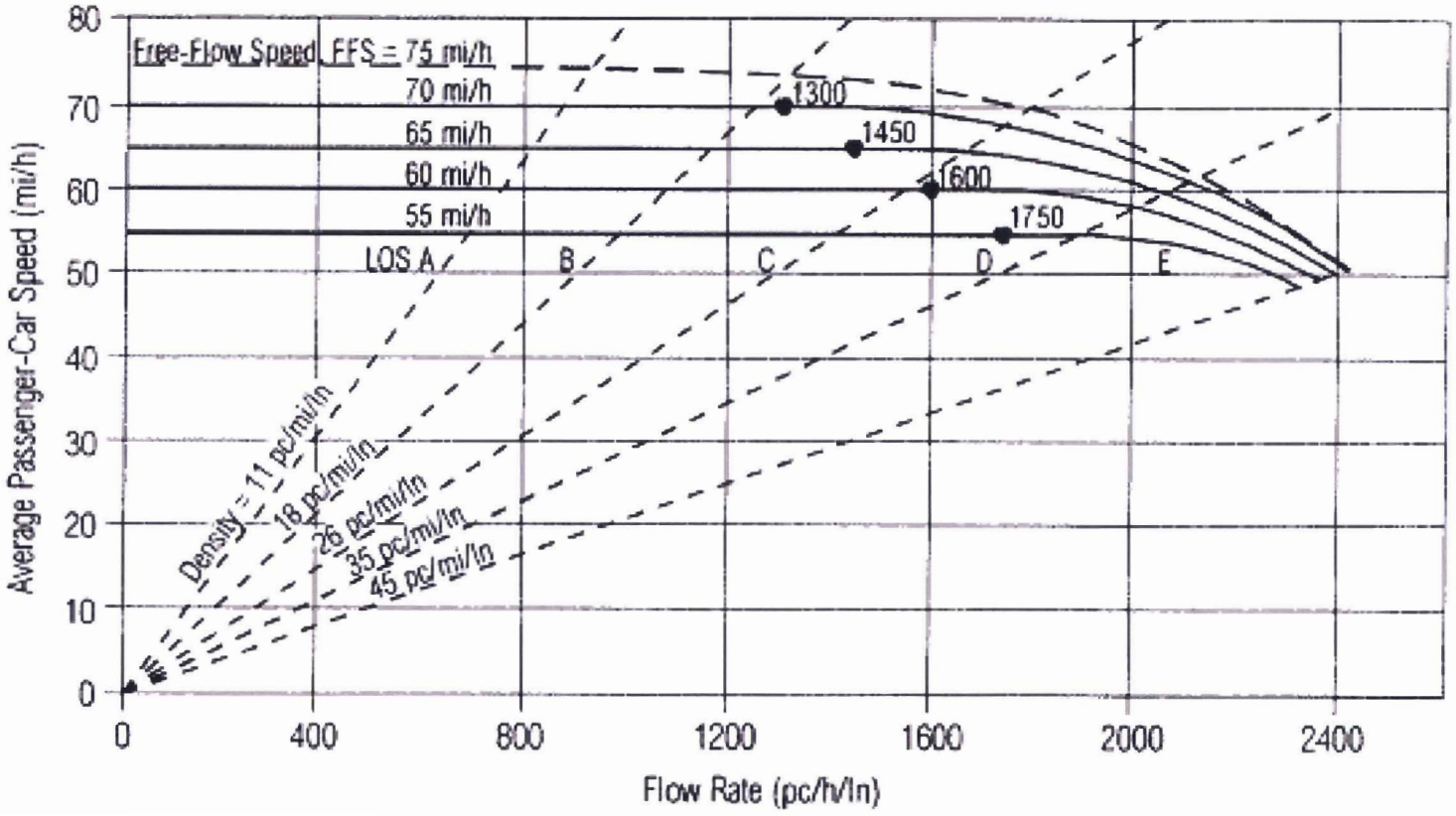
LEGEND

VOL = 2030 Traffic Volume (vehicles per hour) LOS = Levels of Service	V/C = Volume-to-Capacity Ratio A – D = Free or Stable Flow/Reduced Speeds E = Irregular Flow/Speeds/With Occasional Stop-and-Go F = Congested; Stop-and-Go Conditions	V/C Ratio Range (70 mph) South of I-370 to Father Hurley Blvd.	A 0.00 – 0.30	C 0.51 – 0.71	E 0.90 – 1.00	V/C Ratio Range (65 mph) Father Hurley Blvd. to Biggs Ford Rd.	A 0.00 - 0.29	C 0.48 – 0.68	E 0.89 – 1.00	
			B 0.31 – 0.50	D 0.72 – 0.89	F >1.00		B 0.30 – 0.47	D 0.69 – 0.88	F >1.00	

Why Alternative 7 instead of Master Plan Alternative 3?

From	To	Miles	Time Of Day	No Build 2025	Highway Alt 3	Congestion Relief "Points"	No Build 2030	Highway Alt 7	Congestion Relief "Points"
Park Hills Road	MD 121	8.8	AM SB	F	F	0	F	D/E	1
			PM NB	F	F	0	F	F	0
MD 121	Newcut Rd.	1.2	AM SB	F	E	1	F	E	1
			PM NB	F	E	1	F	E	1
Newcut Rd.	MD 27	1.5	AM SB	F	E	1	F	E	1
			PM NB	F	E	1	F	E	1
MD 27	MD 118	1.0	AM SB	E	E	0	E	D	1
			PM NB	F	E	1	D	C	1
MD 118	Middlebrook Rd.	0.8	AM SB	F	F	0	F	D	2
			PM NB	F	E	1	E	D	1
Middlebrook Rd.	Watkins Mill Rd.	1.8	AM SB	F	F	0	F	D	2
			PM NB	F	E	1	F	E	1
Watkins Mill Rd.	MD 124	0.7	AM SB	F	F	0	F	F	0
			PM NB	F	F	0	E	C	2
MD 124	MD 117	0.6	AM SB	F	F	0	E	C	2
			PM NB	F	F	0	C	C	0
MD 117	I-370	1.5	AM SB	F	F	0	F	D	2
			PM NB	F	F	0	D	E	1
	Total	**17.9**	**AM SB**			**2**			**12**
			PM NB			**5**			**8**

EXHIBIT 23-3. SPEED-FLOW CURVES AND LOS FOR BASIC FREEWAY SEGMENTS



Why Alternative 7 instead of Master Plan Alternative 3?

Daily Person Through-put	Round 7.0 - Year 2030			
	No-Build	Alt. 3A/B	Alt. 6A/B	Alt. 7A/B
MD 85	162,300	201,000	200,300	202,000
MD 80	168,100	216,000	220,300	222,600
MD 75 Extension	133,500	169,700	163,000	175,600
MD 109	133,500	148,300	146,900	162,600
MD 121	126,900	163,100	157,800	173,800
Newcut Rd	168,200	195,300	182,700	196,200
MD 27	168,200	216,100	214,000	225,900
MD 118	155,700	203,500	204,800	213,400
Middlebrook Rd	174,400	228,100	208,700	219,800
Watkins Mill Rd	213,800	273,400	246,600	248,200
MD 124	214,100	269,800	250,400	255,600
MD 117	239,500	289,700	275,600	266,000
I-370	315,900	362,600	343,900	331,800
Total	**2,374,100**	**2,936,600**	**2,815,000**	**2,893,500**

- Daily Person "Through-put" Similar
- Barrier Separated Operation for:
  - Toll Collection
  - Enforcement
  - Reduced Weaving or Friction With Other Traffic
- Need more information on
  - HOT lane access
  - Performance relative to all other alternatives with updated land use
  - Assumptions on toll structure and project financial profile

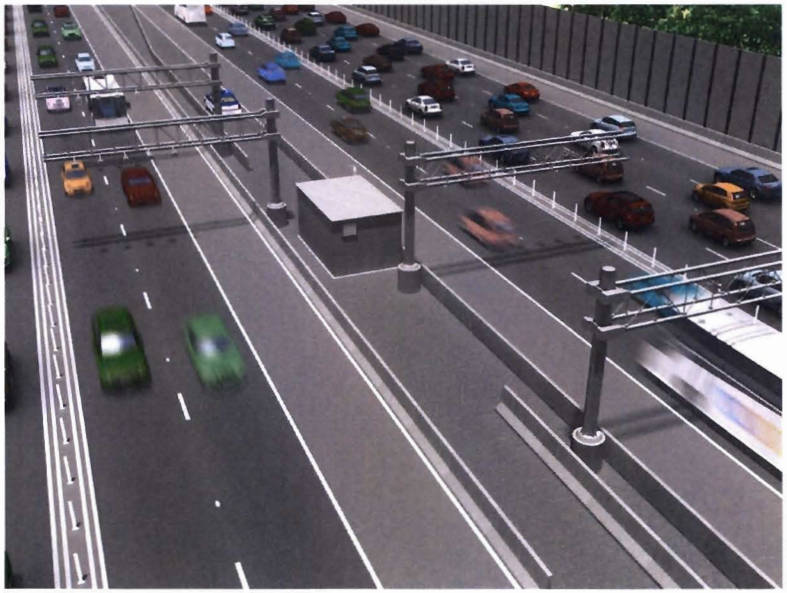
Modify Alternative 7 To Mitigate Impacts and Include HOV Preferential Treatment

↓↓ **Southbound AM**

↑↑ **Northbound PM**

Limit Number of Through Lanes North of MD 121 – Consider Reversible Lanes

Consider Alternatives To Barriers and Shoulders Where Safe To Do So In Order To Mitigate Impacts

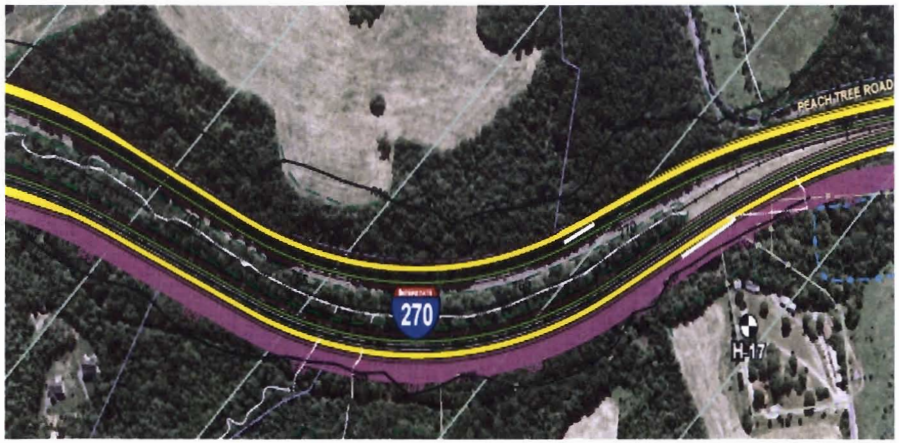


4. Provide Additional Detail and Outreach On On-Going Mitigation Efforts

Brighton West and Fireside – Just North of I-370

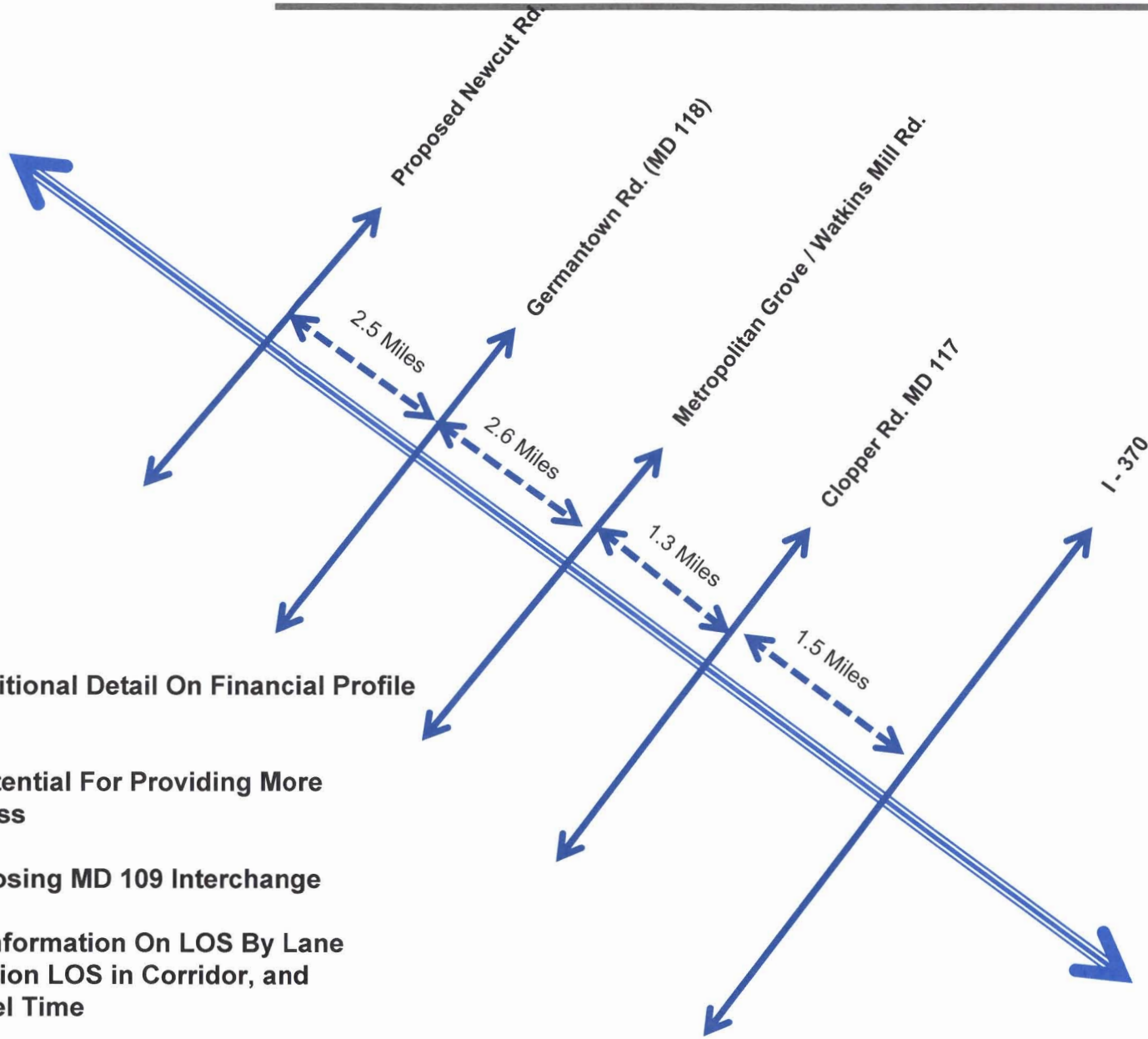
Belward Farm

London Derry – Just South of Clopper Rd.



Little Bennett Regional Park

Recommendations – Further Analysis



5. Provide Additional Detail On Financial Profile of Project

6. Examine Potential For Providing More Frequent Access

7. Consider Closing MD 109 Interchange

8. Additional Information On LOS By Lane Type, Intersection LOS in Corridor, and Roadway Travel Time

Recommendations – Further Analysis and Further Action By County

9. Expedite Minimization and Mitigation Efforts Related To:

•Belward Farm

•Linear Stormwater Management Techniques In Use IV subwatersheds, Clarksburg SPA, Great Seneca and Little Seneca Creeks

•Little Bennett and Black Hill Regional Parks

10. Establish Working Group To Examine Methods of Accelerated Funding & Implementation of CCT

11. Before I-270 Improvements Are Designed For Mandatory Referral - Identify Priority Of Additional Roadway & Transit Projects Through CIP & CTP :

•I-270 North of I-370 With Managed (Value Priced) Lanes

•Extended Managed Lanes Evaluated In West Side Mobility Study

•Countywide BRT Network

•Midcounty Highway Extended (M-83)

Maryland Department of Transportation

CONSOLIDATED TRANSPORTATION PROGRAM

2009 State Report on Transportation • FY 2009–2014

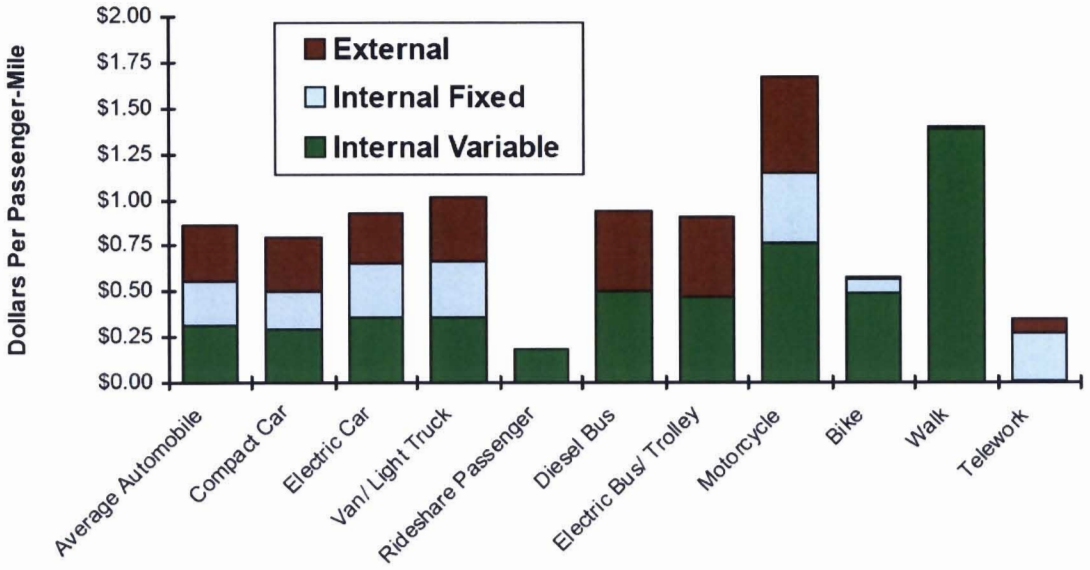
Martin O'Malley, Governor
Anthony G. Brown, Lt. Governor
John D. Porcari, Secretary

What are the Next Steps?

- July 13th - County Council T&E Committee Review
- July 21st – Full Council Review
- Ongoing – West Side Mobility Feasibility Study & VDOT Coordination
- Fall 2009 – MTA Analysis of Alternative CCT Alignment
- Fall 2009 – Selection of Preferred Alternative By State *
- Fall 2009 – Highway and Transit Studies Split After Selection of LPA – SHA Highway ROW Reservation By Completing Tier I FEIS.
- Late 2009 – Submittal of New Starts Application & Request To Enter PE (for CCT) By State *
- PE/FEIS Completion – TBD
- Ongoing – Identification of Funding and Phasing of Implementation for Transit and Highway

* Note: Submittal of new starts application and request to enter PE could be delayed estimated 12 – 18 months if alternative alignment is selected

Cost of Various Modes - $ / Passenger Mile



This graph shows the cost distribution of each mode. These costs are measured per passenger-mile, not per vehicle-mile, as in previous graphs. Note that transit costs are based on average U.S. ridership levels and would be lower in areas with higher ridership rates.

Does Not Directly Affect Consumer's Travel Decisions – Examples of Cost Categories Used	Affects Vehicle Ownership But Once Paid Does Not Affect Individual Trip Decisions	**Directly Affects Individual Trip Making Decisions – Examples of Cost Categories Used**
Operating Subsidies	Vehicle Ownership	Vehicle Operation
Congestion	Parking	Travel Time
Air Pollution		

Source: Transportation Cost and Benefit Analysis II – Victoria Transport Policy Institute – January 2009

•Motorcycles highest because of crash and pollution costs.

•Transit modes relatively higher because of because of low densities and ridership in U.S. overall.

•Walking & cycling costs are primarily travel time.

•Ridesharing has lowest cost and is representative of the incremental cost incurred with shifts to transit from other more costly modes.

From the National Transit Database – 2007 …

•Pass Miles – Nationwide Avg. – 36.8 million

•Metrobus – 416.0 million
•Ride On – 81.3 million
•Frederick Co. – 3.1 million
•Fairfax Co. – 71.0 million
•PRTC – 46.9 million
•Loudoun Co. – 21.5 million
•Alexandria – 10.5 million

Comparing Costs of Auto With Other Modes

Findings …

Costs are comparable on a per passenger mile basis in areas of relatively low density

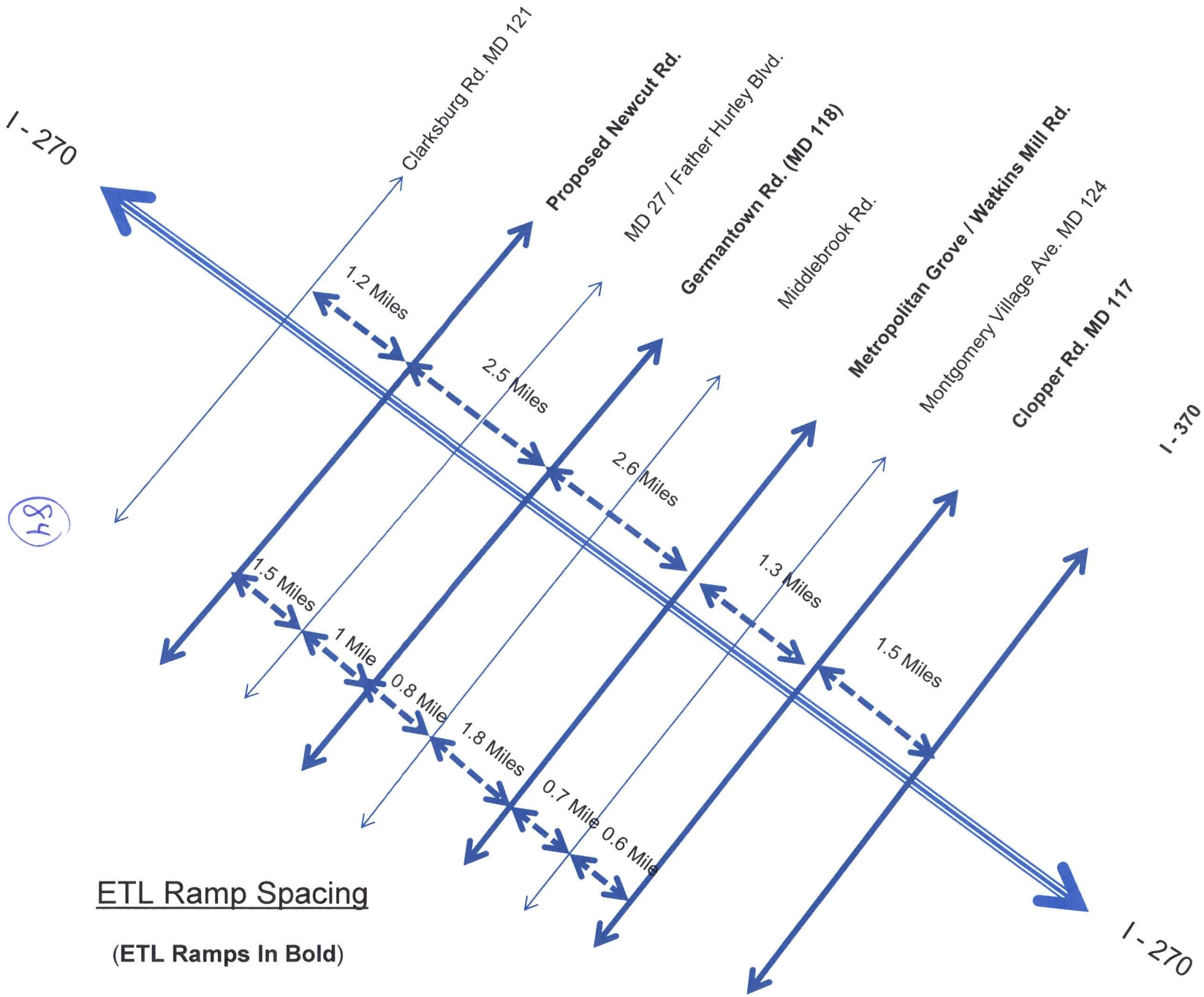
Costs are lower for transit on a per passenger mile basis in areas where transit is available and is positioned to attract more riders without adding significant amounts of service to do so – something that is a lot easier to do – and less costly – if the adjacent land use is transit supportive.

Strategy …

Improve transit travel times relative to auto travel times.

Use value pricing to more accurately reflect the cost of providing capacity for auto travel.

Establish as equitable economic (and travel) environment as possible so people can have time to adjust and make informed decisions – about tolls and travel costs – and also eventually about where to live and work.



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ETL Ramp Spacing

(ETL Ramps In Bold)

Alternatives Comparison

Environment

- Total Right of Way
  - Alts. 6A/B and 7A/B: 746 acres
  - Alts. 3A/B, 4A/B, 5A/B/C: 446 acres to 592 acres
- Wetlands
  - Alts. 6A/B and 7A/B: 15.6 acres
  - Alts. 3A/B, 4A/B, 5A/B/C: 10.7 acres to 11.6 acres

Alternatives Comparison

Environment

- Parkland (11 to 13 parks)
  - Alts. 6A/B and 7A/B: 42.7 acres
  - Alts. 3A/B, 4A/B, 5A/B/C: 37 acres
    48 acres
- Historic Properties
  - Alts. 6A/B and 7A/B: 8
  - Alts. 3A/B, 4A/B, 5A/B/C: 5 to 7 properties

Alternatives Comparison

Cost – Capital (millions 2007 $)

	Hwy.	Transit	Total
Alts. 6A/7A	$3,879	$777.5	$4,656.5
Alts. 6B/7B	$3,879	$449.9	$4,328.9

Cost – Operating / Maintenance (millions 2007 $)

	CCT	Feeder Bus	Total
LRT	$27.0	$1.1	$28.1
BRT	$17.9	$9.0	$26.9

(rounded $)

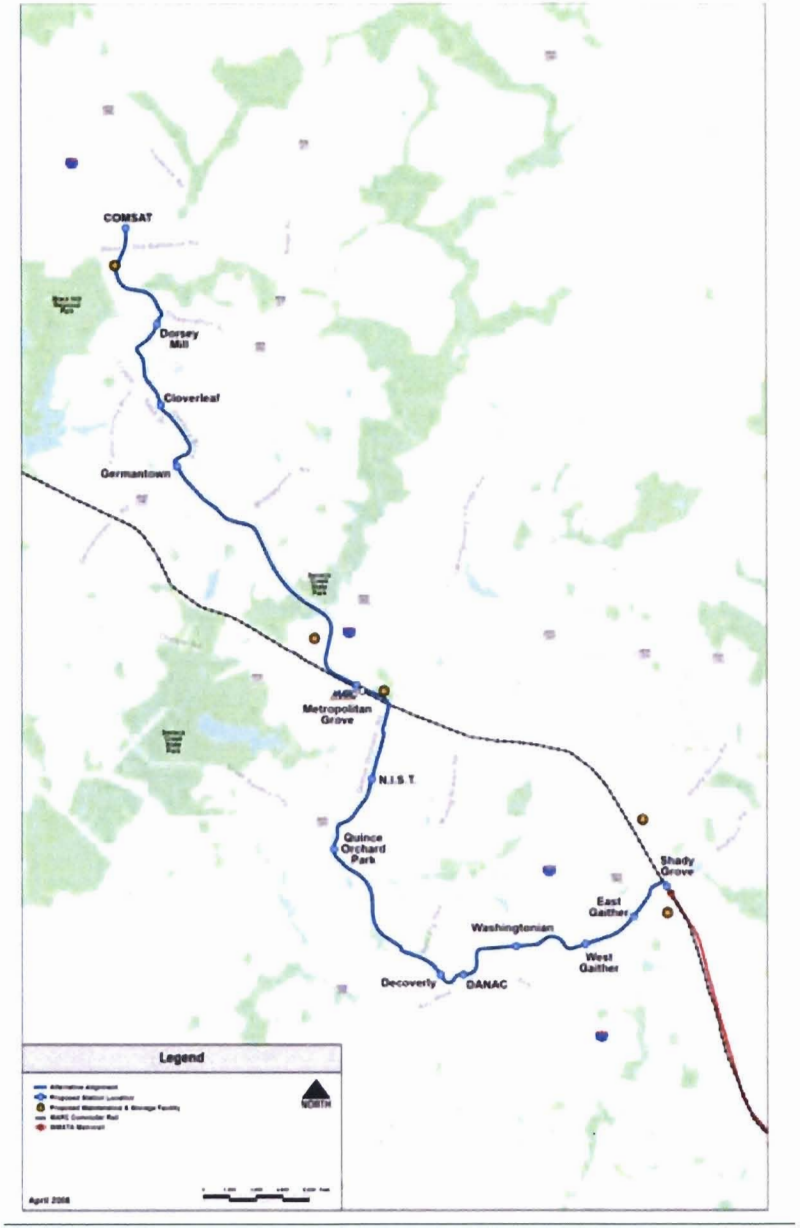
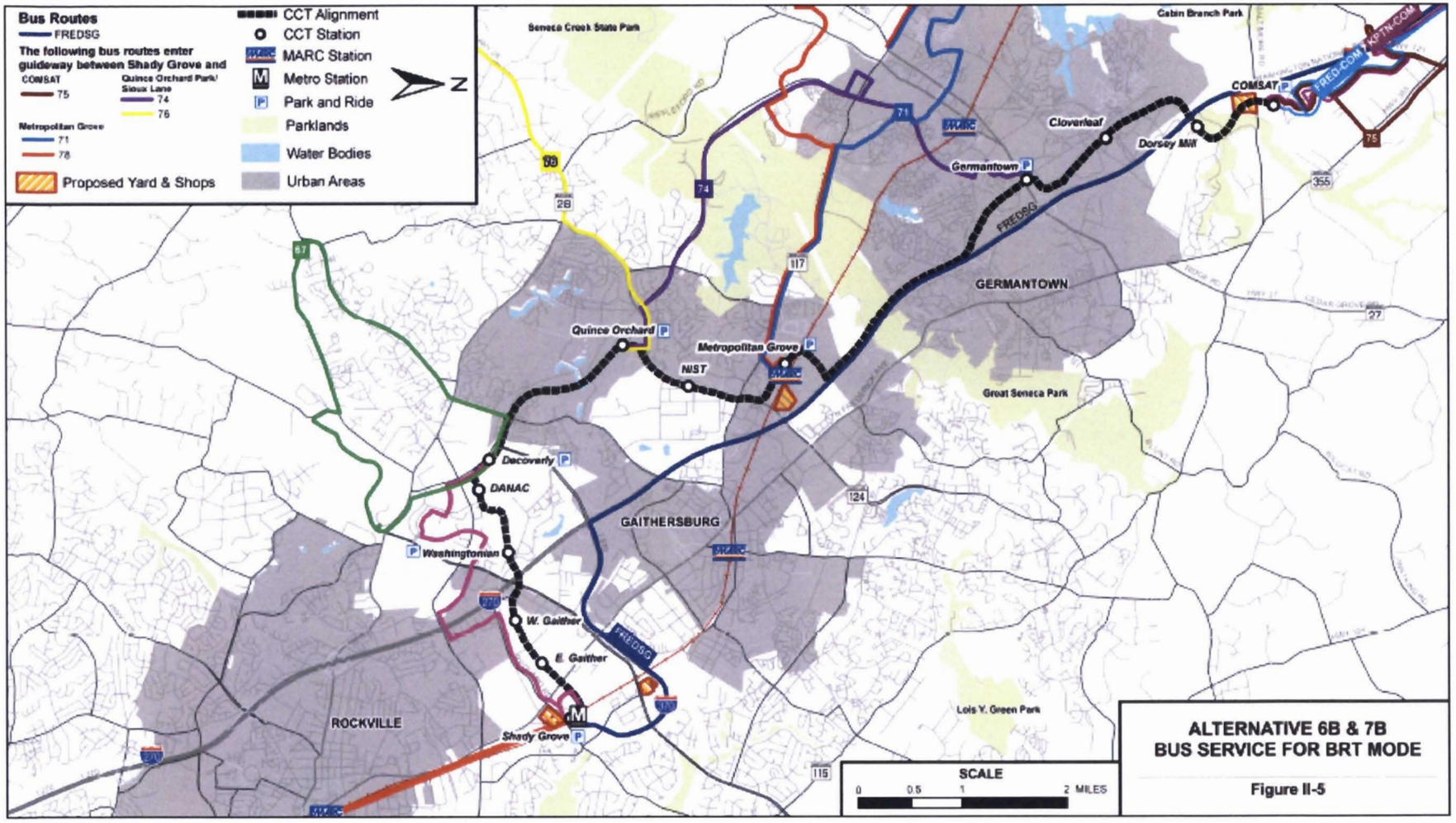

COMSAT
Dorsey Mill
Cloverleaf
Germantown
Metropolitan Grove
N.I.S.T.
Quince Orchard Park
Shady Grove
East Gaither
Washingtonian
West Gaither
Decoverly
DANAC
Legend
NORTH
April 2006

Figure II-5: Alternatives 6B & 7B Bus Service for LRT Mode

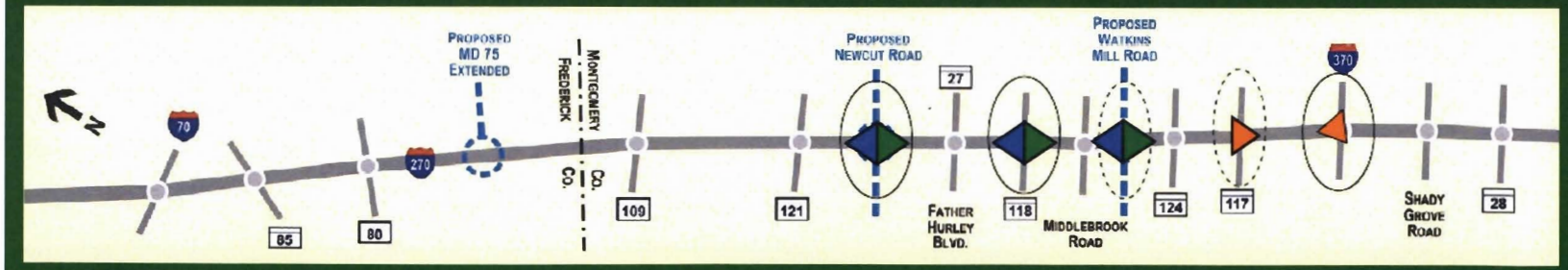


CCT Alternatives Under Review By MTA For Life Sciences

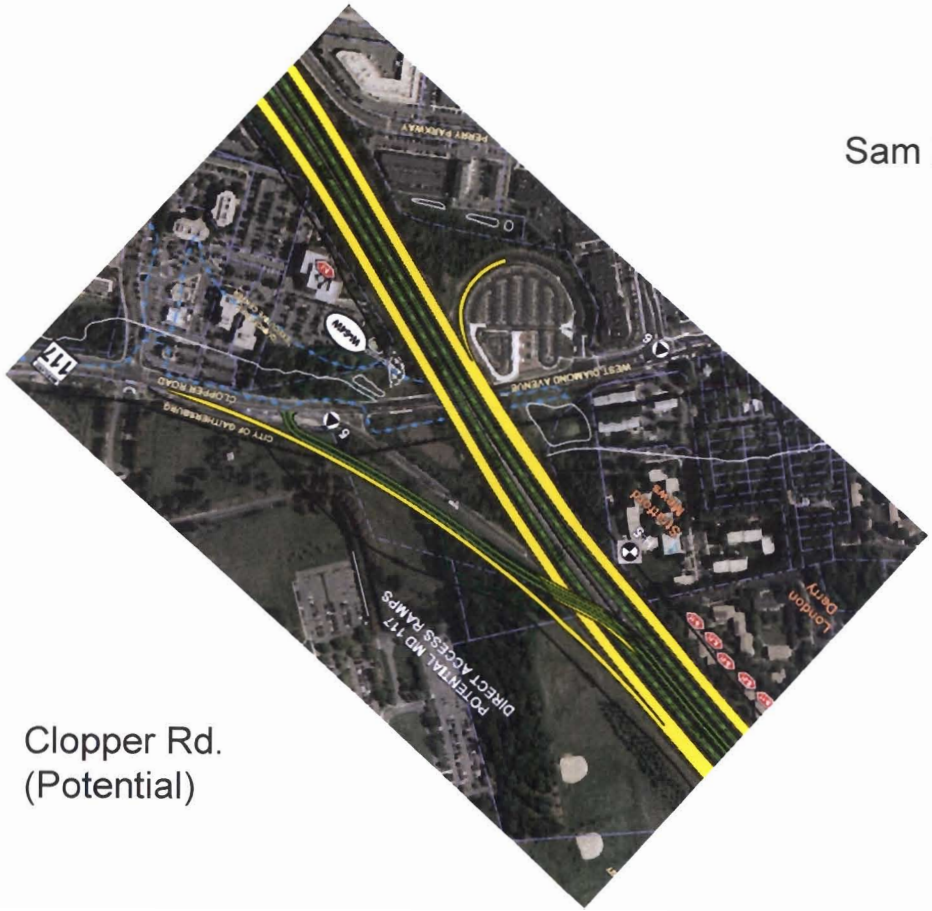
Alternative	BRT	LRT	Master Plan Alignment	Life Sciences Alignment	Updated Land Use For 2030 Based Upon GWMP
Base	●	●	●		Yes
Life Science Alignment	●	●		●	Yes
Hybrid	●		●	●	Yes

I-270 ETL Southern Access

- Vehicles will access the ETL lanes via **Direct Access Ramps** from these Interchanges:
  - Newcut Road (NB/SB)
  - MD 118 (NB/SB)
  - Watkins Mill Road Area (NB/SB) and/or MD 117 (SB)
  - I-370/ICC (NB to/from EB)



Plan Concept



Clopper Rd.
(Potential)

Sam Eig Hwy.

Further Technical Analysis

Additional detail on mitigation efforts

- Residential and business displacements
- Replacement of parkland and forest cover
- Historical Preservation
- Wetland preservation and water quality
- Stream preservation
- Noise attenuation
- Endangered species

(93)

Additional detail on financial profile of project

- Assumptions used for toll rates
- Estimated revenue
- Cost recovery
- Potential for funding transit improvements

Potential for additional access points – including ramp to provide access to LSC area.

Consider closing MD 109 interchange

Additional Traffic Data

- Traffic volumes and level of service by lane type
- Intersection LOS in format similar to 2002 AA/DEIS
- Roadway travel times

Further Action By County

Working Group to Examine Potential Funding Sources – Post Recession

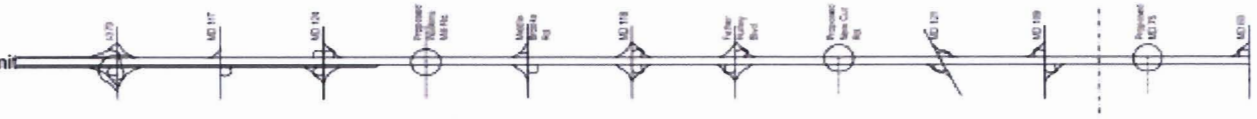
- Indexing federal and state gas taxes
- Local option sales tax for region
- Value capture around station areas

Develop position on the combined purpose and need for any additional roadway capacity in the corridor – after the introduction of managed (value priced) lanes and other AA/EA related improvements as well as other planned improvements - e.g., Countywide BRT and Midcounty Highway Extended (M-83).

Forecast indicates level of service under no-build is problematic.

Southbound Profile

Watkins Mill Rd. | Middlebrook Rd. | MD 118 | Father Hurley Blvd. | Proposed New-cut Rd. | MD 121 | MD 109 | Co. Boundary



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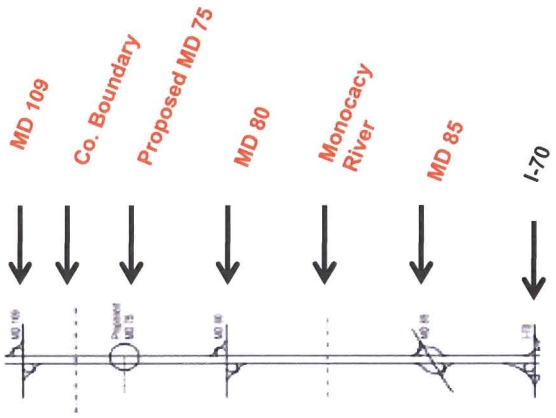
SOUTHBOUND I-270 and US 15	PM PEAK HOUR	Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	B 0.41	B 0.42	A 0.28	C 0.51	B 0.43	B 0.49	B 0.38	C 0.56	C 0.56	C 0.52	B 0.46	C 0.53
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	B 0.43	B 0.44	B 0.31	C 0.53	B 0.45	C 0.52	B 0.40	C 0.59	C 0.63	C 0.56	C 0.52	C 0.59
		Alternative 1 - No Build	LOS V/C	B 0.37	C 0.60	B 0.47	C 0.54	C 0.59	C 0.69	B 0.48	D 0.74		D 0.75	D 0.82	
	AM PEAK HOUR	Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	D 0.75	D 0.84	C 0.61	F 1.03	D 0.80	D 0.87	C 0.70	E 0.95	E 0.98	E 0.98	D 0.82	E 0.99
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	D 0.76	D 0.84	C 0.61	E 1.00	D 0.84	E 0.92	D 0.82	F 1.11	F 1.16	F 1.29	F 1.14	F 1.32
		Alternative 1 - No Build	LOS V/C	C 0.67	F 1.14	E 0.93	F 1.08	F 1.15	F 1.28	E 0.90	F 1.31		F 1.58	F 1.57	

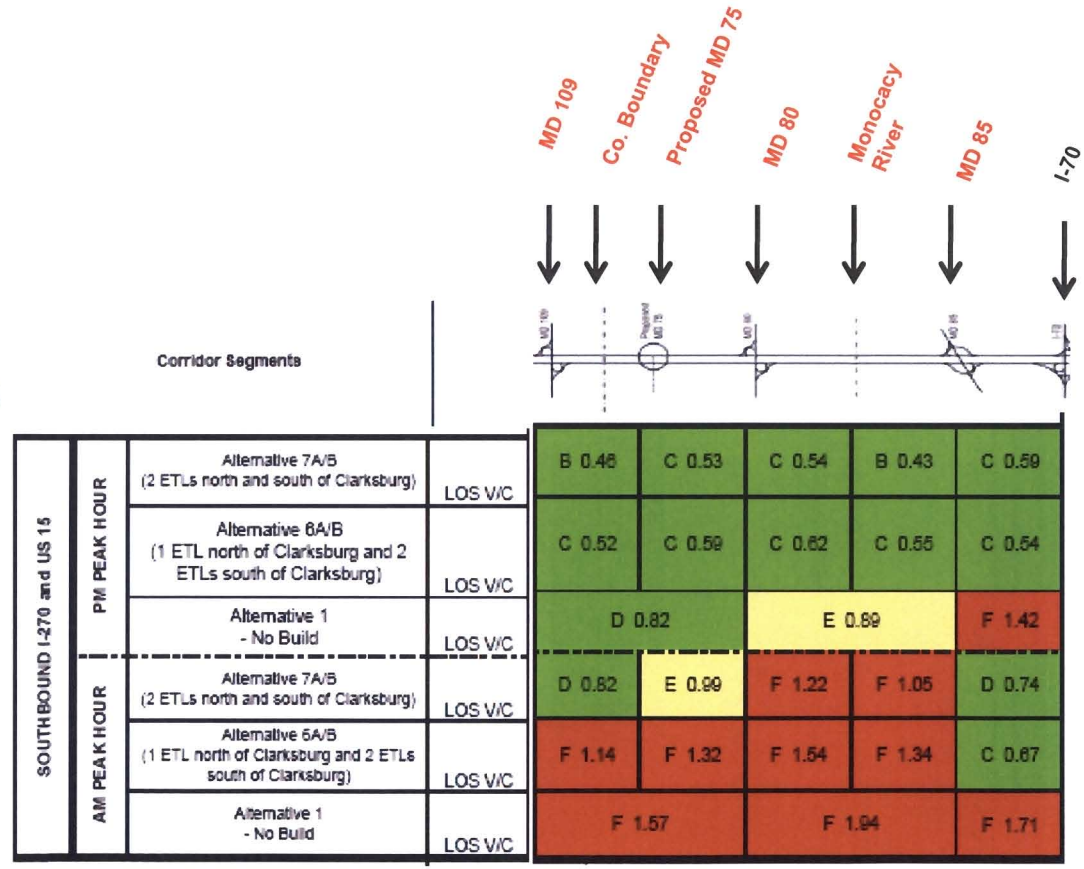
Forecast indicates level of service under no-build is problematic.



		Corridor Segments							
NORTHBOUND I-270 and US 15	AM PEAK HOUR	Alternative 1 - No Build	LOS V/C	D 0.73		E 0.89		C 0.47
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	B 0.44	C 0.55	C 0.60	C 0.62	C 0.60
		Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	B 0.43	C 0.52	C 0.61	C 0.48	C 0.48
	PM PEAK HOUR	Alternative 1 - No Build	LOS V/C	F 1.70		F 1.99		E 0.90
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	F 1.06	F 1.29	F 1.60	F 1.37	E 0.89
		Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	D 0.84	F 1.06	F 1.24	F 1.08	E 0.95

Frederick County Northbound Profile

Forecast indicates level of service under no-build is problematic.



		Corridor Segments		MD 109	Co. Boundary	Proposed MD 75	MD 80	Monocacy River	MD 85	I-70
SOUTHBOUND I-270 and US 15	PM PEAK HOUR	Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	B 0.48	C 0.53		C 0.54	B 0.43	C 0.59	
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	C 0.52	C 0.59		C 0.62	C 0.55	C 0.54	
		Alternative 1 - No Build	LOS V/C	D 0.82			E 0.89		F 1.42	
	AM PEAK HOUR	Alternative 7A/B (2 ETLs north and south of Clarksburg)	LOS V/C	D 0.82	E 0.99		F 1.22	F 1.05	D 0.74	
		Alternative 6A/B (1 ETL north of Clarksburg and 2 ETLs south of Clarksburg)	LOS V/C	F 1.14	F 1.32		F 1.54	F 1.34	C 0.67	
		Alternative 1 - No Build	LOS V/C	F 1.57			F 1.94		F 1.71	

Frederick County Southbound Profile

CHAPTER 6. LAND DEVELOPMENT GUIDELINES

INTRODUCTION

The growth and development of urban areas reflects the impacts of transportation technology. Suburban railroads, city and interurban electric railways, rapid transit, and roadways have continually influenced where people and businesses locate. These impacts have been well documented in the past.

There is limited—but growing—documentation of BRT's land development impacts.

BRT has emerged in recent years as a relatively new rapid transit mode. Similar to LRT in many aspects, it also has begun to impact the areas it serves. There is growing documentation of its positive development effects; however, given the newness of most BRT systems, more information is needed regarding when, where, and why these effects occur over time and how communities can work with transit agencies and developers to achieve BRT transit-oriented development (TOD).

The "Experience and Research" section documents available cost, impact, and effectiveness data for BRT land development.

The "TOD Programs" section contains overviews of selected agencies' TOD incentives and programs and information from case studies of Boston and Ottawa. The case studies address the land development impacts of BRT from the perspective of community efforts to link land development with proximate transit service.

Developers' perceptions of BRT have not been formally surveyed before.

The "Developer Perceptions" section presents findings from surveys of developers in Boston and Ottawa. The surveys focused on the characteristics of BRT that are likely to impact development decisions. It is believed that such formal surveys have not been conducted elsewhere.

The guidelines in this chapter address circumstances under which can BRT foster transit-oriented development.

The "Guidelines" section synthesizes and interprets information from the previous sections and from other research on the land development impacts of transit investments related to BRT. The guidelines are intended to help public agencies (i.e., transit agencies, local government agencies, and metropolitan planning organizations) assess the potential land development benefits of BRT system development by identifying data sources, identifying analysis tools, and providing guidance on conducting future surveys of the various stakeholders in the development process.

EXPERIENCE AND RESEARCH

Overview of Transit-Oriented Development

TOD is defined by Caltrans as follows:

> "TOD is a strategy that has broad potential in both large urban and small communities using bus or rail transit systems. It focuses compact growth around transit stops, thereby capitalizing on transit investments by bringing potential riders closer to transit facilities and increasing ridership. TOD can also produce a variety of other local and regional benefits by encouraging walkable compact and infill development. Transit agencies often play an important role in TOD. Local governments can play a significant role in promoting TOD through plans, policies, zoning provisions, and incentives for supportive densities [and] designs, along with a mix of land uses.

> "For development to be transit-oriented, it needs to be more than just adjacent to transit. Development generally needs to be shaped by transit in terms of parking, density, and/or building orientation in comparison to conventional development for it to be considered transit-oriented. A successful TOD will reinforce both the community and the transit system." (*1*)

TCRP Report 102 (2) contains other definitions. For the purposes of this chapter, the key characteristic of TOD is that it is the formal linking of land development opportunities and activities with the station sites of premium transit services to encourage a desirable form of development.

TOD Measures

NCHRP Research Results Digest 294 (3) summarizes surveys of public agencies and transportation professionals across the United States to identify indicators that can and/or should be used to quantify the land development impacts of TOD. The research evaluated 56 categorized measures in terms of each measure's usefulness, the level of effort required to obtain its data, and how frequently it should be monitored. The indicators recommended as "the foundation for [a TOD] evaluation program" are the following:

Several key indicators can be used to quantify and monitor land development activity along transit routes.

- Transit ridership
- Density (population/housing)
- Quality of streetscape design
- Quantity of mixed-use structures
- Pedestrian activity/pedestrian safety
- Increase in property value/tax revenue
- Public perception (resident and merchant surveys)
- Mode connections at the transit station
- Parking configuration (for commuters, for residents, and shared)

NCHRP Research Results Digest 294 notes that, "while data collection is relatively easy for some of these indicators, it is more difficult for some of the others; a strategy suggested in the [research] is setting aside government funds to monitor TOD progress. For virtually every indicator, with a few exceptions, data collection needs to occur only yearly or less frequently." (*3*)

Quantifying TOD Impacts

In describing the measured benefits of TOD, *TCRP Report 102* (2) says "...relatively few serious studies have been carried out that assign benefits to TOD in any quantitative sense," the exceptions being studies of ridership increases and property gains. The report also notes that "...quite a few of the benefits of TOD are associated with any form of compact, mixed-use development."

Examples of recent studies quantifying the land value benefits of rail transit investments are set forth in Exhibit 6-1. Proximity to rail and LRT stations generally increases land values. However, comparable studies of BRT are limited—largely because of the relative newness of the concept.

EXHIBIT 6-1 Land Value Results of Selected Price Model Studies

Author(s)	Data Source	Selected Results
	Heavy Rail Rapid Transit	
Cervero and Duncan, 2002b	3,802 sales of properties in multi-family housing in Los Angeles in 2000	No evidence of appreciable effects
Lewis-Workman and Brod, 1997	All recorded single family property sales (263) within 1.61 km of BART's Pleasant Hill station from the 1984-1996 period	Premium of $1,578 for every 0.03 km closer to BART station
Benjamin and Sirmans, 1996	250 residential apartment rental prices in Washington during 1992	Premium of 2.4% to 2.6% for every 0.16 km closer to Metro station
Landis et al., 1995	2,359 sales of single-family homes in Alameda and Contra Costa Counties during 1990	Premium of $100-$200 per 0.1 km closer to the station
McDonald and Osuji, 1995	79 blocks in Chicago during 1980 and 1990	Premium of 17% for location within 0.5 mile of a station
Smith, 1978	300 new home sales in Chicago for 1971	Premium of $450 for every 0.8 km closer to rail transit station
Damm et al., 1980	286 single-family and 771 multi-family housing sales from 1969 to 1976 in Washington, D.C.	Dummy variables indicating location within 0.16 km of a station: elasticities of -0.19 for multi-family housing and between -0.06 to -0.13 for single-family housing sales
	Light Rail Transit/Trolley Service	
Dueker and Bianco, 1999	Population Census' median house value in Portland between 1980 and 1990	Premium of $2,300 for properties within 0.06 km of a MAX station
Lewis-Workman and Brod, 1997	Cadastral information for nearly all properties (4,170) within 1.6 km of three MAX stations in Portland	Premium of $75 per 0.03 km closer to the station
Forrest et al., 1995	795 house sales in Manchester (UK) during 1990	Premium ranging from 2.1% to 8.1% depending on distance to station
Cervero and Duncan, 2002c	1,495 sales of properties in multi-family housing in San Diego in 2000	Premium for multi-family units ranging from 2% to 6%
Landis et al., 1995	134 single-family sales in San Diego during 1990	Premium of $272 for every 0.1 km closer to station
Dabinett, 1998	Sheffeld (UK) Supertram	No evidence of appreciable effects
Al-Mosaind et al., 1993	235 single-family home sales in Portland during 1988	Premium of $663 per 0.03 km closer to station

NOTE: Results apply to area and properties studied only. Refer to each source study for details.
SOURCE: The Value of Accessibility to Bogotá's Bus Rapid Transit System (*4*)

Examples of land development benefits of existing BRT systems are given in Exhibit 6-2.

BRT systems—especially busways—have created land development benefits.

EXHIBIT 6-2 Reported Land Development Benefits of BRT

BRT System	Land Development Benefits
Adelaide Guided Busway	Tea Tree Gully area is becoming urban village.
Bogotá TransMilenio	For every 5 minutes of additional walking time to a BRT station, the rental price of a property decreases between 6.8% and 9.3% after controlling for structural characteristics and neighborhood attributes
Boston Silver Line (rebuilt Washington Street)	$700+ million in new investment within two to three blocks of BRT line
Brisbane South East Busway	Up to 20% gain in property values near busway. Property values in areas within 6 miles of station grew two to three times faster than those at greater distances. Higher increase in median home values around busway than other suburban areas.
Ottawa Transitway System	$1 billion (Canadian) in new construction at Transitway Stations.
Pittsburgh East Busway	59 new developments within 1,500 feet of stations. $302 million in land development benefits of which $275 million was new construction. 80% clustered at stations.
Pittsburgh West Busway	Land development focused on six park-and-ride lots.

SOURCE: The Value of Accessibility to Bogotá's Bus Rapid Transit System (*4*) and *TCRP Report 90* (*5*)

Findings of other studies are as follows:

- The Value of Accessibility to Bogotá's Bus Rapid Transit System (4) reports that, for every 5 minutes of additional walking time to a BRT station in Bogotá, the rental price of a property decreases between 6.8% and 9.3% after controlling for structural characteristics and neighborhood attributes.
- Boston's Silver Line operating on rebuilt Washington Street between downtown Boston and Dudley Square has generated more than $700 million in new investment within a few blocks.
- Brisbane's South East Busway has reported a 20% gain in property values near the busway. There has been a greater increase in home values along the busway as compared with other suburban areas.
- Ottawa's Transitway system has generated more than $1 billion (Canadian) dollars in new investment along the Transitway. The municipality's land use policy requires major activity centers to locate near the Transitway and has been supportive of TOD. The St. Laurent Centre, which is connected to the Transitway by weather-protected, grade-separated walks, is one of Canada's most productive shopping centers. About one-third of customers arrive via the Transitway. Concurrent with opening the St. Laurent Transitway station in 1987, the Centre completed a major expansion that included 80 additional stores.
- Pittsburgh's East Busway, which shares a corridor with a railroad, generated more than $302 million in new development between 1983 and 2000. By 2007, more than $500 million of new investment has been reported. About 80% is clustered at stations. One-third of the new development represents an extension of the CBD. The extent to which this development would have occurred without the busway was not reported by PAT.

Achieving TOD with BRT

Achieving TOD at BRT stations requires (1) providing the right mix, design, and density of activities; (2) recognizing the development potential associated with BRT; and (3) acknowledging that land development impacts may not be realized in the near term.

An important insight can be found in studying the factors that researchers have identified as being characteristics of a successful TOD project. *NCHRP Research Results Digest 294* (3) cites a 2001 study by Nelson, Niles, and Hibshoosh (6) that identifies 16 factors in successful TOD projects. These factors are listed in Exhibit 6-3. Of the 16 factors, transit technology and resident reactions are the only factors where mode-specific differences might be significant, and the latter is highly likely to reflect the perceived "rail bias."

EXHIBIT 6-3 Factors Determining the Success of TOD

Number and Siting of TODs	Station Area Parking	Regional Marketing Structure	Resident Reactions
Transit Quality	Employment and Housing Density	Consumer Activity Patterns	Housing Type Preference/Life Stage
Transit Technology	Commercial Mix	Travel Behavior/Trip Chaining	Self-Selection in Residential Choice
Street Pattern	Retail Siting Criteria	Zoning Flexibility/ Land Assembly	Government Policies

SOURCE: *A New Planning Template for Transit-Oriented Development* (6) as reproduced in *NCHRP Research Results Digest* (3)

Factors for TOD success added by other researchers include the following:

- The Victoria Transportation Policy Institute (VTPI) lists employment density and clustering, demographic mix (captive riders), transit pricing and rider subsidies, parking pricing, tolls, the quality of transit service, the effectiveness of transit marketing, walkability, and street design. VTPI cites previous research in concluding that "TOD generally requires at least six residential units per acre in residential areas and 25 employees per acre in commercial centers, and about twice that for premium quality transit, such as rail service.... These densities create adequate transit ridership to justify frequent service...." (7)
- The Urban Land Institute identifies 10 principles for TOD success (8):
  - > Make It Better with a Vision
  - > Apply the Power of Partnerships
  - > Think Development When Thinking about Transit
  - > Get the Parking Right
  - > Build a Place, Not a Project
  - > Make Retail Development Market-Driven, Not Transit-Driven
  - > Mix Uses, but Not Necessarily in the Same Place
  - > Make Buses a Great Idea
  - > Encourage Every Price Point to Live around Transit
  - > Engage Corporate Attention

The Urban Land Institute has published 10 principles for successful TOD.

The various factors do not explicitly depend on the mode of the premium service. They depend instead on service design decisions and external factors (such as market conditions, the specifics of land development regulations, and site design).

Citizens, transportation professionals, and decision-makers traditionally have perceived rail service as more attractive than bus service. The rail bias underlying ridership estimates reflects the sense of permanence associated with rail infrastructure, the technology, and the level of investment. It also may be perceived when comparing the land development effects of BRT and rail service.

However, ridership experience with BRT indicates that similar bias considerations apply to BRT in terms of passenger attraction. (See Chapter 3 for more information.) Similarly, reported development effects indicate that BRT can influence land development.

In Chapter 2 of CBRT (*9*), the authors state that "...rapid bus technologies are so new that there is little evidence about their attractiveness for development." Research organizations such as the Urban Land Institute and the Center for Transit-Oriented Development have not conducted BRT-specific studies to date. These organizations have assembled much data on TOD in general, however. The question is whether general TOD data and/or TOD data for rail and regular bus service can be applied to BRT.

None of the previous research reviewed distinguishes the land development impacts of BRT from the impacts of high-quality transit service in general or from the impacts of rail service. For example: As stated in Chapter 2 of *The New Transit Town* (*10*), "The more that BRT can approach [the] features of rail in its design ... the more it will succeed in providing an attractive development climate." In many cases, the type of transit linked to TOD is described in the research with a generic phrase such as "premium service" or "rapid service," which conveys that a high-quality transit service is offered but is non-specific as to the mode. In cases where a modal distinction is present, it typically takes the form of an assumption that a rail station is being assessed, without reference to explicit service characteristics. Thus, research to date does not provide evidence that BRT and rail services with similar service characteristics have different land development impacts.

Full-featured BRT can be similar to rail transit in terms of its impacts on land development.

In conclusion, BRT is a "premium transit" or "rapid transit" service. BRT can physically operate in any corridor that rail transit can; BRT service can be provided at levels comparable to rail service (e.g., headways and vehicle features); development around BRT stations can achieve the "success" characteristics noted above; and BRT service can be attractive to riders. It is therefore reasonable to expect that BRT could achieve land development effects similar to rail-based TOD where the service structure is similar, and that it is not necessary to distinguish BRT from LRT or other rail modes for the purposes of assessing land development impacts.

TOD PROGRAMS

This section overviews the TOD program requirements and incentives of Boston, Pittsburgh, and Ottawa. The overview illustrates how BRT is being incorporated into selected TOD programs. Program information was obtained through surveys (Boston and Ottawa) and review of planning documents and codes.

Boston

Overview of TOD Program

The Massachusetts Bay Transit Authority (MBTA) and State of Massachusetts define TOD as mixed-use, higher-density, pedestrian-oriented development located within 0.5 mile of a transit station and designed to encourage transit use, walking, and other alternative modes of transportation. While densities, intensities, and types of uses will vary depending upon the location and type of transit service, TOD shall generally have the following characteristics:

- A mix of uses
- Moderate to high density
- Pedestrian orientation
- Connectivity between uses and transit station
- Reduced parking
- Attractive streetscapes and urban design

The City of Boston does not have a specific definition for TOD or an explicit program to promote TOD beyond efforts on surplus City property. However, it recognizes that Boston's long transit history and dense development pattern have made TOD the norm.

MBTA's TOD program is focused on City/MBTA surplus property.

MBTA's TOD program encourages development of the type described above. However, the program is targeted toward the development of surplus property owned by MBTA in coordination with local jurisdictions. MBTA does not have surplus property in the Silver Line BRT corridor and, therefore, has not been active as a developer of TOD projects in the corridor.

The City and MBTA work together on TOD projects when they occur within the city limits, but they both acknowledge that TOD has become the common practice in the City of Boston and several of the surrounding communities. *TCRP Report 102* (2) has a chapter that looks extensively at the history of TOD in Boston and addresses some of these issues in greater detail than is possible for this report.

Requirements and Incentives

Because TOD is the traditional form of development in Boston and does not take place within narrowly defined programs, MBTA and the City place few, if any, requirements upon TOD projects. Given the few restrictions placed on TOD projects by MBTA and the City, there are currently few, if any incentives offered directly by either MBTA or the City for TOD per se.

The Boston Redevelopment Authority (BRA) is the City's planning and development arm and provides a variety of development incentives to projects in the City. The assistance offered includes site acquisition, neighborhood visioning, grants, low-interest loans, joint development opportunities, multi-agency coordination, and streetscape improvements. While the BRA encourages developers to make their projects pedestrian-friendly, mixed-use in character, and with minimized parking, there is no qualifying process for this assistance that depends upon meeting specific design standards. BRA staff mentioned that developers are very receptive to this encouragement because they have seen that it is the traditional pattern of development and they have seen it work throughout the City.

Boston has realized $700 million in development along its Washington Street Silver Line alignment.

Impacts

BRA noted that $700 million of development occurred in a 1.5-mile stretch of the Washington Street corridor in the same time period as the Silver Line was being implemented. Public investment in the corridor was clearly an impetus for development, but it is difficult to determine how influential the Silver Line operation has been relative to other investments such as roadway resurfacing and streetscaping. While the corridor was previously served by the #49 bus line, it is difficult to discern the impact of the new development on ridership as opposed to the Silver Line's service changes.

Planning and implementation of the Silver Line in the South Boston Waterfront has also occurred in tandem with a boom in development, beginning the transformation of acres of parking lots to what will become a very dense mix of offices, housing, and retail. Even more than on Washington Street, this boom has followed a wide array of public investment, including the construction of a new Federal courthouse and a convention center. Creating an improved transportation link from this area to the downtown has clearly been a key factor and one reason for Silver Line Phase 2 development. There had been no previous service along this portion of the line, so any ridership developed is a result of new development.

Throughout the system, MBTA has seen a demand for increased housing opportunities adjacent to transit stations, and much of the development in the Washington Street corridor has been residential with ground floor commercial.

Pittsburgh

Overview of TOD Program

The City of Pittsburgh defines TOD projects as "developments that focus on areas in which stations are located, through the adoption of public programs and regulations by local governments that permit an intensively built mix of land uses and activities around the station." Pittsburgh's busway stations are considered Major Transit Facilities. A Major Transit Facility is defined as "a platform or waiting area adjacent to a public mass transit system which utilizes an exclusive right-of-way."

Requirements and Incentives

In certain zoning districts, proximity to a Major Transit Facility allows developers to take advantage of increased development densities. These zoning districts are defined by the City as follows:

- The Urban Neighborhood Commercial (UNC) District is intended to serve a broader market than the immediate neighborhood; allow a range of development while controlling impacts on the neighborhood adjacent to them; ensure that new developments fit within existing development patterns; and reinforce qualities of the built environment, such as the continuity of storefronts and pedestrian-oriented streetscapes.
- The Highway Commercial (HC) District is intended to accommodate auto-oriented commercial activities and uses for which automobile travel is generally required (such as automobile dealerships, fast food restaurants, and appliance stores); improve the design quality of auto-oriented development (making such areas more attractive components of the city); provide space for large-scale regional retail stores that require large lots, broadly defined market areas, and high sales volumes and that tend to be incompatible with locations adjoining smaller neighborhoods; provide

space for commercial uses that would create conflicts with residential uses or other less intensive types of land uses; and maintain the efficiency of the City's existing and planned traffic network.

- The Urban Industrial (UI) District is intended to allow mid-sized to large industries with lower external impacts on surrounding properties and districts; provide a flexible district that addresses the growing need for easily adaptable and flexible spaces (including office parks, incubator spaces, high technology, and service sector industries); allow multi-use buildings that permit assembly, inventory, sales, and business functions within the same space; and encourage adaptive reuse of manufacturing buildings and allow the development of high density multi-unit residential buildings.

Exhibit 6-4, Exhibit 6-5, and Exhibit 6-6 show how proximity to a Major Transit Facility is accommodated in the City's zoning code. As the exhibits show, proximity allows increases in floor area ratio and maximum building height.

Pittsburgh's transit-supportive land development code allows increased densities near "major transit facilities."

Site Development Standard	UNC District
Minimum Lot Size	0
Maximum Floor Area Ratio	
when not located within 1500 ft. of a Major transit facility	3:1
when located within 1500 ft. of a Major Transit Facility	4:1
Maxiumum Lot Coverage	
Minimum Front Setback	none required
Minimum Rear Setback	
when not adjacent to a way	20 ft.
when adjacent to a way	none required
Minimum Exterior Sideyard Setback	none required
Minimum Interior Sideyard Setback	none required
Maximum Height	
when not located within 1500 ft. of a Major transit facility	45 ft. (not to exceed 3 stories)
when located within 1500 ft. of a Major Transit Facility	60 ft. (not to exceed 4 stories)

SOURCE: City of Pittsburgh Zoning Code

EXHIBIT 6-4 Site Development Standards for Pittsburgh's UNC District

Site Development Standard	HC District
Minimum Lot Size	0
Maximum Floor Area Ratio	
when not located within 1500 ft. of a Major transit facility	2:1
when located within 1500 ft. of a Major Transit Facility	3:1
Maxiumum Lot Coverage	
Minimum Front Setback	none required
Minimum Rear Setback	
when not adjacent to a way	20 ft.
when adjacent to a way	none required
Minimum Exterior Sideyard Setback	none required
Minimum Interior Sideyard Setback	none required
Maximum Height	75 feet (not to exceed 5 stories)

SOURCE: City of Pittsburgh Zoning Code

EXHIBIT 6-5 Site Development Standards for Pittsburgh's HC District

Site Development Standard	UI District
Minimum Lot Size	0
Maximum Floor Area Ratio	
when not located within 1500 ft. of a Major Transit Facility	3:1
when located within 1500 ft. of a Major Transit Facility	4:1
Maximum Lot Coverage	
Minimum Front Setback	none required
Minimum Rear Setback	
when not adjacent to a way	20 ft.
when adjacent to a way	none required
Minimum Exterior Sideyard Setback	10 ft.
Minimum Interior Sideyard Setback	10 ft.
Maximum Height	60 ft. (not to exceed 4 stories)

SOURCE: City of Pittsburgh Zoning Code

EXHIBIT 6-6 Site Development Standards for Pittsburgh's UI District

Ottawa

Overview of TOD Program

In Ottawa, TOD is development that is focused on Mixed-Use Centers. Mixed-Use Centers are "lands that have been identified as strategic locations on the rapid transit network. These nodes can be defined as ... compact, transit-oriented, [and] pedestrian-friendly areas where the highest concentrations of residential, employment, retail, and other uses in the urban area are located." The Transitway and the LRT line are not differentiated with respect to the requirements conditioned on the development of Mixed-Use Centers.

Mixed-Use Centers in Ottawa are allowed only along the rapid transit network.

Several Mixed-Use Centers are identified in the City's Official Plan. The Official Plan and the Transportation Master Plan include policies that regulate transit-supportive land uses, such as locating Mixed-Use Centers at rapid transit stations, so the City is able to impose requirements on TOD by imposing requirements on Mixed-Use Centers. The requirements are intended to achieve employment targets (e.g., 5,000 jobs) and population targets.

Requirements and Incentives

Ottawa requires Community Design Plans for development around rapid transit stations.

To construct a Mixed-Use Center, developers must complete a Community Design Plan for Council approval. Community Design Plans delineate the boundaries of the Mixed-Use Center and guide development in Mixed-Use Centers by regulating how buildings are oriented to the rapid transit network, parking supply (regulated within 1,300 feet), provision of (informal) park-and-ride lots and passenger drop-off zones, compactness of development (regulated through setbacks and building heights), mix of land uses, pedestrian and bicycle accessibility (including direct pedestrian connections), and proximity of employment uses (within 1,300 feet). New regional shopping centers *must* be located on the rapid transit network. Additional requirements may include the following:

- High-density residential uses should occur close to a BRT station, and medium-density residential uses should occur in locations where it can act as a transition to nearby low-density residential neighborhoods.
- Parking requirements may be reduced for developments located within 2,000 feet of a rapid transit (bus or rail) station, after considering factors such as walking distance from the development to the station, the presence and frequency of transit service between the development and the station, and physical barriers in the pedestrian network.
- A maximum parking requirement may be implemented for development located within 1,300 feet of a rapid transit station.
- "Big box" retail uses are permitted only when located within multi-story buildings oriented to the street, with multiple pedestrian entrances, with storefront display windows, and where at least 80% of parking is located underground or within structures.
- Wayfinding signage may be required for the guidance of transit users.

The Community Design Plan requirements apply to existing rapid transit lines as well as rapid transit lines and connections that will be constructed over the next 20 years.

Although there is no formal TOD incentive program, the City of Ottawa offers the following services and opportunities:

- The City provides pre-consultation design assistance where possible. The City encourages all developers to have pre-consultation meetings with City staff.
- The Community Design Plan process provides a basis for consistent community visioning.
- The City is willing to explore joint development opportunities on City-owned lands.
- While Provincial Statutes prohibit waiving municipal charges, permit fees, and inspections fees, there is some provision for Development Charge discounts for projects near transit stations. All residential applicants and developers near transit stations are eligible for these Development Charge discounts.

Before 2001, some of the independent municipalities that are now part of the City of Ottawa offered discounted development charges and reduced parking requirements. The City of Ottawa is developing new zoning that, when

The City of Ottawa is planning to modify parking space requirements near Transitway stations.

implemented in 2006, may include a TOD incentive program. City staff provided the following examples of what the new zoning may allow:

- The maximum parking requirement within 1,300 feet of a transit station is 1 parking space per 455 square feet of development.
- Office uses of more than 25,000 square feet may have a minimum of 1.8 parking spaces for every 1,075 square feet of gross floor area and a maximum of 2.0 spaces per 1,000 square feet.
- Uses in core areas (i.e., within 100 feet of a transit station) may be required to share parking spaces.

City staff indicated that developer response to the TOD requirements varies. Development of properties owned by the federal government was characterized by a "very positive" response, while some private developers were "less positive." This variation was borne out in the surveys of developers, as described later in this chapter.

DEVELOPER PERCEPTIONS

The developer perspective on specific transit service characteristics and components (particularly BRT service characteristics and components) has been addressed to a limited extent in previous research. The research performed for *NCHRP Research Results Digest 294* (3) did not survey developers. The survey of developers and lenders performed for *TCRP Report 102* (2) focused on the financial aspects of TOD projects. Caltrans reports that, "whether real or perceived, many developers believe there are significant barriers to overcome in trying to secure funding for TODs; these barriers include the belief that mixed-use developments are risky, difficulty in appraising TODs using traditional appraisal methods, and a perceived unwillingness of investors to fund developments in central cities."

A survey of developers along San Pablo Avenue in Oakland reported that increased stop spacing and transit preferential treatments were not enough to attract developer interest.

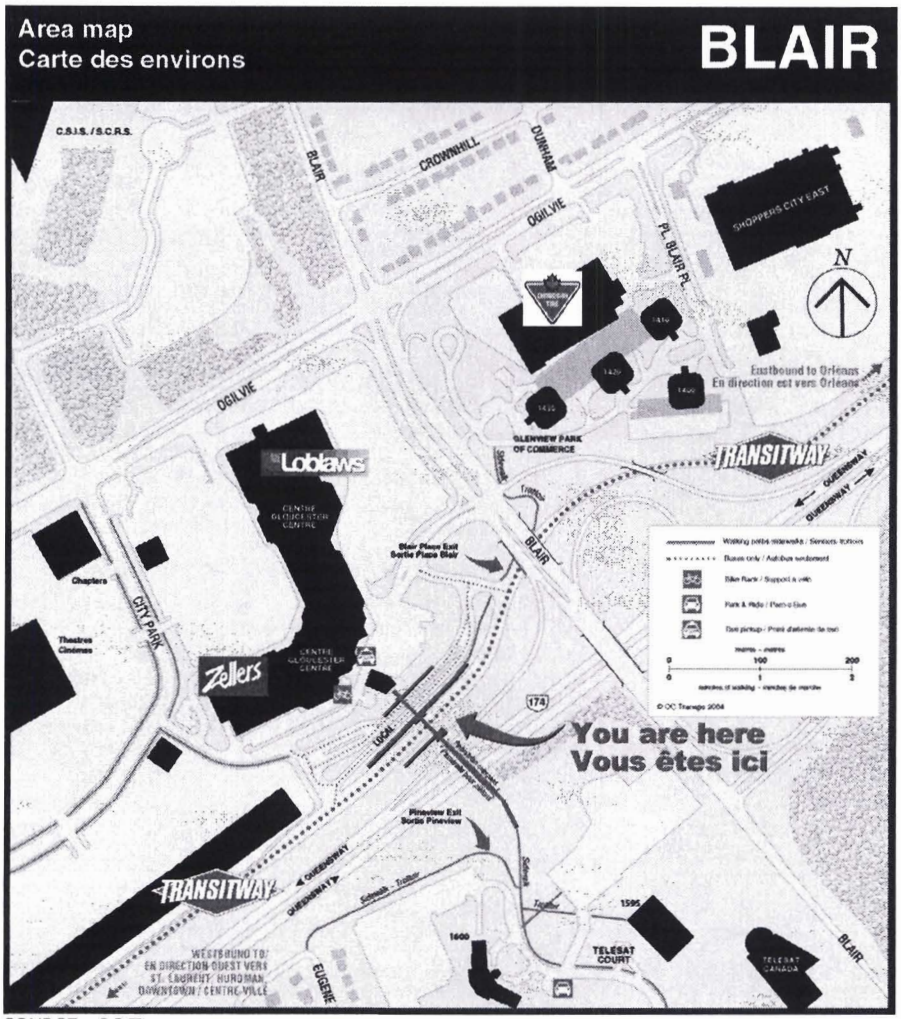
A 2005 study conducted by Mejias and Deakin (*11*) looked at development activity along San Pablo Avenue in Oakland, where the new San Pablo Rapid BRT service runs. This study surveyed 11 developers involved in recent or ongoing residential and mixed-use projects on San Pablo Avenue. A key finding was that developers "...view transit availability as a bonus but not necessarily a major development incentive." A second finding was that a BRT service distinguished from regular local bus service primarily by increased stop spacing and bus preferential treatments is *not* adequate to attract developer interest. A third finding was that factors such as unattractive streetscaping, high crime rates, and confusing and inflexible development regulations can deter developers regardless of the quality of the transit service. Not cited was the proximity of BART stations within a mile of San Pablo Avenue and joint development at some of the other train stations.

Methodology

Special surveys were conducted in Boston and Ottawa to assess the impact of BRT components on land development decisions and perceived differences in BRT and rail transit. Boston was chosen to assess the impact of an arterial street BRT operation (the Silver Line), while Ottawa was chosen to assess the impact of an off-street busway (the Transitway). Transit agency real estate and city/county planning and economic development staff in each city were contacted to review the factors that resulted in added development along the new BRT lines.

Selected developers (including a non-profit agency) in Boston and Ottawa who have made development decisions along the BRT lines were interviewed to obtain

their insights. Developer contacts were identified from the initial local jurisdiction contacts and, in the case of Ottawa, from station area walking maps such as the one in Exhibit 6-7. For developers, the focus was on the hard or design elements of BRT, including stations, running ways, and vehicles. The questions revolved around the factors that influence why developers might be inclined to locate different types of development (i.e., residential, commercial, or mixed-use) within walking distance of BRT stations in different types of environments (i.e., CBD, central city, or suburban) and different features.



SOURCE: OC Transpo

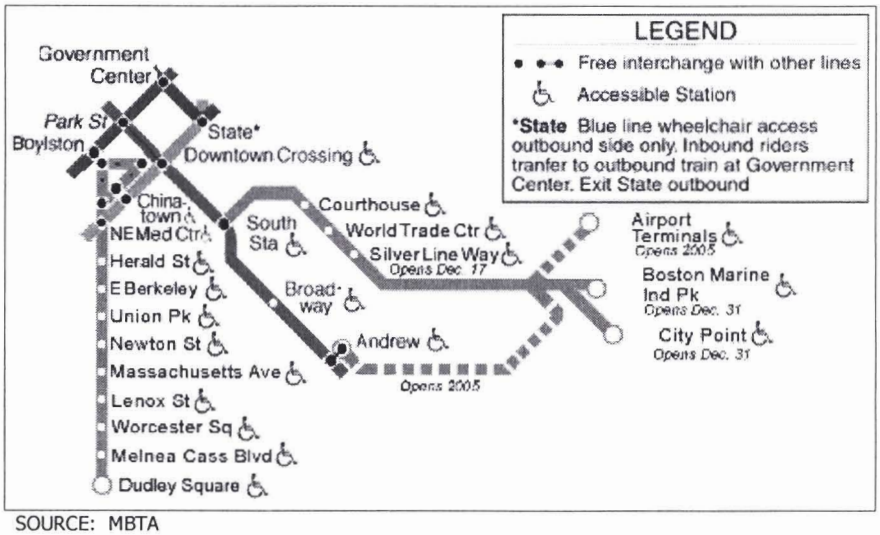
EXHIBIT 6-7 Transitway Station Area Map - Blair Station

Boston

TOD Overview

The first phase of Boston's first BRT project, the Silver Line, opened in July 2002 on Washington Street between the Dudley Square/Roxbury neighborhoods, traveling through the South End and ending at the Downtown Crossing station.

The Washington Street corridor was served by the Orange Line—an elevated heavy rail line—until 1987, when the Orange Line was shifted to right-of-way that had been purchased for a highway. Exhibit 6-8 is a map of the MBTA subway system, which includes the Silver Line.



SOURCE: MBTA

EXHIBIT 6-8 Subway and BRT Map with Silver Line

Most of the second phase, from South Station to Logan Airport, opened in December 2004, and the connection to the airport began operation in 2005. A considerable portion of this segment is located underground, and the press release for the opening read, "New Subway Opens in Boston for First Time Since 1918." (Silver Line schedules are also found under "Subway" on MBTA's web site.) This phase of the Silver Line was built at the same time as a new federal courthouse and new convention center spurred significant construction in the South Boston Waterfront, which was formerly filled with surface parking lots and port access. Massport, a state-created entity charged with management of the airports, bridges, and port facilities, owns much of the property in this area and has been actively involved in encouraging TOD.

A third phase, a bus tunnel, is planned to connect the two initial segments but has encountered challenges from stakeholders along the proposed alignment and the FTA. This connection is important not so much because of the need for trips along the entire length of the corridor but to connect each of the initial phases to all of the existing rail lines to allow for single-transfer trips throughout the entire MBTA system.

The parties that provided input to this research included staff from MBTA, the BRA (a division of the City of Boston), Massport, and the Washington Gateway Main Street program, as well as five developers. One of the developers is a non-profit development corporation.

Summary of Boston Developer Surveys

The Silver Line has clearly played a role in encouraging development along its first two phases, although in each instance the other public investments may have had as much, if not more, influence on the development prospects. All of the

surveyed developers have seen a benefit in the connections to downtown provided by the Silver Line, and some of their projects have less parking because of the adjacent transit. However, most projects still contain on-site structured parking to meet the needs of tenants. Finally, some developers expressed a preference for rail and had concerns about MBTA's long-term commitment to the Washington Street portion of the line and its ability to link the two sections to each other and the entire system.

Important factors underlying development decisions were proximity to the Silver Line, supportive zoning, land availability and cost, and provisions of real-time passenger information. The reconstruction of Washington Street, including widening sidewalks and installing amenities, was perceived (by some) to be as important in making investment decisions as the transit improvement itself.

Factors influencing development along Boston's Silver Line include supportive zoning, land availability and cost, and a reconstructed streetscape.

It is interesting to compare developer interest along the Silver Line with the findings of Mejias and Deakin's San Pablo Avenue study (*11*). In Boston, some developers stated that reconstruction of Washington Street as part of Silver Line development was an attractive component of the BRT project. In Oakland, developers thought that the attractiveness of some sections of San Pablo Avenue was "a bonus" while other sections needed to be improved to enhance "development prospects."

Developers in Boston and Oakland expressed concerns about the "permanence" of BRT.

Both Boston and Oakland developers shared concerns about the "permanence" of BRT investments. Some Boston developers expressed this concern directly by contrasting BRT with heavy rail (a more costly alternative). Some Oakland developers did not know that the San Pablo Rapid service existed, presumably because it runs in mixed traffic and required relatively little reconstruction of San Pablo Avenue.

Ottawa

TOD Overview

The City of Ottawa is a regional government that, since 2001, includes 11 urban and rural communities and 800,000 residents. The City forecasts that the region's population will exceed 1 million within the next 20 years. To accommodate this level of growth, City policies include TOD and the Transitway; TOD projects are located at Mixed-Use Centers according to the relevant policy documents and reports. Such a center was depicted in Exhibit 6-7. When supported by an extensive rapid transit network and deployment of transit preferential treatments, the requirements for Mixed-Use Centers further the City's aim of realizing the highest level of future transit usage that can reasonably be achieved (i.e., a target mode share of 30%).

OC Transpo (the Ottawa transit agency) is a part of the City of Ottawa government, so the transit agency and the city government were not surveyed separately. Surveyed staff included current and former staff. City staff answered the survey questions about development activity near the Transitway and provided copies of several documents that describe elements of the TOD program. These documents include the following:

- City of Ottawa's Official Plan (May 2003)
- City of Ottawa's Transportation Master Plan (September 2003)
- "Land Use Strategies to Support Increased Transit Ridership - A Guidebook" (prepared for the City by Entra Consultants, March 2003)

Developer Involvement in Transitway Development

The City indicated that developers had the opportunity to be involved in the development of the rapid transit network because the City used a very extensive public involvement process during the Rapid Transit Expansion Study, development of the City's Transportation Master Plan, and development of the City's 2020 Growth Management Strategy. The City also regularly has dialogues with the local Homebuilders Association, the local chapter of the Building Owners and Managers Association, and the federal government (which is the largest employer in Ottawa). The level of developer involvement is based primarily on whether a given developer owns property affected by rapid transit network development. Developer involvement is less linked to whether the rapid transit line is a BRT line or an LRT line.

City staff indicated that they could not quantify developers' interest in specific components of BRT (e.g., proximity of station, ridership, quality of pedestrian environment, quality of streetscape/transitway, transit service frequency, and station amenities), but they related the following qualitative observations:

- Developer interest in BRT components is site-specific.
- The federal government (a major landowner and employer in Ottawa) has always had a high level of interest in the BRT components listed above. Public Works and Government Services Canada, a federal agency, is currently preparing a long-term master plan to develop Tunney's Pasture (one of the Transitway stations) in accordance with Official Plan objectives to intensify development and increase ridership.
- Private developers are less interested if there are significant additional costs associated with the BRT components listed above. Private developers generally contribute their share to the Transitway as a result of legislative requirements.
- Developers feel that BRT contributes to the station-area development market. The City does not have trend data to verify this.
- Developers endorse proximity to rapid transit when promoting sales and rentals. The City does not know what effect this has on sales and rentals.

Summary of Ottawa Developer Surveys

The City and developer surveys resulted in the following findings and insights:

- The range of responses from developers was wide in terms of positive and negative viewpoints on TOD and rapid transit systems such as BRT. Much concern seemed to spring from frustration with the timetable of transit line construction and the amount of right-of-way that developers are required to dedicate to transit routes (which are not necessarily separate issues.)

LRT and BRT are not significantly different in Ottawa from the perspective of surveyed developers.

- LRT and BRT are not significantly different from the perspective of virtually all of the surveyed developers in terms of the modes' impact on TOD project success. If this is the case generally, then research completed to understand the developer perspective on land development impacts of LRT could be applied to BRT. One developer indicated a preference for BRT, which was surprising given common assumptions about the relative attractiveness of bus and rail modes.

- The City's perspective on developer interest in BRT components is generally supported by the developer surveys. The City's perspective on developers' views of LRT vs. BRT also is generally supported by the developer surveys. Nevertheless, a disconnect may exist between the perceptions of the development community, transportation professionals, and several classes of the general public regarding which TOD factors (and BRT components) are important, which are not, and how the factors might be ranked. For example, walking distance to transit is important for public agencies and for people who intend to use transit, but not for developers who believe that their target customers do not intend to use transit and/or believe that walking distance is a very insignificant issue in comparison to other development concerns. These ideas of relative value may originate in inconsistent understanding of what rapid transit hopes to achieve and what it is capable of achieving in a given environment.

Caveats

The results of the developer survey described in this chapter were based on a small sample size. In addition to the obvious differences between the two cities (e.g., climate and development character) and expected differences between each developer's business philosophies, Boston and Ottawa have very different transit histories: A new BRT line in Boston complements a mature subway system, while a new LRT line complements an established BRT line in Ottawa. The findings and implications related to TOD influences are likely to reflect these factors.

GUIDELINES

TOD at BRT stations has the benefits of improving mobility choices, reducing reliance on driving and achieving greater sustainability, and enhancing BRT ridership. Suggested guidelines for planning and assessing land development related to BRT follow.

The Guide provides several guidelines for planning and assessing the land development impacts of BRT.

Coordinating BRT with Land Development

The following guidelines will help communities, transit agencies, and developers plan and assess the land development opportunities and impacts along BRT lines:

- BRT, like rail transit, can improve accessibility and increase passenger capacity in the corridors that it serves. It can help increase CBD intensity and encourage development at major development nodes and in outlying areas. Each of these locations offers promise for transit-related development. BRT junctions with major intersecting bus routes also offer promising locations for TOD.
- BRT systems should serve both existing and future markets. Where BRT serves existing markets in built-up areas, the customer base is well-established, but creating new TOD projects may be difficult. Where BRT serves undeveloped areas, it has the opportunity to shape development around it.
- For TOD to be successful, there must be a market for TOD. Only where there is a latent demand for development near transit can significant increases in land value be achieved. Thus, not every BRT route or station can attract development.
- Land should be available at reasonable cost for the intended uses.

- TOD works best in dynamic markets. Strong markets are particularly important for retail developments.
- The BRT route should provide a strong sense of permanence and a clear identity (in addition to faster service) to attract development. Improved (preferably separate) running ways and new urban design features can create a positive climate for investment; a good example of this is the positive development effects of Boston's Washington Street Silver Line.
- The location and design of BRT routes should consider land development opportunities. Vision is important. Urban redevelopment, for example, has been a major consideration underlying Cleveland's Euclid Avenue Transitway.
- Convenient transit passenger access should be provided for developments adjacent to, or integrated with, BRT stations. Attractively designed BRT stations with conflict-free, weather-protected pedestrianways connecting transit stations to adjacent activity centers can have a positive effect on land development. The St. Laurent station along Ottawa's Transitway is an example of such a treatment.
- Site designs for TODs should encourage density, diversity, and walkability. Transit-supportive uses (such as retail, office, and residential) should be encouraged. Mixed-use developments can add interest and variety; however, the various uses do not have to be mixed in the same location.
- Parking policies should support TOD. It is desirable to avoid either too much or too little parking. Parking should be limited, especially adjacent to BRT stations, and structured parking, while costly, may be desirable where land costs are high and space is at a premium. Ottawa's policies, for example, specify a maximum parking requirement of one parking space per 455 square feet of development within 1,300 feet of a BRT station and a maximum of two spaces per 1,000 square feet of office space elsewhere.
- Transit-supportive policies should be established. They can specify where various developments can locate (i.e., zoning), site design and access features, and parking requirements. Ottawa's Official Plan, for example, requires all major centers to be located along its Transitway or LRT system.
- Public-private partnerships should be encouraged. The public sector has the power to resolve land assembly problems, ensure that the site is ready for development, contribute land, and fund infrastructure improvements. Private developers can finance, build, and operate the developments. Working together, they can expedite TOD.
- Service planning should consider that BRT, in contrast to rail transit, can potentially minimize transfers by providing transfer-free neighborhood feeder bus service as well as trunk service.

Stakeholder Perspectives

The various parties involved in TOD may have different perspectives on the value of TOD and TOD design requirements.

The parties involved in BRT and land development (i.e., transit users, tenants, residents, customers, transit agencies, planners, developers, lenders, and local governments) have different perspectives on the value of TOD and specific TOD design requirements. The following guidelines are directed to these differences:

- The surveys conducted for this *Bus Rapid Transit Practitioner's Guide* suggest that, for developers, financial concerns related to TOD requirements, TOD incentives, and demonstrated agency commitment to the BRT (or rail) service are important. These considerations may outweigh the value of the BRT (or rail) service's operating characteristics (e.g., headways and service span).
- The differing perspectives indicate that there is an opportunity to educate the parties involved in the development of TOD projects and BRT lines. For example, developers may benefit by learning more about how their tenants view premium transit services.
- Achieving TOD along BRT lines calls for achieving stakeholder consensus and resolving conflicts by establishing a clear vision and set of goals for a TOD project. *The New Transit Town* (*10*) points out that there can be conflicts between local and regional jurisdictions. These conflicts should be minimized.
- The Executive Summary of the *Statewide Transit-Oriented Development Study* (*1*) identifies three elements required to overcome the unwillingness of investors to finance TOD projects: well-planned phasing, a solid track record for implementing projects and conducting accurate market studies, and availability of multiple sources of capital with varying investment timelines.
- Surveys conducted for the *Bus Rapid Transit Practitioner's Guide* identified the following developer concerns that should be addressed:
  - > Availability of land at a reasonable cost
  - > Land development regulations affecting properties in the vicinity of transit stations (especially those that require dedication of right-of-way to transit facilities)
  - > Agency commitment to the transit corridor
  - > Good connections to regional destinations
  - > Existence of a strong development market
- According to surveys described in Redevelopment and Revitalization Along Urban Arterials (*11*), developers may be discouraged by high development costs, difficulties in obtaining financing because comparable projects do not exist, limited development incentives, incompatible surrounding land uses, small parcel sizes, confusing codes, inflexible development regulations, slow review processes, high vehicle speeds, excessive parking requirements, high crime rates, environmental conditions, and certain state laws. Developers may be encouraged by density bonuses, low land costs in redevelopment zones, exemptions from state environmental review laws, coordinated streetscaping projects, pooled open space requirements, city efforts to reduce crime, city assistance with neighborhood communication, shortened review periods, and clearer zoning codes.

The following guidelines concern specific BRT components:

- Attractively designed BRT stations with conflict-free, weather-protected pedestrian-ways connecting transit stations to adjacent activity centers can have a positive effect on land development.

Attractively designed stations can have a positive effect on land development.

- "More defined stations attract potential development," according to CBRT (*9*).
- BRT services that do not operate in a fixed guideway may not attract developer interest according to Redevelopment and Revitalization Along Urban Arterials (*11*).

Evaluating TOD Programs

TODs often evolve over a long time frame (as in Ottawa and Pittsburgh). They should be periodically evaluated for effectiveness and possible changes in public policy or public-private arrangements. The components of a recommended TOD evaluation program are shown in Exhibit 6-9. The exhibit describes the usefulness of each indicator, the ease of collecting the data necessary to evaluate each indicator, and frequency of monitoring for each indicator. Once the initial evaluation program is established, subsequent updates should be less costly. *NCHRP Research Results Digest 294* (*3*) suggests that, because construction of a BRT line is typically less expensive than construction of a rail line, surveys of land development impacts could be funded with the cost savings.

EXHIBIT 6-9 Indicators Recommended as the Foundation of a TOD Evaluation Program

Indicator	Usefulness Score[1]	Ease of Data Collection Score[2]	Frequency of Monitoring[3]
Transit Ridership	70	61	More than once a year
Density (Population/Housing)	67	—	Once a year
Quality of Streetscape Design	77	—	Once a year
Quantity of Mixed-Use Structures	60	54	Once a year
Pedestrian Activity/Pedestrian Safety	60	59	Once a year
Increase in Property Value/Tax Revenue	63	57	Once a year
Public Perception	63	—	Once a year
Mode Connections at the Transit Station	63	79	Once a year
Parking Configuration	53	62	Once a year

[1] Percentage of survey respondents rating indicator as "Very Useful"

[2] Percentage of survey respondents rating indicator as "Very Easy" to collect data

[3] *NCHRP Research Results Digest 294* (*3*) reports that the majority of indicators studied should be collected once a year or less often according to survey respondents. A key exception is Transit Ridership, which most respondents stated should be collected more often than once a year.

SOURCE: *NCHRP Research Results Digest 294* (*3*)

In general, BRT systems are likely to attract levels of ridership (comprising customers, residents, and employees) like those of rail systems with similar service characteristics. Property values can increase near a BRT station beyond that observed in more distant locations.

Resource Materials

General TOD information is available from many other sources.

Some potential resources for BRT-related TOD program evaluation include the following:

- *NCHRP Research Results Digest 294: Transit-Oriented Development: Developing a Strategy to Measure Success* (*3*), available through TRB, gives indicators for monitoring TOD programs. It suggests that "...transit agencies/state DOTs/MPOs set aside special funds for TODs to support pedestrian activity surveys, resident and merchant surveys, analyses of property values and taxes, design assessment, and density tracking."

- The Center for Transit-Oriented Development maintains the National TOD Database, which is a "GIS [geographical information system] database that combines a current demographic snapshot of who presently lives near transit with information on travel behavior in each transit region of the country." A promising potential application of this database is the ability to derive historical trends and before-and-after comparisons of station area development.
- The Center for Transit-Oriented Development and the Urban Land Institute have published several reports and case studies about the impacts of TOD in general and factors in successful TOD projects.
- The BRT Institute at the Center for Urban Transportation Research is a clearinghouse of information about existing and planned BRT services.
- VTPI's Online TDM [Transporation Demand Management] Encyclopedia (http://www.vtpi.org/tdm/) summarizes many sources of TOD and TOD-related information.
- The U.S. Census provides relevant demographic data (e.g., population densities) in a variety of formats.
- Building permit data, vacancy rates, rental prices, and home value data can be obtained from local governments to track development activity and demand for development near BRT stations.
- Local government staff (from planning, economic development, and real estate departments) can provide information about new projects, developer response to TOD program requirements and incentives, and TOD trends.
- Transit agency staff can provide information about new projects, developer response to TOD program requirements and incentives, and TOD trends
- Other comprehensive TOD research reports and studies include the following:
  - > *TCRP Report 102: Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects* (2), available through TRB
  - > *Developing Around Transit: Strategies and Solutions that Work* (8), available from the Urban Land Institute
  - > *The New Transit Town* (10), edited by Dittmar and Ohland and available from Island Press

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