MCPB
Item No. 6
Date: 05-10-12

Subdivision Staging Policy: 2012 Draft Transportation Policy Area Review Worksession #2

Eric Graye, Planning Supervisor, Functional Planning & Policy Division, eric.graye@montgomeryplanning.org, 301.495-4632

Mary Dolan, Chief, Functional Planning & Policy Division, mary.dolan@montgomeryplanning.org, 301.495-4552

Completed: 05-03-12

Description

The County Council has asked the Planning Board to develop a new area wide transportation test as part of the 2012 Subdivision Staging Policy. The test currently in force, the Policy Area Mobility Review or PAMR, has been used since 2007 to show where transit and arterial roadway mobility is inadequate and require mitigation in the form of facilities or fees in order to obtain development approval in these areas. The Transportation Policy Area Review (TPAR) is proposed to replace PAMR as the area wide test.

The Initial Draft of the 2012 Transportation Policy Area Review (TPAR 12) Report was provided to the Montgomery County Planning Board on March 29, 2012 and was also posted on the Board's agenda website so as to be available to interested parties. A presentation and briefing on the Initial Draft was given to the Board on April 5, 2012. Based on comments by the Board some revisions were made to the report and a Revised Draft dated April 6, 2012 was substituted on the website. A Stakeholder Forum was held on April 9, 2012 and was attended by some half dozen interested parties and staff. An internal coordination meeting on the particulars of the report was held with staff of MCDOT on April 11, 2012. The Board's Public Hearing was held on April 19, 2012 and followed by an agenda item on the process for the 2012 Subdivision Staging Policy of which the TPAR 12 Report will be an element. Two letters were received and one person testified at the Public Hearing. The Board and the public raised several issues, many of which were addressed at a Planning Board Worksession #1 on May 3, 2012. **Issues not addressed at that worksession will be addressed at this worksession. If necessary, another worksession will be scheduled on May 17, 2012 to address any outstanding issues before transmitting the report and draft resolution to the County Council.**

Summary

This memorandum responds to outstanding issues not addressed at the May 3, 2013 Planning Board worksession. As appropriate, it also identifies selected issues that may warrant further discussion. **The issues and responses are generally sequenced in the order of the six Sections of the Draft (revised) TPAR 12 Report and staff recommendations are shown in bold type.** It is anticipated that the Board's review in this second worksession will follow the sequence of this memorandum.

There were no comments on Sections I and II. Therefore, the memorandum begins with Section III.

Section III: Details of the Transportation Policy Area Review Process

The following sections of the report were discussed at the May 3, 2012 Planning Board worksession. Unless the Board asked for additional information or has unresolved issues, the worksession will start with Part 2 (e).

Part 1: Identify Transit Inadequacies and Solutions: Regarding the transit component of TPAR, several comments or issues were raised in the testimony and/or by the Board about: (a) having separate adequacy measurements for transit and roadways, (b) the appropriateness of the proposed categorization of policy areas as urban, suburban or rural (see Exhibit 3.3, page 14, in the TPAR 12 report), (b) the appropriateness of the proposed transit quality of service standards (see Exhibit 3.4, page 15, in the TPAR 12 report), (d) is there too much of a focus on "peak headway" solutions, (e) issues related to "coverage", and (f) issues related to "span duration."

Part 2: Identify Roadway Inadequacies and Solutions: Regarding the roadway component of TPAR several comments or issues were raised in the testimony and/or by the Board about: (a) separately measuring the flow in the peak and non-peak directions, (b) how the Average Levels of Service for roadways were set for the Urban, Suburban, and Rural Area Categories, (c) are the "Standards of Acceptable Roadway Average Levels of Service" set too low, (d) more information is desired about how "free-flow" speed is defined and calculated and how stable are the defined values expected to be, (e) is reliance of the identified listing of Unbuilt Master Plan improvements too constricting and is Step 16 not sufficient, and (f) Adequacy of a Policy Area roadways versus a need to have the performance of each roadway being adequate, and (g) include a sample calculation in the report that shows how the peak flow direction and the non-peak flow direction average levels of service are calculated for an individual roadway section that also demonstrates the procedure for weighting by Vehicle-Miles-of Travel (VMT).

- **Reliance of the listing of Un-built Master Plan improvements for identifying roadway improvement solutions**: At the Board's discrection, this general issue may warrant futher discussion beyond that which occurred at the May 3, 2012 worksession.

- **Adequacy of a Policy Area roadway average versus the adequacy of each roadway in the Policy Area**: While general aspects of this issue were discussed at the May 3, 2012 worksession, the testimony was related to the forecast roadway performance for MD 547, (Strathmore and Knowles Avenues). *More discussion of the particulars as they relate to these roadways in the North Bethesda and in the Kensington Wheaton Policy Areas is provided in Section VI, the Application of TPAR to Each Policy Area.*

- **Sample Calculation:** Staff will prepare a sample calculation that could go in the TPAR 12 report that shows how peak flow direction and non-peak flow direction average levels of service are calculated for an individual roadway section, which also demonstrates the procedure for weithting by Vehicle-Miles-of-Travel (VMT). This information is summarized in a PowerPoint that will be presented to the Board on May 10, 2012.**Additional Information about Free-Flow Speeds**: The Board requested more information regarding whether the "free flow" auto speeds derived from transportation model are "realistic" (i.e., do the "free

flow" speeds compare favorably to "posted speed limit" speeds.). *This information is summarized in a PowerPoint that will presented to Board on May 10, 2012.*

Part 3: Allocate Costs for Needed Improvements: *For reference, the May 3, 2012 staff memo discussion of this item is provided below. At the Board's discretion, more discussion of this item may be warranted at the May 10, 2012 worksession*.

The Montgomery County Civic Federation (MCCF) submitted written testimony at the April 19th Public Hearing that included comments regarding the proposed TPAR cost allocation process. Staff's responses to these comments are noted below.

- **Complexity of the Process** – Staff agrees that aspects of the proposed cost allocation process are complex. This a key reason why this process must be undertaken as a collaborative effort using the cost-estimation engineering expertise of MCDOT staff in combination with the travel demand forecasting capability of M-NCPPC staff.

- **Annual Adjustment of Maximum and Minimum TPAR Payment** - This adjustment would be determined based on the prevailing national and regional construction cost indices as identified by MCDOT and M-NCPPC staffs.

- **Timing of Collection of TPAR Payment** - The MCCF believes that the collection of the entire TPAR payment prior to the release of building permits is far wiser than instituting a complex multi-year plan. Staff will discuss this issue with the Planning Board.

Some key areas where the Board can provide guidance to the Council concerning this matter are steps 25, 26a and 26b as described on page 29 of the TPAR 12 report. This discussion is provided below.

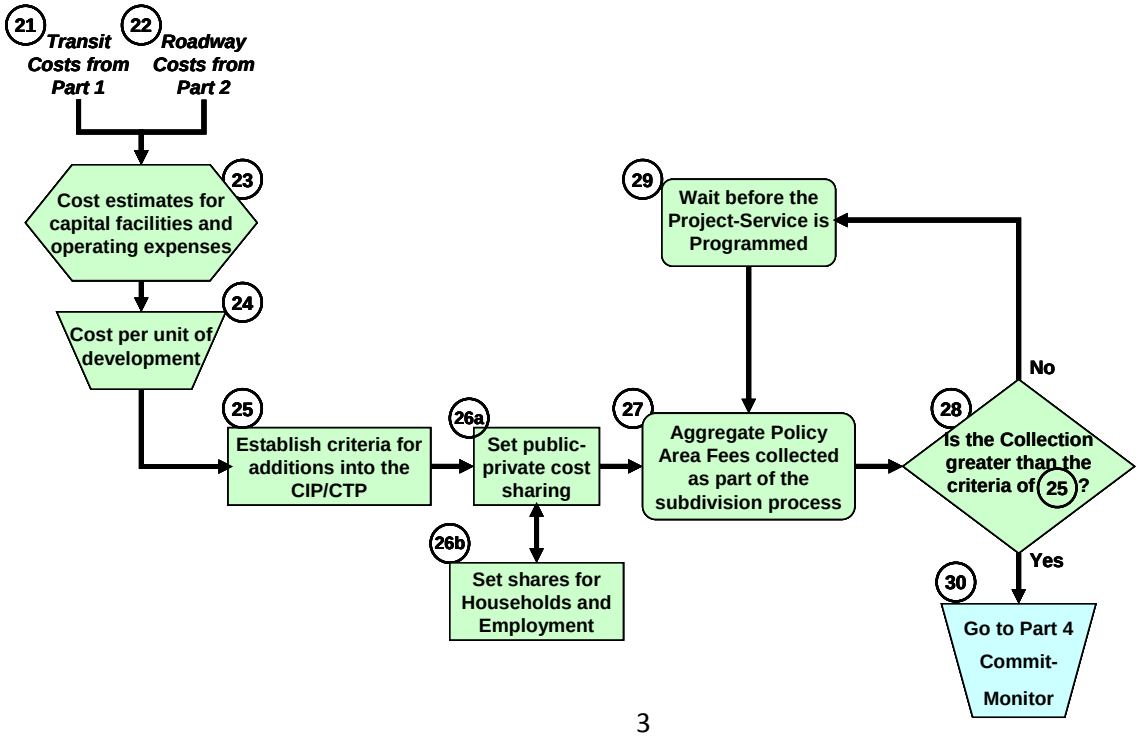


Exhibit 3.11: Develop and Allocate Costs of the Needed Improvements

(Source: Proposed TPAR Report, April 2010)

Step 25 – Establish Criteria for Additions into the CIP/CTP: The cost components described above (i.e., roadway, major capital transit and local bus transit) would be combined to develop a total TPAR cost (by policy area). The determination of TPAR costs, for both roadway and transit projects, would be a collaborative effort between MCDOT and Planning Board staff. MCDOT would take the lead on developing cost estimates for both roadway and transit projects need to meet adequacy standards. Planning Board staff would develop evening peak hour trip estimates, produce cost per trip estimates and calculate TPAR payments (by Policy Area) based on the public/private cost sharing allocation paradigm discussed below.

This step would also rely on criteria set and refined by the elected officials that can result in using TPAR to better stage growth by **specifying the collection level** that triggers the programming of projects in each Policy Areas. However, the overall processes for proposing and approving the CIP as well as the CTP will need to be followed. This Step also relates to Step 32 discussed in Part 4, below.

Step 26a and 26b – Set Public-Private Cost Sharing and Shares for Households and Employment: The TPAR methodology gives elected officials the ability and responsibility to set a public/private cost sharing participation for each Policy Area. The level of public financing could be assessed in various ways, such as these four options:

(1) the same for all areas of the County;
(2) separately for each policy area;
(3) by geographic category (Urban, Suburban, and Rural); or
(4) by assigning priorities for development to each Policy Area.

As a starting point for discussion of the public/private partnership, the implementation of TPAR under Option (4) offers desirable flexibility. As one possibility, three different levels of priority for development: high, medium and low, could be considered. In high priority policy areas, the costs of the improvements be split 2/3 public – 1/3 private. In medium priority policy areas the split could be at 50 - 50. For low priority policy areas for development, the split could be 1/3 public – 2/3 private.

Policy Areas where elected officials want to encourage development will be identified as high priority and so on. In any case, under TPAR development can proceed, with payment, in all policy areas. In low priority areas, the private sector will carry a higher burden.

It is important to point out that it is the policy intent of TPAR that there will be no Policy Areas where development will be stopped outright due to inadequate areawide transportation. At the same time it is also important to note that the policy intent of TPAR in letting development proceed is that elected officials are also providing a high degree of certainty and commitment to

ensure that the transportation solutions to accommodate such development are implemented in a timely manner.

Part 4: Program Public Commitments: *For reference, the May 3, 2012 staff memo discussion of this item is provided below. At the Board's discrecition, more discussion of this item may warrented at the May 10, 2012 worksession.*

Under TPAR, once developers pay the TPAR payment, their development proceeds in accordance with the regular subdivision process. The County continues to collect the TPAR payment as more developments are approved. As part of the TPAR process, the County Government must designate the highest priority transportation improvement for each Policy Area with inadequate LOS from the list of un-built Master Planned transportation projects. When programmed, the needed improvement(s) must be identified as a committed project in the CIP, CTP or Operating Budget and scheduled and implemented within the 10 year time frame.

As TPAR revenues are collected, they are applied to the improvement of transit service and roadway construction on a "proportional basis" to the transit and roadway cost deficiencies. The roadway component is dedicated to the highest priority improvement in the Policy Area where the development is proposed to occur. When a certain percentage of the cost of the highest priority capital project serving a given Policy Area is collected, the County programs the project or service. Exhibit 3.12 below indicates the general sequence of these activities related to the programming of public commitments. (See Steps 31 – 34 below).

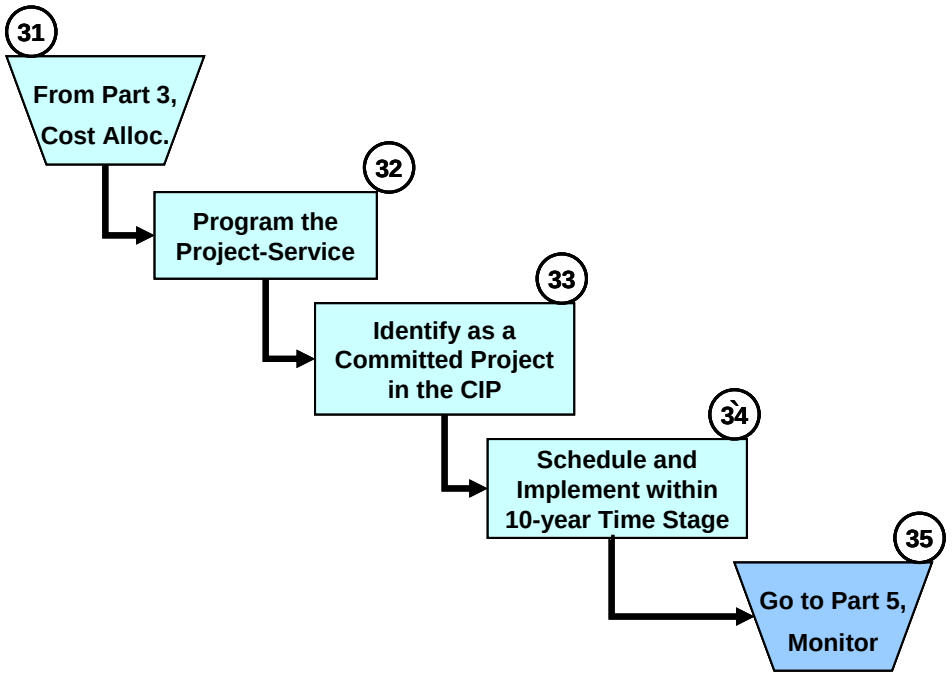


Exhibit 3.12: Programming Public Commitments – Monitor and Report Progress

(Source: adapted from the Proposed TPAR Report, April 2010)

Step 32 – Program the Project and/or Service: As noted in the Part 3 discussion above, elected officials can use the TPAR to **specify the collection level** that triggers the programming of projects in each Policy Areas. That is shown in above in Exhibit 3.11 as Step 25, "establishing criteria for additions into the CIP/CTP."

TPAR recommends the initial level to trigger programming of a capital project to be ten percent of the estimated construction cost multiplied by the selected public-private cost sharing ratios identified as part of Step 26 in Exhibit 3.11, above in Part 3. This criteria seems reasonable given that for a typical roadway project, the engineering design cost varies between eight and twelve percent. With this recommendation, a project would be programmed when the expected private participation for the project covers the portion of the design cost attributable to the private sector. MCDOT may need to program funding in advance of receiving private funds, especially for design and engineering of complex projects, or equipment that requires a long lead time. The County will request needed improvements to state roads as a priority in state budgets.

As an example, if the cost of the highest priority road project in a Policy Area has an estimated construction cost of $10 million, and the share ratio of public-private participation for that area is 2/3 public – 1/3 private, then that capital project should be programmed when a total of $333,333 is collected in TPAR payments in that area ($10,000,000 * 0.1 * 0.333). No other capital project in the area would be programmed until enough TPAR payments are collected to pay for the private allocation share of the total cost of that project. After the private share for a project is collected, then additional TPAR payments are accumulated to program the second highest priority capital project, following the same procedure as for the first one.

Staff Recommendation: Staff recommends the public financing Option (4) as described in Part 3 (Steps 26a and 26b) above.

Section IV: Ways that TPAR Differs from the Current PAMR Methodology:

As described in the TPAR 12 report …

TPAR differs from the existing PAMR in many respects. TPAR:

1. Uses separate adequacy standards for transit service and roadway operations.

2. Defines transit standards in a simple, easy to understand manner, consistent with the County's Transit Strategic Plan.

3. Uses roadway congestion in the PM peak direction of travel to measure adequacy, rather than the weighted average of both directions.

4. Recommends specific roadway projects and transit service additions to improve the transportation network in a Policy Area where inadequacies are found.

5. Uses a 10-year forecast of development activity rather than the "pipeline" of approved development.

6. Analyzes variable transportation scenarios to serve the forecast of development activity for the next 10 years. The current PAMR method analyzes variable amounts of

development activity that could be supported by the set programmed transportation improvements of the CIP and CTP.

7. Examines the within-Policy Area roadway and transit performance, not just the overall average for the area. TPAR presents information for the arterial roadways serving Policy Areas. Such analyses show that while the overall average for an area may be inadequate, there are still many arterial roads that operate at acceptable congestion levels. In addition, TPAR presents information on the transit system performance of Policy Areas based on three metrics: span of service, coverage and peak headway.

8. Closely ties development approvals with the programming and timely implementation of transportation solutions.

9. Clearly identifies public-private cost sharing responsibilities, and ensures services are programmed and funded in the Policy Areas where development occurs.

10. Requires regular monitoring and reporting of conditions of the key elements of the policy and requires the cooperation of the Executive Branch and MNCPPC in the formulation of solutions and adjustments to the Policy when there are discrepancies between the plans and the in-the-field realities.

11. Firmly ties the Growth Policy to the CIP, CTP and the Operating Budget.

12. Provides an open, iterative process and identifies for elected officials specific transportation projects to select to ensure balance in transportation – development activity within a " rolling" ten year (on average) time frame.

Section V: Application of TPAR to Policy Areas and Local Area Transportation Reviews

As part of the analysis for the Transportation Master Plan – Costing Stage additional specific transportation solutions should be considered countywide and for particular Policy Areas. Further, the discussion by the Board identified several issues either related to a broader vision for TPAR as an element of the Subdivision Staging Policy including better consideration of regional interdependencies of future balances between land use planning and regulation staging and the timing of transportation solutions to adequately serve that planned pattern of development.

It is recommended that discussion of these types of issues be reserved for a future presentation to the Board on the Subdivision Staging Policy process that will take place in June, 2012.

Section VI: Application of TPAR to Each Policy Area:

Regarding the Application of TPAR to Each Policy Area, there were several general comments and a few specific ones as well, which include the following: (a) improvements that could be made to the graphics depicting the roadway networks in each Policy Area, (b) Adequacy of a Policy Area roadways versus a need to have the performance of each roadway being adequate, and (c) consideration of identifying additional particular transit and/or roadway solutions in particular Policy Areas.

A response to these concerns will be provided in a PowerPoint that will be presented to the Board on May 10th.

TPAR and the Subdivision Staging Policy (SSP)

The County Council requested that the Planning Board prepare the TPAR test two months in advance of the remainder of the items in the Subdivision Staging Policy. County Code requires that the Council adopt a new Subdivision Staging Policy by November 15, 2012. The Subdivision Staging Policy is adopted as a Council resolution and the areawide transportation test is separable (see sections highlighted in **bold** below) and can be adopted earlier and folded into the full Subdivision Staging Policy resolution in November if the Council wishes. As currently organized, the 2009 Subdivision Staging Policy resolution contained the following sections:

- Applicability
- Guidelines for the Administration of the Adequate Public Facilities Ordinance
- Guidelines for Transportation Facilities
    - Policy Area Boundaries and Definitions
    - **Policy Area Mobility Review (Replace with Transportation Policy Area Review)**
    - Local Area Transportation Review
    - **Alternative Review Procedures (allows developments in Metro Station Policy Areas to avoid the PAMR and LATR tests and fees if the applicant adheres to specific conditions)**
- Public School Facilities
- Guidelines for Water and Sewerage Facilities
- Guidelines for Police, Fire and Health Services
- Guidelines for Re-subdivisions
- Timely Adequate Facilities Determination and Local Area Transportation Review under Chapter 8

The County Council resolution adopting the 2009-2011 Growth Policy attached is (as amended by two subsequent Council resolutions) and includes "tracked changes" suggesting draft language that would establish the Transportation Policy Area Review in accordance with the staff recommendations. This proposed language is currently under review by the Montgomery Department of Transportation and our review staff. Further revisions may be presented at the worksession for Planning Board consideration. If substantive revisions are made at the worksession, the final language will be presented to the Planning Board at the May 17, 2012 meeting for final approval before transmittal to the County Council.

Staff Recommendation: Transmit the draft TPAR 12 report and TPAR-related Subdivsion Staffing Policy draft resolution language to the County Council by May 20, 2012.

ATTACHMENTS

1. Proposed Draft Resolution
2. TPAR 12 PowerPoint Presentation

EG/MD/kr

Attachment 1

Resolution No: 16-1187 (as amended)
Introduced: November 10, 2009
Adopted: November 10, 2009

NOTE: THIS INCLUDES LANGUAGE FROM SUBSEQUENT RESOLUTIONS 16-1324 AND 17-222.

COUNTY COUNCIL
FOR MONTGOMERY COUNTY, MARYLAND

By: Council President at the request of the Planning Board

SUBJECT: 2009-2011 Growth Policy

Background

1. County Code §33A-15 requires that no later than November 15 of each odd-numbered year, the County Council must adopt a Growth Policy to be effective until November 15 of the next odd-numbered year, to provide policy guidance to the agencies of government and the general public on matters concerning land use development, growth management and related environmental, economic and social issues.

2. On August 1, 2009, in accordance with §33A-15, the Planning Board transmitted to the County Council its recommendations on the 2009-2011 Growth Policy. The Final Draft Growth Policy as submitted by the Planning Board contained supporting and explanatory materials.

3. On September 22, 2009, the County Council held a public hearing on the Growth Policy**.**

4. On October 6, 19, and 20, 2009, the Council's Planning, Housing, and Economic Development Committee conducted worksessions on the recommended Growth Policy.

5. On October 27 and November 3, 2009, the Council conducted worksessions on the Growth Policy, at which careful consideration was given to the public hearing testimony, updated information, recommended revisions and comments of the County Executive and Planning Board, and the comments and concerns of other interested parties.

Action

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

The Growth Policy is approved as follows:

Applicability; transition

AP1 Effective dates

This resolution takes effect on January 1, 2010, and applies to any application for a preliminary plan of subdivision filed on or after that date, except that Section S (Public School Facilities) takes effect on November 15, 2009.

AP2 Clarksburg effective dates

This resolution does not apply to any amendment or extension of a preliminary plan of subdivision in the Clarksburg policy area that was approved before this resolution took effect if the amendment or extension does not increase the amount of housing units or non-residential development previously approved.

Guidelines for the Administration of the Adequate Public Facilities Ordinance

County Code Section 50-35(k) ("the Adequate Public Facilities Ordinance or APFO") directs the Montgomery County Planning Board to approve preliminary plans of subdivision only after finding that public facilities will be adequate to serve the subdivision. This involves predicting future demand from private development and comparing it to the capacity of existing and programmed public facilities. The following guidelines describe the methods and criteria that the Planning Board and its staff must use in determining the adequacy of public facilities. These guidelines supersede all previous ones adopted by the County Council.

The Council accepts the definitions of terms and the assignment of values to key measurement variables that were used by the Planning Board and its staff in developing the recommended Growth Policy. The Council delegates to the Planning Board and its staff all other necessary administrative decisions not covered by the guidelines outlined below. In its administration of the APFO, the Planning Board must consider the recommendations of the County Executive and other agencies in determining the adequacy of public facilities.

The findings and directives described in this Growth Policy are based primarily on the public facilities in the amended FY ~~2009-14~~2011-16 Capital Improvements Program (CIP) and the Maryland Department of Transportation FY ~~2009-14~~2011-16 Consolidated Transportation Program (CTP). The Council also reviewed related County and State funding decisions, master plan guidance and zoning where relevant, and related legislative actions. These findings and directives and their supporting planning and measurement process have been the subject of a public hearing and review during worksessions by the County Council. Approval of the findings and directives reflects a legislative judgment that, all things

considered, these findings and procedures constitute a reasonable, appropriate, and desirable set of growth limits, which properly relate to the ability of the County to program and construct facilities necessary to accommodate growth. These growth limits will substantially advance County land use objectives by providing for coordinated and orderly development.

These guidelines are ~~not~~ intended to be used as a means for government to ~~avoid~~ fulfill its responsibility to provide adequate public facilities. Biennial review and oversight allows the Council to identify problems and initiate solutions that will serve to avoid or limit the duration of any moratorium on new subdivision approvals in a specific policy area. Further, alternatives may be available for developers who wish to proceed in advance of the adopted public facilities program, through the provision of additional public facility capacity beyond that contained in the approved Capital Improvements Program, or through other measures that accomplish an equivalent effect.

The administration of the Adequate Public Facilities Ordinance must at all times be consistent with adopted master plans and sector plans. Where development staging guidelines in adopted master plans or sector plans are more restrictive than Growth Policy guidelines, the guidelines in the adopted master plan or sector plan must be used to the extent that they are more restrictive. The Growth Policy does not require the Planning Board to base its analysis and recommendations for any new or revised master or sector plan on the public facility adequacy standards in this resolution.

Guidelines for Transportation Facilities

TP Policy Areas

TP1 Policy Area Boundaries and Definitions

For the purposes of transportation analysis, the County has been divided into 376 areas called traffic zones. Based upon their transportation characteristics, these areas are grouped into transportation policy areas, as shown on Map 1. In many cases, transportation policy areas have the same boundaries as planning areas, sector plan areas, or master plan analysis (or special study) areas. The policy areas in effect for 2009-2011 are: Aspen Hill, Bethesda CBD, Bethesda-Chevy Chase, Clarksburg, Cloverly, Damascus, Derwood, Fairland/White Oak, Friendship Heights, Gaithersburg City, Germantown East, Germantown Town Center, Germantown West, Glenmont, Grosvenor, Kensington/Wheaton, Montgomery Village/Airpark, North Bethesda, North Potomac, Olney, Potomac, R&D Village, Rockville City, Rockville Town Center, Rural East, Rural West, Shady Grove, Silver Spring CBD, Silver Spring/Takoma Park, Twinbrook, Wheaton CBD, and White Flint. The following are Metro Station Policy Areas: Bethesda CBD, Friendship Heights, Glenmont, Grosvenor, Rockville Town Center, Shady Grove, Silver Spring CBD, Twinbrook, Wheaton CBD, and White Flint. Boundaries of the policy areas are shown on maps 2-33.

The boundaries of the Gaithersburg City and Rockville City policy areas reflect existing municipal boundaries, except where County-regulated land is surrounded by city-regulated land. The boundaries of these municipal policy areas do not automatically reflect any change in municipal boundaries; any change in a policy area boundary requires affirmative Council action.

TP2 Transportation Policy Area ~~Mobility~~ Review

TP2.1 Components of ~~Tranportaion~~Transportation Policy Area ~~Mobility~~ Review

There are two components to Transportation Policy Area ~~Mobility~~ Review: ~~*Relative Arterial Mobility*~~*Roadway Adequacy* and ~~*Relative Transit Mobility*~~*Transit Adequacy* for each policy area.

TP2.1.1 ~~Relative Arterial Mobility~~Roadway Adequacy

~~*Relative Arterial Mobility*~~*Roadway adequacy* is a measure of congestion on the County's arterial roadway network. It is based on the *urban street delay level of service* in the ~~2000~~ 2010 Highway Capacity Manual, published by the Transportation Research Board. This concept measures congestion by comparing modeled (congested) speeds to free-flow speeds on arterial roadways. It then assigns letter grades to the various levels of roadway congestion, with letter A assigned to the best levels of service and letter F assigned to the worst levels of service. For a trip along an urban street that has a free-flow speed (generally akin to posted speed) of 40 MPH, LOS A conditions exist when the actual travel speed is at least 34 MPH, including delays experienced at traffic signals. At the other end of the spectrum, LOS F conditions exist when the actual travel speed is below 10 MPH.

~~Relative Arterial Mobility~~Roadway Travel Speed and Arterial LOS

If the actual urban street travel speed is	~~*PAMR*~~ *TPAR Arterial LOS is*
At least 85% of the free-flow speed	A
At least ~~70~~68% of the highway speed	B
At least 55% of the highway speed	C
At least 40% of the highway speed	D
At least 25% of the highway speed	E
Less than 25% of the highway speed	F

The following are the standards established to assess the level of roadway adequacy for the purposes of the Transportation Policy Area Review:

Standards of Acceptable Roadway Average Level of Service

Proposed Roadway (Arterial) Level of Service Standards	
Policy Area Categories	**Acceptable Weighted Arterial Level of Service**
Urban	Average congestion of "D/E" borderline in the peak directions
Suburban	Average congestion of Mid-"D" or less in the peak directions
Rural	Average congestion of "C/D" borderline in the peak directions

~~Any policy area with an actual urban street travel speed equal to or less than 40 percent of the highway speed must be considered acceptable with full mitigation for transportation.~~

~~The PAMR~~TPAR evaluates conditions only on the arterial roadway network. Freeway level of service is not directly measured because County development contributes a relatively modest proportion of freeway travel, and because the County has limited influence over the design and operations of the freeway system. However, because arterial travel is a substitute for some freeway travel, ~~PAMR~~ TPAR indirectly measures freeway congestion to the extent that travelers choose local roadways over congested freeways.

TP2.1.2 ~~Relative~~ Transit ~~Mobility~~Adequacy

~~*Relative transit mobility* is based on the Transit/Auto Travel Time level of service concept in the 2003 *Transit Capacity and Quality of Service Manual* published by the Transportation Research Board. It is defined as the relative speed by which journey to work trips can be made by transit, as opposed to by auto. This concept assigns letter grades to various levels of transit service, so that LOS A conditions exist for transit when a trip can be made more quickly by transit (including walk access/drive access and wait times) than by single occupant auto. This LOS A condition exists in the Washington region for certain rail transit trips with short walk times at both ends of the trip and some bus trips in HOV corridors. LOS F conditions exist when a trip takes more than an hour longer to make by transit than by single occupant auto.~~

~~This ratio between auto and transit travel times can also be expressed in an inverse relationship, defined by modal speed. If a trip can be made in less time by transit than by auto, the effective transit speed is greater than the effective auto speed. Based on the typical roadway network speed during the AM peak period, the Planning Board established the following relationship between auto and transit trips:~~

~~**Relative Transit Mobility and Transit LOS**~~

~~*If the effective transit speed is*~~	~~*PAMR Transit LOS is*~~
~~100% or more (e.g., faster) than the highway speed~~	~~A~~
~~At least 75% of the highway speed~~	~~B~~
~~At least 60% of the highway speed~~	~~C~~
~~At least 50% of the highway speed~~	~~D~~
~~At least 42.5% of the highway speed~~	~~E~~
~~Less than 42.5% of the highway speed~~	~~F~~

~~Any policy area with an effective transit speed equal to or less than 42.5 percent of the highway speed must be considered acceptable with full mitigation for transportation.~~

Transit Adequacy is determined by comparing bus route coverage, scheduled headways and actual hours of operation (span) based on 2012 data to established standards as illustrated in the table below. Areas shown in yellow highlight are considered inadequate for transit service. *Note: This table will have to be re-formatted in black and white for Council consideration.*

Transit Adequacy Analysis Results TPAR 2012 (4-5-12)				
	Number of Bus Routes	**Coverage** (Percent of area within 1 mi. rail; 1/3 mi.of bus)	**Peak Headway** by Bus in PM Peak Hour (min.)	**Span**: Duration of Weekday Bus Service (hours)
"Urban" Policy Areas served by Metrorail				
Silver Spring/Takoma Park	35	96%	18.2	18.9
North Bethesda	15	87%	**21.3**	17.7
Kensington/Wheaton	29	82%	**20.7**	18.5
Bethesda/Chevy Chase	17	81%	**20.4**	17.4
Rockville City	16	80%	**21.2**	17.8
Derwood	7	**70%**	**21.1**	18.8
Inadequate versus the Standards shown	**xx.x**	**more than 80%**	**less than 14.0 ##**	**more than 17.0**
		## = 20.0 with Metrorail		
"Suburban" Policy Areas				
R&D Village	5	76%	**25.8**	15.8
Gaithersburg City	10	75%	20.0	17.6
Fairland/White Oak	14	48%	19.1	18.8
Germantown West	9	48%	**21.8**	18.6
Montgomery Village/Airpark	9	47%	19.4	18.0
Aspen Hill	11	44%	19.9	19.3
Germantown East	5	39%	**21.4**	17.8
Cloverly	2	30%	**26.5**	**8.0 ***
North Potomac	7	**29%**	**24.3**	17.0
Olney	5	**26%**	**25.0**	22.3
Potomac	10	**23%**	**21.1**	16.4
Clarksburg	2	**16%**	**30.0**	14.1
Inadequate versus the Standards shown	**xx.x**	**more than 30%**	**less than 20.0**	**more than 14.0**
"Rural" Policy Areas				
Rural West	1	8%	30.0	6.3 *
Damascus	1	7%	20.0	15.7
Rural East	1	7%	20.0	15.7
Inadequate versus the Standards shown	**xx.x**	**more than 5%**	**less than 30.0**	**more than 4.0**
* Span includes Peak Period Routes because of absence of All Day Routes				

~~**TP2.1.3 Relationship Between Relative Arterial Mobility and Relative Transit Mobility**~~

~~The PAMR Arterial LOS and the PAMR Transit LOS standards are inversely related, reflecting the County's long-standing policy to encourage concentrations of development near high-quality transit. To~~

~~accomplish this policy, greater levels of roadway congestion should be tolerated in areas where high-quality transit options are available. The PAMR uses the following equivalency:~~

~~**Equivalency Between Transit LOS and Arterial LOS**~~

~~*If the forecasted PAMR Transit LOS is*~~	~~*The minimum acceptable PAMR Arterial LOS standard is*~~
~~A~~	~~D~~
~~B~~	~~D~~
~~C~~	~~D~~
~~D~~	~~C~~
~~E~~	~~B~~
~~F~~	~~A~~

~~This chart reflects a policy decision that the PAMR Arterial LOS standard should not fall below LOS D, even when the PAMR Transit LOS standard is A.~~

TP2.2 Conducting Transportation Policy Area ~~Mobility~~ Review

TP2.2.1 Geographic Areas

In conducting Transportation Policy Area ~~Mobility~~ Reviews, each Metro station policy area is included in its larger parent policy area, so that:

- the Bethesda CBD, Friendship Heights, and Bethesda-Chevy Chase policy areas are treated as a single policy area;
- the Grosvenor, White Flint, Twinbrook, and North Bethesda policy areas are treated as a single policy area;
- the Rockville Town Center and Rockville City policy areas are treated as a single policy area;
- the Shady Grove and Derwood policy areas are treated as a single policy area;
- the Silver Spring CBD and Silver Spring-Takoma Park policy areas are treated as a single policy area; and
- the Wheaton CBD, Glenmont, and Kensington-Wheaton policy areas are treated as a single policy area.

The Rural East policy area consists of all area east of I-270 that is not located in another policy area. The Rural West policy area consists of all area west of I-270 that is not located in another policy area.

Any proposed development located in the White Flint Metro Station Policy Area is exempt from Transportation Policy Area ~~Mobility~~ Review if that development, as a condition of approval of a preliminary plan of subdivision, will be required to provide substantial funds to a new development district, new impact tax or special taxing district, or another comprehensive financing mechanism, to finance transportation improvements for that Policy Area. However, the traffic impact of any development in that Policy Area must be considered in any Transportation

Policy Area ~~Mobility~~ Review calculation for any development that is not exempt under this paragraph.

TP2.2.2 Determination of Adequacy

Using a transportation planning model, the Planning staff has computed the relationship between a programmed set of transportation facilities and the ~~geographic pattern of existing and approved jobs and housing units~~forecast growth in households and employment, using the Cooperative Regional Forecast. The traffic model tests this ~~future land use pattern~~forecast growth for its traffic impact, comparing the resulting traffic volume and distribution to the ~~arterial~~ roadway level of service standard for each policy area. Policy areas that do not achieve the level of service standards above are considered inadequate for roadways. This information is combined with the results of the Transit adequacy analysis to determine the policy areas that are considered inadequate.

In those areas where the transit and roadway adequacy standards are both met, a minimum TPAR payment must be levied. This minimum TPAR payment will help finance transit improvements for adjacent Policy Areas where such improvements are required and where the improved bus route provides continuity of service to the area with the minimum TPAR payment. Similarly, the minimum payment could be used to supplement roadway improvements in an adjacent area, where connectivity may provide additional network benefits, or pedestrian or bicycle accommodation in the affected policy area. *Note: Need to add minimum payment amount or percentage once it has been determined by County Council.*

~~This analysis results in a finding of acceptable with full mitigation for a policy area if:~~

~~(a) the level of service on local roads in the policy area is expected to exceed the arterial level of service standard, or~~

~~(b) the magnitude of the hypothetical future land use patterns in that policy area will cause the level of service on local roads in any other policy area to exceed the arterial level of service standard for that policy area.~~

~~If this annual analysis results in a finding of acceptable with full mitigation for a policy area for a fiscal year, the Planning Board must not approve any more subdivisions in that policy area in that fiscal year, except as provided below.~~ For ~~FY2010~~FY2012 and FY2013, the Planning Board must consider the North Bethesda, Kensington/Wheaton, Bethesda/Chevy Chase, Rockville City, Derwood, R&D Village, Fairland/White Oak, Germantown East, Gaithersburg City, Cloverly, Olney, Potomac, Clarksburg and North Potomac Policy Areas to be ~~acceptable with full mitigation for transportation~~inadequate for transportation.

~~During 2009-11, "full mitigation" must be defined as mitigating 50% of the trips created by the proposed development.~~

~~When this annual analysis results in a finding of acceptable with partial mitigation for a policy area for a fiscal year, the Planning Board must not approve any more subdivisions in that policy area in that fiscal year except under certain special circumstances outlined below. For [FY2008] FY2010, the Planning Board must consider the following policy areas to be acceptable with partial mitigation for transportation at the policy area level:~~

~~Policy Area~~	~~Trip Mitigation Required~~
~~Aspen Hill~~	~~20%~~
~~Bethesda/Chevy Chase~~	~~30%~~
~~Clarksburg~~	~~10%~~
~~Derwood~~	~~20%~~
~~Fairland/White Oak~~	~~50%~~
~~Gaithersburg City~~	~~50%~~
~~Germantown East~~	~~50%~~
~~Kensington/Wheaton~~	~~10%~~
~~Montgomery Village/Airpark~~	~~5%~~
~~North Bethesda~~	~~35%~~
~~North Potomac~~	~~50%~~
~~Olney~~	~~10%~~
~~Potomac~~	~~40%~~
~~Rockville City~~	~~25%~~
~~R&D Village~~	~~40%~~
~~Silver Spring/Takoma Park~~	~~10%~~

An applicant for a preliminary plan of subdivision need not take any action under **TP** Transportation Policy Area ~~Mobility~~ Review if the proposed development will generate 3 or fewer peak-hour trips.

The Planning Board may adopt Transportation Policy Area ~~Mobility~~ Review guidelines and other technical materials to further specify standards and procedures for its adoption of findings of policy area adequacy or inadequacy or of acceptable with full or partial mitigation.

The transportation planning model considers all ~~existing and approved~~forecast development and all eligible programmed transportation CIP projects. For these purposes, "forecast~~approved~~ development" includes all ~~approved preliminary plans of subdivision and is also known as the "pipeline of approved development~~households and employment forecast by the Cooperative Regional Forecast.~~"~~ "Eligible programmed transportation CIP projects" include all County CIP, State Transportation Program, and City of Rockville or Gaithersburg projects for which 100 percent of the expenditures for construction are estimated to occur in the first ~~6~~ 10 years of the applicable program.

Because of the unique nature of the Purple Line, the Corridor Cities Transitway, and the North Bethesda Transitway compared to other transportation systems which are normally used in calculating development capacity, it is prudent to approach the additional capacity from these systems conservatively, particularly with respect to the timing of capacity and the amount of the capacity recognized. Therefore, the capacity from any operable segment of any of these transit systems must not be counted until that segment is fully funded in the first ~~6~~ 10 years of the County or State capital improvements program.

To discourage sprawl development, no capacity for new development may be counted outside the boundary of the Town of Brookeville as of March 9, 1999, as a result of relocating MD 97 around Brookeville.

~~Planning staff must keep a record of all previously approved preliminary plans and other data about the status of development projects, and must continuously update the pipeline number of approved preliminary plans. The updated pipeline must be the basis for the annual PAMR.~~

TP3 Mitigation for Applications in Policy Areas with ~~Inadequate PAMR~~Roadway and/or Transit Inadequacies

The Planning Board, after considering any recommendation of the County Executive, may approve a preliminary plan application in a policy area found by Transportation Policy Area ~~Mobility~~ Review to be ~~acceptable~~ adequate for transit and roadways ~~with full mitigation or acceptable with partial mitigation~~if all the required trips are offset by mitigation, as provided in this section. If only a portion of the required trips are offset, acceptable mitigation for some trips may be combined with payment for the remaining trips.~~In approving plans in acceptable with full mitigation policy areas, the Board should ensure that the average level of service for the relevant policy area is not adversely affected. Except as otherwise expressly stated in **TP4**, the same level of service criteria must be used in evaluating an application under this section.~~

The following options to mitigate the traffic impacts of development approved in a preliminary plan may be used, individually or in combination:

- *Trip Mitigation.* An applicant may sign a binding Trip Mitigation Agreement under which up to 50 % of the projected peak hour vehicle trips would be removed from the roadway by using Transportation Demand Management techniques to reduce trips generated by the applicant's development or by other sites, so that an applicant could still generate a certain number of trips if the mitigation program removes half that number of trips from other sites in the same policy area.

- *Trip Reduction by Providing Non-Auto Facilities.* An applicant may mitigate a limited number of trips by providing non-auto facilities that would make alternative modes of transit, walking, and bicycling safer and more attractive. The Planning Board must specify in its *LATR Guidelines* the allowable actions and number of trips associated with them, as well as the maximum number of trip credits allowable for each action, which will partly depend on the congestion standards for the policy area where the proposed development is located. For any preliminary plan approved in or after ~~FY2010~~FY2012, the Planning Board may accept construction of Non-Auto Facilities at a value of $11,000 for each new peak hour vehicle trip for construction and right-of-way costs. *Note: amount to be determined.*

- *Adding Roadway Capacity.* An applicant may mitigate trips by building link-based roadway network capacity. The conversion rate between vehicle trips and lane miles of roadway is shown in Table 2. The values in that table are derived from regional estimates of vehicle trip length by trip purposes and uniform per-lane capacities for roadway functional classes that should be applied countywide. Several conditions apply:
    - The number of lane miles in Table 2 reflects total capacity provided, so that if an applicant widens a roadway by one lane in each direction, the total minimum project length would be half the length listed in the table.
    - The roadway construction or widening must have logical termini, for instance connecting two intersections.

- The roadway construction must occur in the same Policy Area as the proposed development.
- The roadway construction must be recommended in a master plan.

- *Adding Transit Capacity.* An applicant may mitigate inadequate ~~PAMR~~ TPAR conditions by buying 40-foot long hybrid electric fleet vehicles for the Ride-On system, and guaranteeing 12 years of operations funding, at the rate of 30 peak hour vehicle-trips per fleet vehicle. To qualify as mitigation under this provision, a bus must add to the Ride-On fleet and not replace a bus taken out of service.

- *Payment instead of construction.* The Planning Board may accept payment to the County of a fee commensurate with the cost of a required improvement if the applicant has made a good faith effort to implement an acceptable improvement and the Board finds that a desirable improvement cannot feasibly be implemented by the applicant, but the same improvement or an acceptable alternative can be implemented by a public agency within 4 years after the subdivision is approved. The Planning Board may accept a payment to the County instead of identification or construction of any specific improvement for any preliminary plan application that requires ~~PAMR~~ TPAR mitigation of fewer than 30 peak hour vehicle trips. In or after ~~FY2010~~FY2012, the payment must not be less than $11,000 per new peak hour vehicle trip. Unless County law requires otherwise, the Board must index the minimum payment according to construction costs in each later fiscal year. *Note: This section must be amended after the cost allocation procedure and per trip cost has been determined by County Council.*

In general, each mitigation measure or combination of measures must be scheduled for completion or otherwise be operational at the same time or before the proposed development is scheduled to be completed. The nature, design, and scale of any additional facility or program must receive prior approval from any government agency that would construct or maintain the facility or program, and the applicant and the public agency must execute an appropriate public works agreement before the Board approves a record plat. The application must also be approved under **TL** Local Area Transportation Review. An applicant who is required to make an intersection improvement to satisfy TL Local Area Transportation Review may apply the capital cost of that improvement toward any mitigation obligation under this section.

Both the subdivision plan and all necessary mitigation measures must be consistent with an adopted master plan or other relevant land use policy statement. For the Planning Board to accept a roadway capacity improvement as a mitigation measure, the applicant must show that alternative non-auto mitigation measures are not feasible or desirable. In evaluating mitigation measures proposed by an applicant, the Board must place a high priority on design excellence to create a safe, comfortable, and attractive public realm for all users, with particular focus on high-quality pedestrian and transit access to schools, libraries, recreation centers, and other neighborhood facilities.

TP3.1 Special Mitigation Standards

An applicant for a preliminary plan of subdivision located entirely in a Metro Station Policy Area or the Germantown Town Center Policy Area, or entirely in Kensington, White Oak, Rock Spring Park, or the North Bethesda Road Code Urban Area (as shown in maps 34-37), may satisfy the applicant's trip

mitigation requirements under **TP Transportation Policy Area ~~Mobility~~ Review** if the proposed development would meet all of the following conditions:

- At least 50 percent of the floor area must be used for residences.
- The development must use at least 75 percent of the achievable on-site density allowed under Chapter 59, subject to any lower limit imposed in a Master or Sector Plan and applied under Chapter 59.
- The development must achieve a minimum energy cost savings percentage, using applicable LEED standards, of 17.5% for new construction and 10.5% for renovation, or offset at least 2.5% of its annual building energy costs on site, using applicable LEED standards.

If these requirements are met, the applicant must pay 75% of the ~~trip mitigation~~TPAR payment otherwise required under **TP3** to the County Department of Transportation, which must use at least 2/3 of the funds received under this paragraph for any transit system which serves the policy area where the development is located and must use the remaining 1/3 of the funds for any transportation purpose, including any transit system which serves the policy area where the development is located. As used in this paragraph, "transit system" means the transit systems of the Washington Metropolitan Area Transit Authority, Ride On, and the Maryland Transit Administration, and includes any infrastructure project that supports or improves the quality of transit, such as a park and ride lot served by transit, a passenger information system, a queue jumper, or traffic signalization which improves transit efficiency.

TP4 Development District Participation

Under Chapter 14 of the County Code, the County Council may create development districts as a funding mechanism for needed infrastructure in areas of the County where substantial development is expected or encouraged. The Planning Board may approve subdivision plans in accordance with the terms of the development district's provisional adequate public facilities approval (PAPF).

TP4.1 Preparation of a PAPF

The development district's PAPF must be prepared in the following manner:

One or more property owners in the proposed district may submit to the Planning Board an application for provisional adequate public facilities approval for the entire district. In addition to explaining how each development located in the district will comply with all applicable zoning and subdivision requirements, this application must:

- show the number and type of housing units and square footage and type of the non-residential space to be developed, as well as a schedule of proposed buildout in five-year increments;
- identify any infrastructure improvements necessary to satisfy the adequate public facilities requirements for development districts; and
- estimate the cost to provide these improvements.

TP4.2 Planning Board Review

The Planning Board must then review all developments within the proposed development district as if they are a single development for compliance with the Adequate Public Facilities Ordinance. The

Planning Board must identify the public facilities needed to support the buildout of the development district after considering the results of the following tests for facility adequacy:

- Transportation tests for development districts are identical to those for Local Area Transportation Review. Planning Department staff must prepare a list of transportation infrastructure needed to maintain public facility adequacy.

- The PAPF application must be referred to Montgomery County Public Schools staff for recommendations for each stage of development in the proposed district. MCPS staff must calculate the extent to which the development district will add to MCPS's current enrollment projections. MCPS staff must apply the existing school adequacy test to the projections with the additional enrollment and prepare a list of public school infrastructure needed to maintain public facility adequacy.

- The PAPF application must be referred to the Washington Suburban Sanitary Commission for recommendations for each stage of development in the proposed district. Wastewater conveyance and water transmission facilities must be considered adequate if existing or programmed (fully-funded within the first 5 years of the approved WSSC capital improvements program) facilities can accommodate (as defined by WSSC) all existing authorizations plus the growth in the development district. Adequacy of water and wastewater treatment facilities must be evaluated using the intermediate or "most probable" forecasts of future growth plus development district growth, but only to the extent that development district growth exceeds the forecast for any time period. If a test is not met, WSSC must prepare a list of water and sewer system infrastructure needed to maintain public facility adequacy.

- The PAPF application must be referred to the County Executive for recommendations for each stage of development in the proposed district regarding police, fire, and health facilities. Adequacy of police, fire, and health facilities must be evaluated using the intermediate or most probable forecasts of future growth plus development district growth, but only to the extent that development district growth exceeds the forecast for any time period. Any facility capacity that remains is available to be used by the development district. If any facility capacity deficits exist, the County Executive must prepare a list of infrastructure needed to maintain public facility adequacy.

TP4.3 Planning Board Approval

The Board may conditionally approve the PAPF application if it will meet all of the requirements of the APFO and Growth Policy. The Board may condition its approval on, among other things, the creation and funding of the district and the building of no more than the maximum number of housing units and the maximum nonresidential space listed in the petition.

For an application to be approved, the applicants must commit to produce the infrastructure improvements needed to meet APF requirements in the proposed district as well as any added requirements specified by the Planning Board. The Planning Board must list these required infrastructure improvements in its approval. The infrastructure improvements may be funded through

the development district or otherwise. The development district's PAPF must be prepared in the following manner:

The Planning Board must not approve a PAPF application unless public facilities adequacy is maintained throughout the life of the plan. The timing of infrastructure delivery may be accomplished by withholding the release of building permits until needed public facilities are available to be "counted," or by another similar mechanism.

Infrastructure may be counted for public facilities adequacy, for infrastructure provided by the district, when construction has begun on the facility and funds have been identified and committed to its completion, and, for infrastructure provided by the public sector, when:

- for Local Area Transportation Review, the project is fully-funded within the first 6 years of the approved County, state, or municipal capital improvements program;
- for water and sewer facilities, the project is fully-funded within the first 5 years of the approved WSSC capital improvements program;
- for public school facilities, the project is fully-funded within the first 5 years of the approved Montgomery County Public Schools capital improvements program; and
- for police, fire, and health facilities, the project is fully-funded within the first 6 years of the relevant approved capital improvements program.

TP4.4 Additional Facilities Recommended for Funding

The County Executive and Planning Board may also recommend to the County Council additional facilities to be provided by the development district or by the public sector to support development within the district. These facilities may include, but are not limited to libraries, health centers, local parks, social services, greenways, and major recreation facilities.

TP4.5 Satisfaction of APF Requirements

As provided in Chapter 14 of the County Code, once the development district is created and the financing of all required infrastructure is arranged, the development in the district is considered to have satisfied all APF requirements, any additional requirements that apply to development districts in the Growth Policy, and any other requirement to provide infrastructure which the County adopts within 12 years after the district is created.

TL Local Area Transportation Review (LATR)

TL1 Standards and Procedures

To achieve an approximately equivalent transportation level of service in all areas of the County, greater congestion is permitted in policy areas with greater transit accessibility and usage. Table 1 shows the intersection level of service standards by policy area. Local Area Transportation Review must at all times be consistent with the standards and staging mechanisms of adopted master and sector plans.

Local area transportation review must be completed for any subdivision that would generate 30 or more peak-hour automobile trips. For any subdivision that would generate 30-49 peak-hour automobile trips, the Planning Board after receiving a traffic study must require that either:

- all LATR requirements are met; or
- the applicant must make an additional payment to the County equal to 50% of the applicable transportation impact tax before it receives any building permit in the subdivision.

In administering Local Area Transportation Review, the Planning Board must not approve a subdivision if it finds that an unacceptable peak hour level of service will result after considering existing roads, programmed roads, available or programmed mass transportation, and improvements to be provided by the applicant. If the subdivision will affect an intersection or roadway link for which congestion is already unacceptable, then the subdivision may only be approved if the applicant agrees to mitigate either:

- a sufficient number of trips to bring the intersection or link to acceptable levels of congestion, or
- a number of trips equal to 150 percent of the CLV impact attributable to the development.

The nature of the LATR test is such that a traffic study is necessary if local congestion is likely to occur. The Planning Board and staff must examine the applicant's traffic study to determine whether adjustments are necessary to assure that the traffic study is a reasonable and appropriate reflection of the traffic impact of the proposed subdivision after considering all approved development and programmed transportation projects.

If use and occupancy permits for at least 75% of the originally approved development were issued more than 12 years before the LATR study scope request, the number of signalized intersections in the study must be based on the increased number of peak hour trips rather than the total number of peak hour trips. In these cases, LATR is not required for any expansion that generates 5 or fewer additional peak hour trips.

For Local Area Transportation Review purposes, the programmed transportation projects to be considered are those fully funded for construction in the first 4 years of the current approved Capital Improvements Program, the state's Consolidated Transportation Program, or any municipal capital improvements program. For these purposes, any road required under Section 302 of the County Charter to be authorized by law is not programmed until the time for petition to referendum has expired without a valid petition or the authorizing law has been approved by referendum.

If an applicant is participating in a traffic mitigation program or one or more intersection improvements to meet Local Area Transportation Review requirements, that applicant must be considered to have met Local Area Transportation Review for any other intersection where the volume of trips generated is less than 5 Critical Lane Movements.

Any traffic study required for Local Area Transportation Review must be submitted by a registered Professional Engineer, certified Professional Traffic Operations Engineer, or certified Professional Transportation Planner.

Each traffic study must examine, at a minimum, the number of signalized intersections in the following table, unless the Planning Board affirmatively finds that special circumstances warrant a more limited study.

Maximum Peak-Hour Trips Generated	Minimum Signalized Intersections in Each Direction
< 250	1
250 – 749	2
750 – 1,249	3
1,250 – 1,750	4
1,750-2,249	5
2,250 – 2749	6
>2,750	7

At the Planning Board's discretion, each traffic mitigation program must be required to operate for at least 12 years but no longer than 15 years. The Planning Board may select either trip reduction measures or road improvements, or a combination of both, as the required means of traffic mitigation.

The Planning Board has adopted guidelines to administer Local Area Transportation Review. To the extent that they are consistent with this Policy, the Planning Board guidelines may continue to apply or may be amended as the Planning Board finds necessary.

After consulting the Council, the Planning Board may adopt administrative guidelines that allow use of a "delay" or queuing analysis, different critical lane volume standards, or other methodologies, to determine the level of congestion in any area the Planning Board finds appropriate.

In administering Local Area Transportation Review, the Planning Board must carefully consider the recommendations of the County Executive concerning the applicant's traffic study and proposed improvements or any other aspect of the review.

To achieve safe and convenient pedestrian travel, the Planning Board may adopt administrative guidelines requiring construction of off-site sidewalk improvements consistent with County Code §50-25. To support creating facilities that encourage transit use, walking, and bicycling, to maintain an approximately equivalent level of service at the local level for both auto and non-auto modes, the Board may allow the applicant to use peak hour vehicle trip credits for providing non-auto facilities. Before approving credits for non-auto facilities to reduce Local Area Transportation Review impacts, the Board should first consider the applicability and desirability of traffic mitigation agreement measures. The Board's *LATR Guidelines* must identify applicable facilities in terms of actions that can be given trip credits and the maximum number of trips that can be credited. If the Board approves any credits, it must specify mechanisms to monitor the construction of any required facility. During each biennial Growth Policy the Board must report on the number of credits issued and confirm the construction of any required facility.

In general, any mitigation measure or combination of mitigation measures must be scheduled for completion or otherwise operational either before or at the same time as the proposed development is scheduled to be completed. The nature, design, and scale of any additional facility or program must

receive prior approval from any government agency that would construct or maintain the facility or program, and the applicant and the public agency must execute an appropriate public works agreement before the Planning Board approves a record plat.

Both the subdivision plan and the necessary mitigation measures must be consistent with an adopted master plan or other relevant land use policy statement. For the Planning Board to accept a intersection improvement as a mitigation measure, the applicant must show that alternative non-auto mitigation measures are not feasible or desirable. In evaluating mitigation measures proposed by an applicant, the Board must place a high priority on design excellence to create a safe, comfortable, and attractive public realm for all users, with particular focus on high-quality pedestrian and transit access to schools, libraries, recreation centers, and other neighborhood facilities.

TL2 Metro Station Policy Area LATR Standards

In each Metro Station Policy Area, the Planning Board, in consultation with the Department of Transportation, must prepare performance evaluation criteria for its Local Area Transportation Review. These criteria must be used to accomplish: (a) safety for pedestrians and vehicles; (b) access to buildings and sites; and (c) traffic flow within the vicinity, at levels which are tolerable in an urban situation. The County Executive also must publish a Silver Spring Traffic Management Program after receiving public comment and a recommendation from the Planning Board. This program must list those actions to be taken by government to maintain traffic flow at tolerable levels in the Silver Spring CBD and protect the surrounding residential area.

Any proposed development located in the White Flint Metro Station Policy Area is exempt from Local Area Transportation Review if the development will be required to provide substantial funds to a new development district or a new impact tax district to finance master-planned public improvements in that Policy Area. However, the traffic impact of any development in that Policy Area must be considered in any Local Area Transportation Review calculation for any development elsewhere.

TL3 Potomac LATR Standards

In the Potomac Policy Area, only the areas contributing traffic to the following intersections must be subject to Local Area Transportation Review: (a) Montrose Road at Seven Locks Road; (b) Democracy Boulevard at Seven Locks Road; (c) Tuckerman Lane at Seven Locks Road; (d) Democracy Boulevard at Westlake Drive; (e) Westlake Drive at Westlake Terrace; (f) Westlake Drive at Tuckerman Lane; (g) Bradley Boulevard at Seven Locks Road; (h) River Road at Bradley Boulevard; (i) River Road at Piney Meetinghouse Road; and (j) River Road at Seven Locks Road.

TL4 Unique Policy Area Issues

The Local Area Review for the Silver Spring CBD policy area must use the following assumptions and guidelines:

- Each traffic limit is derived from the heaviest traffic demand period in Silver Spring's case, the p.m. peak hour outbound traffic.
- When tested during a comprehensive circulation analysis, the critical lane volumes for intersections in the surrounding Silver Spring/Takoma Park policy area must not be worse than

the adopted level of service standards shown in Table 1 unless the Planning Board finds that the impact of improving the intersection is more burdensome than the increased congestion.

- The Planning Board and the Department of Transportation must implement Transportation Systems Management for the Silver Spring CBD. The goal of this program must be to achieve the commuting goals for transit use and auto occupancy rates set out below.
- The County Government, through the Silver Spring Parking Lot District, must constrain the amount of public and private long term parking spaces.

The parking constraints and commuting goals needed to achieve satisfactory traffic conditions with these staging ceilings are:

Parking constraint: A maximum of 17,500 public and private long-term spaces when all nonresidential development is built; this maximum assumes a peak accumulation factor of 0.9, which requires verification in Silver Spring and may be subject to revision. Interim long-term parking constraints must be imposed in accordance with the amount of interim development. Long-term public parking spaces must be priced to reflect the market value of constrained parking spaces.

Commuting goals: For employers with 25 or more employees, attain 25 percent mass transit use and auto occupancy rates of 1.3 persons per vehicle during the peak periods, or attain any combination of employee mode choice that results in at least 46% non-drivers during the peak periods. For new nonresidential development, attain 30 percent mass transit use and auto occupancy rates of 1.3 persons per vehicle during the peak periods, or attain any combination of employee mode choice that results in at least 50% non-drivers during the peak periods.

Progress towards achieving these goals should be measured annually by scientific, statistically valid surveys.

To achieve these goals it will be necessary to require developers of new development in Silver Spring to enter into traffic mitigation agreements and the employers and certain owners to submit transportation mitigation plans under County Code Chapter 42A.

In accordance with the amendment to the Silver Spring Sector Plan, subdivision applications for nonresidential standard method projects throughout the CBD may be approved for development or additions of not more than 5,000 square feet of gross floor area. However, if, for a particular use the addition of 5 peak hour trips yields a floor area greater than 5,000 square feet, that additional area may be approved for that particular use.

In the North Bethesda Transportation Management District, the goal is 39 percent non-driver mode share for workers in the peak hour. In the Bethesda Transportation Management District, the goal is 37 percent non-driver mode share for workers. In the Friendship Heights Transportation Management District, the goal is 39 percent non-driver mode share for workers.

TA Alternative Review Procedures

TA1 Metro Station Policy Areas

An applicant for a subdivision which will be built completely within a Metro station policy area need not take any action under **TP Transportation Policy Area ~~Mobility~~ Review** or **TL Local Area Transportation Review** if the applicant agrees in a contract with the Planning Board and the County Department of Transportation to:

- submit an application containing all information, including a traffic study, that would normally be required for Local Area Transportation Review;
- meet trip reduction goals set by the Planning Board as a condition of approving that subdivision, which must require the applicant to reduce at least 50% of the number of trips attributable to the subdivision, either by reducing trips from the subdivision itself or from other occupants of that policy area;
- participate in programs operated by, and take actions specified by, a transportation management organization (TMO) to be established by County law for that policy area (or a group of policy areas including that policy area) to meet the mode share goals established under the preceding paragraph;
- pay an ongoing annual contribution or tax to fund the TMO's operating expenses, including minor capital items such as busses, as established by County law; and
- pay 75% of the applicable General District development impact tax without claiming any credits for transportation improvements.

TA2 Expiration of Approvals Under Previous Alternative Review Procedures

Annual Growth Policy resolutions in effect between 1995 and 2001 contained Alternative Review Procedures that required any development approved under those procedures to receive each building permit no later than 4 years after the Planning Board approved the preliminary plan of subdivision for that development. Any outstanding development project approved under an Alternative Review Procedure is subject to the expiration dates in effect when that development project was approved, with the following 2 exceptions.

TA2.1 Certain multi-phased projects

A multi-phased project located in the R&D or Life Sciences Center zone may receive some of its building permits later than 4 years after its preliminary plan of subdivision is approved if:

- when the Planning Board approves or amends a site plan for the development, it also approves a phasing schedule that allows an extended validity period, but not longer than 12 years after the preliminary plan of subdivision was approved; and
- the applicant receives the first building permit for a building in the development no later than 4 years after the Planning Board approves the preliminary plan of subdivision for the development.

TA2.2 Certain developments in I-3 zone

Similarly, if the development is located in the I-3 zone, and a previously approved subdivision plan and site plan contains more than 900,000 square feet of office space and at least 40% of that space has been

constructed by November 1, 2001, the Planning Board may approve an amendment to its site plan which allows an extended validity period, but not longer than 12 years after the preliminary plan of subdivision was approved.

TA3 Golf Course Community

An applicant for a planned unit development in the Fairland-White Oak policy area that includes a golf course or other major amenity which is developed on a public/private partnership basis need not take any action under **TL Local Area Transportation Review** if the applicant pays to the County a Development Approval Payment, established by County law, before the building permit is issued. However, the applicant must include in its application for preliminary plan approval all information that would have been necessary if the requirements for Local Area Transportation Review applied.

The Planning Board may approve the application if:

- not more than 100 units, in addition to Moderately Priced Dwelling Units (MPDUs), are built in the first fiscal year after construction of the development begins, and
- not more than 100 units, in addition to MPDUs and the unbuilt remaining portion of all prior years' approved units, are built in any later fiscal year.

TA3.1 MPDU Requirements

Any applicant for a subdivision under **TA3** must agree, as part of the application, that it will build the same number of MPDUs among the first 100 units that it would be required to construct at that location if the subdivision consisted of only 100 units, or a pro rata lower number of MPDUs if the subdivision will include fewer than 100 units.

TA3.2 Requirement to Begin Construction

Any applicant for a subdivision approval under **TA3** must agree, as part of the application, that it will not begin to construct any residential unit approved in the application later than 3 years after the plat is recorded or the site plan is approved (whichever occurs later).

TA4 Corporate Headquarters Facility

TA4.1 LATR

An applicant for a preliminary plan of subdivision need not take any action under Local Area Transportation Review if the applicant meets the following conditions:

TA4.1.1 Jobs/Location

The applicant must have employed an average of at least 500 employees in the County for the 2 years before the application was filed, and the applicant must seek to build or expand a corporate headquarters located in the North Bethesda Policy Area.

TA4.1.2 Size/Use

Any new or expanded building approved under this Procedure must not exceed 900,000 square feet, and must be intended primarily for use by the applicant and the applicant's affiliates or business partners.

TA4.1.3 Traffic Information

Each application must include all information that would be necessary if the requirements for Local Area Transportation Review applied.

TA4.1.4 Mode Share Goals

Each applicant must commit to make its best efforts to meet mode share goals set by the Planning Board as a condition of approving the subdivision.

TA4.1.5 TMO Participation

Each applicant must participate in programs operated by, and take actions specified by, the transportation management organization (TMO), if any, established by County law for that policy area to meet the mode share goals set by the Planning Board.

TA4.1.6 TMO Payment

If an applicant is located in a transportation management district, the applicant must pay an annual contribution or tax, set by County law, to fund the TMO's operating expenses, including minor capital items such as busses.

TA4.1.7 Development Approval Payment Limits

The applicant must pay the applicable Development Approval Payment (DAP) as provided in County Code §8-37 through 8-42, but not more than the DAP in effect on July 1, 2001.

TA4.1.8 Eligibility

An applicant may use this Procedure only if it met the criteria in **TA4.1.1** for number of employees and site location on November 1, 2003.

TA5 Strategic Economic Development Projects

An applicant for a preliminary plan of subdivision need not take any action under **TL Local Area Transportation Review** if all of the following conditions are met.

TA5.1 Traffic information

The applicant files a complete application for a preliminary plan of subdivision which includes all information that would be necessary if the requirements for LATR applied.

TA5.2 Designation

The County Council has approved the County Executive's designation of the development as a strategic economic development project under procedures adopted by law or Council resolution.

TA5.3 Transportation Impact Tax Payments

The applicant must pay double the applicable transportation impact tax without claiming any credits for transportation improvements.

TA7 **Automobile related uses in the Cherry Hill Employment Area**

For any property located in the Cherry Hill Employment Area with automobile repair, service, sales, parking, storage, or related office uses:

TA7.1 TP Transportation Policy Area ~~Mobility~~ Review and TL Local Transportation Review are not required.

TA7.2 This provision applies to any application for a preliminary plan of subdivision, site plan, or building permit approved before July 26, 2016.

Public School Facilities

S1 Geographic Areas

For the purposes of public school analysis and local area review of school facilities at time of subdivision, the County has been divided into 25 areas called high school clusters. These areas coincide with the cluster boundaries used by the Montgomery County Public School system.

The groupings used are only to administer the Adequate Public Facilities Ordinance and do not require any action by the Board of Education in exercising its power to designate school service boundaries.

S2 Grade Levels

Each cluster must be assessed separately at each of the 3 grade levels -- elementary, intermediate/middle, and high school.

S3 Determination of Adequacy

Each year, not later than July 1, the Planning Board must evaluate available capacity in each high school cluster and compare enrollment projected by Montgomery County Public Schools for each fiscal year with projected school capacity in 5 years. If at any time during fiscal year 2010 the County Council notifies the Planning Board of any material change in the Montgomery County Public Schools Capital Improvements Program, the Planning Board may revise its evaluation to reflect that change.

S4 Moratorium on Residential Subdivision Approvals

In considering whether a moratorium on residential subdivisions must be imposed, the Planning Board must use 120% of Montgomery County Public Schools program capacity as its measure of adequate school capacity. This utilization measure must not count relocatable classrooms in computing a school's permanent capacity. If projected enrollment at any grade level in that cluster will exceed 120% utilization, the Board must not approve any residential subdivision in that cluster during the next fiscal year. If the Planning Board revises its measure of utilization during fiscal year 2010 because of a material change in projected school capacity, that revision must be used during the rest of that fiscal year in reviewing residential subdivisions.

Table 3 shows the result of this test for July 1, 2009, to July 1, 2010. Table 3 also shows the remaining capacity, in students, at each grade level in each cluster. Using average student generation rates developed from the most recent Census Update Survey, the Planning Board must limit residential subdivision approvals in any cluster during the fiscal year so that the students generated by the housing units approved do not exceed the remaining capacity for students at any grade level in that cluster.

S5 Imposition of School Facilities Payment

In considering whether a School Facilities Payment must be imposed on a residential subdivision, the Planning Board must use 105% of Montgomery County Public Schools' program capacity as its measure

of adequate school capacity. This utilization measure must not count relocatable classrooms in computing a school's permanent capacity. If projected enrollment at any grade level in that cluster will exceed 105% utilization but not exceed 120% utilization, the Board may approve a residential subdivision in that cluster during the next fiscal year if the applicant commits to pay a School Facilities Payment as provided in County law before receiving a building permit for any building in that subdivision. If the Planning Board revises its measure of utilization during fiscal year 2010 because of a material change in projected school capacity, that revision must be used during the rest of that fiscal year in reviewing residential subdivisions.

Table 4 shows the result of this test for July 1, 2009, to July 1, 2010. Table 4 also shows the remaining capacity, in students, at each grade level in each cluster. Using average student generation rates developed from the most recent Census Update Survey, the Planning Board must limit residential subdivision approvals in any cluster during the fiscal year so that the students generated by the housing units approved do not exceed the remaining capacity for students at any grade level in that cluster.

S6 Senior Housing

If public school capacity in inadequate in any cluster, the Planning Board may nevertheless approve a subdivision in that cluster if the subdivision consists solely of multifamily housing and related facilities for elderly or handicapped persons or multifamily housing units located in the age-restricted section of a planned retirement community.

S7 De Minimis Development

If public school capacity in inadequate in any cluster, the Planning Board may nevertheless approve a subdivision in that cluster if the subdivision consists of no more than 3 housing units and the applicant commits to pay a School Facilities Payment as otherwise required before receiving a building permit for any building in that subdivision.

S8 Development District Participants

The Planning Board may require any development district for which it approves a provisional adequate public facilities approval (PAPF) to produce or contribute to infrastructure improvements needed to address inadequate school capacity.

S9 Allocation of Staging Ceiling to Preliminary Plans of Subdivision

The Planning Board must allocate available staging ceiling capacity in a high school cluster based on the queue date of an application for preliminary plan of subdivision approval.

S9.1 Assignment of queue date

The queue date of a preliminary plan of subdivision is the date:

- a complete application is filed with the Planning Board; or
- 6 months after the prior queue date if the prior queue date expires under **S9.4**.

S9.2 Calculation of available staging ceiling capacity

The Planning Board must determine whether adequate staging ceiling capacity is available for a project by subtracting the capacity required by projects with earlier queue dates from the remaining capacity on Table 3 as updated periodically. Based on this calculation, the Planning Board may:

- approve a project for which there is sufficient capacity;
- approve part of a project for which there is sufficient capacity, leaving the remainder of the project in the queue until additional capacity becomes available;
- deny an application for a project for which there is insufficient capacity; or
- defer approval of a project and leave the project in the queue until sufficient capacity becomes available for all or part of the project. If insufficient capacity is available, the Board must not schedule a hearing on the application unless the applicant requests one.

If sufficient capacity is available for a project based on the queue date, the Planning Board must not deny an application based on pipeline (but not staging ceiling) changes while the queue date is in effect.

S9.3 Applicability of School Facilities Payment

The Planning Board must determine whether a project is required to pay a School Facilities Payment by subtracting the capacity required by projects with earlier queue dates from the remaining capacity on Table 4 as updated periodically. Based on this calculation, the Planning Board may:

- approve a project for which there is sufficient capacity;
- approve part of a project for which there is sufficient capacity, requiring the remainder of the project to pay the applicable School Facilities Payment until additional capacity becomes available; or
- defer approval of a project and leave the project in the queue until sufficient capacity becomes available for all or part of the project. If insufficient capacity is available, the Board must not schedule a hearing on the application unless the applicant requests one.

If a project must pay a School Facilities Payment, the Planning Board must not deny an application based on pipeline (but not staging ceiling) changes while the Payment requirement is in effect.

S9.4 Expiration of queue date

A queue date for an application for preliminary plan of subdivision approval expires:

- 6 months after the queue date if sufficient staging ceiling capacity was available for the entire project on the queue date and the Planning Board has not approved the application or granted an extension of the queue date; or
- 6 months after sufficient capacity becomes available for the entire project.

The Planning Board may grant one or more 6-month extensions of a queue date if the applicant demonstrates that a queue date expired or will expire because of governmental delay beyond the applicant's control.

Guidelines for Water and Sewerage Facilities

In accordance with the Adequate Public Facilities Ordinance, applications must be considered adequately served by water and sewerage if the subdivision is located in an area in which water and sewer service is presently available, is under construction, is designated by the County Council for extension of service within the first two years of a current approved Comprehensive Water Supply and Sewerage Systems Plan (i.e., categories I, II, and III), or if the applicant either provides a community water and/or sewerage system or meets Department of Permitting Service**s** requirements for septic and/or well systems, as outlined in the Adequate Public Facilities Ordinance. These requirements are determined either by reference to the Water and Sewerage Plan, adopted by the Council, or by obtaining a satisfactory percolation test from the Department of Permitting Services.

Applications must only be accepted for further Planning staff and Board consideration if they present evidence of meeting the appropriate requirements.

Guidelines for Police, Fire and Health Services

The Planning Board and staff must consider the programmed services to be adequate for facilities such as police stations, firehouses, and health clinics unless there is evidence that a local area problem will be generated. Such a problem is one which cannot be overcome within the context of the approved Capital Improvements Program and operating budgets of the relevant agencies. Where such evidence exists, either through agency response to the Subdivision Review committee clearinghouse, or through public commentary or Planning staff consideration, a Local Area Review must be undertaken. The Board must seek a written opinion from the relevant agency, and require, if necessary, additional data from the applicant, to facilitate the completion of the Planning staff recommendation within the statutory time frame for Planning Board action. In performing this Local Area Review, the facility capacity at the end of the sixth year of the approved CIP must be compared to the demand generated by the "most probable" forecast for the same year prepared by the Planning Department.

Guidelines for Resubdivisions

An application to amend a previously approved preliminary plan of subdivision does not require a new test for adequacy of public facilities if:

- Revisions to a preliminary plan have not been recorded, the preliminary plan has not expired, and the number of trips which will be produced by the revised plan is not greater than the number of trips produced by the original plan.
- Resubdivision of a recorded lot involves the sale or exchange of parcels of land (not to exceed a total of 2,000 square feet or one percent of the combined area, whichever is greater) between owners of adjoining properties to make small adjustments in boundaries.
- Resubdivision of a recorded lot involves more than 2,000 square feet or one percent of the lot area and the number of trips which will be produced by the revised plan is not greater than the number of trips produced by the original plan.

Timely Adequate Public Facilities Determination and Local Area Transportation Review under Chapter 8.

APF1 General.

Except as otherwise provided by law, an adequate public facilities determination or local area transportation review conducted under Article IV of Chapter 8 must use the standards and criteria applicable under this Resolution when evaluating the adequacy of public facilities to serve the proposed development.

APF2 Traffic Mitigation Goals.

Any proposed development that is subject to requirements for a traffic mitigation agreement under Article IV of Chapter 8 and §42A-9A of the County Code must meet the traffic mitigation goals specified in paragraphs (1) or (4), as appropriate.

(1) Subject to paragraph (2), the portion of peak-period nondriver trips by employees of a proposed development must be at least the following percentage greater than the prevailing nondriver mode share of comparable nearby land use:

In Policy Areas With LATR CLV Standard of	Required Percentage Greater Than Prevailing Nondriver Mode Share
1800 and 1600	100%
1550	80%
1500	60%
1475 and 1450	40%

LATR CLV standards for each policy area are shown on Table 1.

(2) The portion of peak-period nondriver trips by employees calculated under paragraph (1) must not be less than 15% nor higher than 55%.

(3) The applicant for a proposed development in a policy area specified under paragraph (1) is responsible for reviewing existing studies of nondriver mode share; conducting new studies, as necessary, of nondriver mode share; and identifying the prevailing base nondriver mode share of comparable land uses within the area identified for the traffic study. Comparable land uses are improved sites within the area identified for the traffic study for the proposed development that have similar existing land use and trip generation characteristics. As with other aspects of the traffic study required by Article IV of Chapter 8, selection of the comparable studies and land uses to be analyzed and determination of the prevailing base nondriver mode share are subject to review by the Planning Department and approval by the Department of Transportation.

(4) Proposed development in the Silver Spring CBD must meet the commuting goals specified under **TL4**.

(5) In accordance with County Code §42A-9A, the applicant must enter into an agreement with the Director of the Department of Transportation before a building permit is issued. The agreement may include a schedule for full compliance with the traffic mitigation goals. It must provide appropriate enforcement mechanisms for compliance.

(6) As provided by law, these goals supersede traffic mitigation goals established under §42A-9A(a)(4).

This is a correct copy of Council action.

_____

Linda M. Lauer, Clerk of the Council

F:\LAW\Resolutions\Growth Policy\09 GP\Approved Resolution Clean.Doc

TABLE 1

Local Area Transportation Review Intersection Congestion Standards

1350	Rural East	Rural West
1400	Damascus	
1425	Clarksburg Germantown East Montgomery Village/ Airpark	Gaithersburg City Germantown West
1450	Cloverly Olney R & D Village	North Potomac Potomac
1475	Aspen Hill Fairland/White Oak	Derwood
1500	Rockville City	
1550	North Bethesda	
1600	Bethesda/Chevy Chase Kensington/Wheaton	Germantown Town Center Silver Spring/Takoma Park
1800	Bethesda CBD Glenmont Rockville Town Center Silver Spring CBD Wheaton CBD	Friendship Heights CBD Grosvenor Shady Grove Twinbrook White Flint

Attachment 2

Additional Responses to Issues Raised at the Board's Public Hearing of 5-19-12 on the 2012 TPAR Report – for discussion at the Board's Worksession of May 10, 2012

Support to MNCPPC for Refinements of the
Local Area Transportation Review (LATR) Process and the draft
Transportation Policy Area Review (TPAR) Process

Prepared by

Dr. Robert M. Winick, Motion Maps, LLC

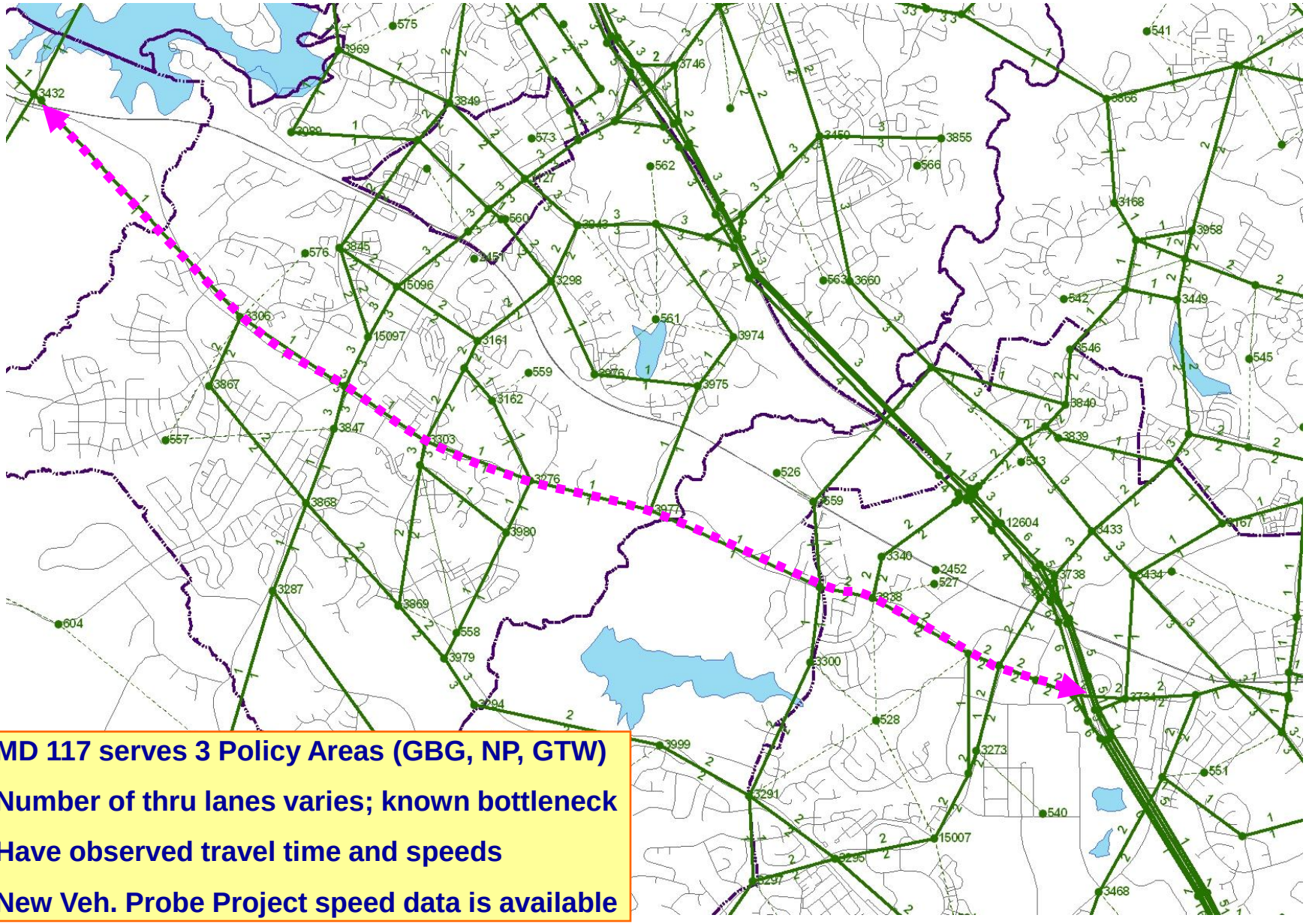
RMWinick@motionmaps.com

May 3, 2012 (Draft 3)

Additional Response Needed for the Following:

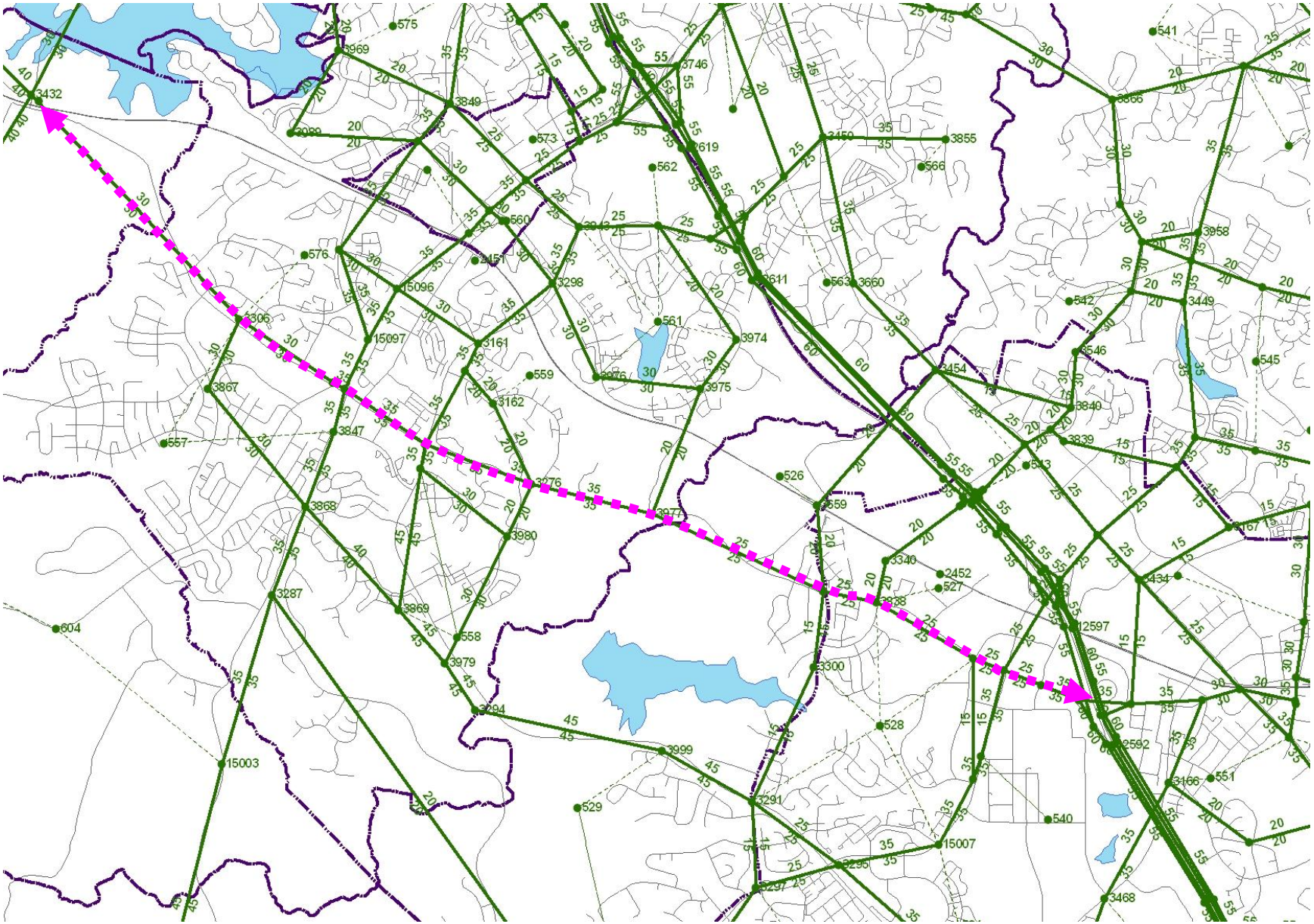
- Roadway Issues:
  - Include a sample calculation for average LOS
  - Also to show weighting by Vehicle-Miles-of-Travel
  - Checks against observed & monitored speed data
  - More information on Free-flow speed
- Consideration of a Broader Vision for TPAR
- Application of TPAR to Policy Areas:
  - Improvements to the graphics
  - Policy Area Adequacy – Each road being Adequate?

Sample Calculation for MD 117, Clopper Rd

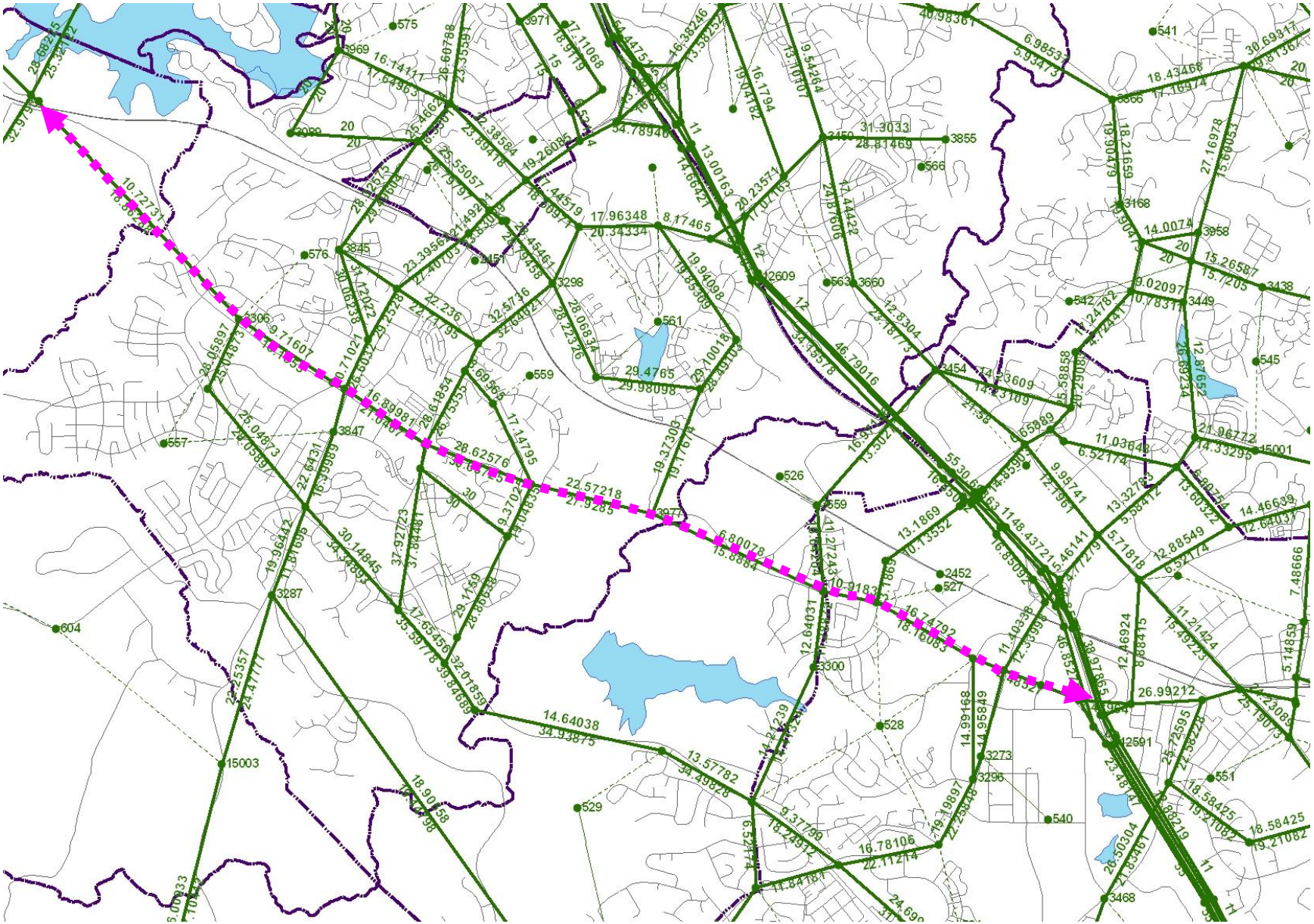


- MD 117 serves 3 Policy Areas (GBG, NP, GTW)
- Number of thru lanes varies; known bottleneck
- Have observed travel time and speeds
- New Veh. Probe Project speed data is available

MD 117 Clopper Rd: Variation in Free-Flow Speed



MD 117 Clopper Rd: Variation in Forecast Speed



TPAR12 Summary: 2022 Network & Development

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	27.0	3,546	0.82	0.63	3	III	0.771	35,414	45,921						
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	7.4	6,910	2.18	0.46	3	III	0.213	13,880	65,300						
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	13.3	5,515	0.90	0.34	3	III	0.381	14,722	38,605						
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	5.9	5,515	1.93	0.46	2	IV	0.237	6,200	26,196						
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	6.0	5,491	1.71	0.41	2	IV	0.239	5,581	23,337						
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	16.7	3,466	2.08	1.39	2	IV	0.670	33,668	50,257						
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	10.9	4,350	1.54	0.67	2	IV	0.437	13,298	30,450	0.420					
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	6.8	2,607	8.47	2.30	2	IV	0.272	17,020	62,568	0.272					
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	22.6	2,163	1.67	1.08	3	III	0.645	30,759	47,694						
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	28.6	1,533	1.28	1.05	3	III	0.818	26,769	32,730						
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.51	35	16.9	2,513	1.81	0.87	3	III	0.483	21,659	44,857						
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.07	35	32.9	2,102	0.13	0.12	3	III	0.941	4,847	5,150						
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	9.7	2,102	3.58	1.16	3	IV	0.324	11,845	36,575						
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	3	NB	1	1.66	30	10.7	2,020	9.28	3.32	3	IV	0.358	35,971	100,596	0.493	0.436				
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	3	SB	1	1.66	30	18.9	1,541	5.28	3.32	3	IV	0.629					48,252	76,742		
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58	30	13.2	1,865	2.65	1.16	3	IV	0.439					14,230	32,451		
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.07	35	33.2	1,865	0.13	0.12	3	III	0.948					4,331	4,569		
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.51	35	21.0	2,325	1.45	0.87	3	III	0.601					24,956	41,501		
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61	35	30.6	1,248	1.19	1.05	3	III	0.875					23,324	26,645		
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63	35	27.9	1,632	1.35	1.08	3	III	0.798					28,715	35,986	0.660	
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96	25	15.9	1,830	3.63	2.30	2	IV	0.636					27,913	43,920	0.636	
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28	25	18.0	3,213	0.93	0.67	2	IV	0.721					16,211	22,491		
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	2	EB	2	0.58	25	18.2	3,187	1.92	1.39	2	IV	0.726					33,570	46,212		
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17	25	6.8	5,219	1.50	0.41	2	IV	0.271					6,019	22,181		
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19	25	4.5	6,176	2.54	0.46	2	IV	0.179					5,263	29,336		
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20	35	9.9	6,176	1.22	0.34	3	III	0.281					12,167	43,232		
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27	35	30.3	2,625	0.53	0.46	3	III	0.866					21,483	24,806		
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37	35	24.8	3,923	0.89	0.63	3	III	0.709					36,010	50,803		
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19	30	4.7	4,448	2.41	0.38	3	IV	0.157					3,993	25,354	0.509	0.582

TPAR12 Summary: Model Analysis Inputs

	A	B	C	D	I	J	K	M	O	P	Q
1	Partial Modeling Inputs										
2	A	B	ROUTE_ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.51
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.07
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	3	NB	1	1.66
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	3	SB	1	1.66
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.07
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.51
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	2	EB	2	0.58
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19

TPAR12 Summary: Transparency of Results

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z
1	Partial Modeling Inputs											Partial Modeling Results						
2	A	B	ROUTE_ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	27.0	3,546	0.82	0.63	3	III
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	7.4	6,910	2.18	0.46	3	III
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	13.3	5,515	0.90	0.34	3	III
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	5.9	5,515	1.93	0.46	2	IV
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	6.0	5,491	1.71	0.41	2	IV
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	16.7	3,466	2.08	1.39	2	IV
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	10.9	4,350	1.54	0.67	2	IV
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	6.8	2,607	8.47	2.30	2	IV
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	22.6	2,163	1.67	1.08	3	III
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	28.6	1,533	1.28	1.05	3	III
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.51	35	16.9	2,513	1.81	0.87	3	III
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.07	35	32.9	2,102	0.13	0.12	3	III
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	9.7	2,102	3.58	1.16	3	IV
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	3	NB	1	1.66	30	10.7	2,020	9.28	3.32	3	IV
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	3	SB	1	1.66	30	18.9	1,541	5.28	3.32	3	IV
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58	30	13.2	1,865	2.65	1.16	3	IV
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.07	35	33.2	1,865	0.13	0.12	3	III
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.51	35	21.0	2,325	1.45	0.87	3	III
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61	35	30.6	1,248	1.19	1.05	3	III
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63	35	27.9	1,632	1.35	1.08	3	III
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96	25	15.9	1,830	3.63	2.30	2	IV
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28	25	18.0	3,213	0.93	0.67	2	IV
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	2	EB	2	0.58	25	18.2	3,187	1.92	1.39	2	IV
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17	25	6.8	5,219	1.50	0.41	2	IV
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19	25	4.5	6,176	2.54	0.46	2	IV
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20	35	9.9	6,176	1.22	0.34	3	III
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27	35	30.3	2,625	0.53	0.46	3	III
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37	35	24.8	3,923	0.89	0.63	3	III
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19	30	4.7	4,448	2.41	0.38	3	IV

TPAR12 Summary: Analysis of Model Results

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Model Results								
2	A	B	ROUTE_ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	27.0	3,546	0.82	0.63	3	III	0.771	35,414	45,921						
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	7.4	6,910	2.18	0.46	3	III	0.213	13,880	65,300						
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	13.3	5,515	0.90	0.34	3	III	0.381	14,722	38,605						
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	5.9	5,515	1.93	0.46	2	IV	0.237	6,200	26,196						
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	6.0	5,491	1.71	0.41	2	IV	0.239	5,581	23,337						
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	16.7	3,466	2.08	1.39	2	IV	0.670	33,668	50,257						
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	10.9	4,350	1.54	0.67	2	IV	0.437	13,298	30,450	0.420					
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	6.8	2,607	8.47	2.30	2	IV	0.272	17,020	62,568	0.272					
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	22.6	2,163	1.67	1.08	3	III	0.645	30,759	47,694						
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	28.6	1,533	1.28	1.05	3	III	0.818	26,769	32,730						
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.51	35	16.9	2,513	1.81	0.87	3	III	0.483	21,659	44,857						
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.07	35	32.9	2,102	0.13	0.12	3	III	0.941	4,847	5,150						
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	9.7	2,102	3.58	1.16	3	IV	0.324	11,845	36,575						
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	3	NB	1	1.66	30	10.7	2,020	9.28	3.32	3	IV	0.358	35,971	100,596	0.493	0.436				
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	3	SB	1	1.66	30	18.9	1,541	5.28	3.32	3	IV	0.629					48,252	76,742		
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58	30	13.2	1,865	2.65	1.16	3	IV	0.439					14,230	32,451		
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.07	35	33.2	1,865	0.13	0.12	3	III	0.948					4,331	4,569		
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.51	35	21.0	2,325	1.45	0.87	3	III	0.601					24,956	41,501		
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61	35	30.6	1,248	1.19	1.05	3	III	0.875					23,324	26,645		
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63	35	27.9	1,632	1.35	1.08	3	III	0.798					28,715	35,986	0.660	
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96	25	15.9	1,830	3.63	2.30	2	IV	0.636					27,913	43,920	0.636	
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28	25	18.0	3,213	0.93	0.67	2	IV	0.721					16,211	22,491		
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	2	EB	2	0.58	25	18.2	3,187	1.92	1.39	2	IV	0.726					33,570	46,212		
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17	25	6.8	5,219	1.50	0.41	2	IV	0.271					6,019	22,181		
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19	25	4.5	6,176	2.54	0.46	2	IV	0.179					5,263	29,336		
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20	35	9.9	6,176	1.22	0.34	3	III	0.281					12,167	43,232		
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27	35	30.3	2,625	0.53	0.46	3	III	0.866					21,483	24,806		
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37	35	24.8	3,923	0.89	0.63	3	III	0.709					36,010	50,803		
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19	30	4.7	4,448	2.41	0.38	3	IV	0.157					3,993	25,354	0.509	0.582

TPAR12 Summary: Roll-up to Policy Areas

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Model Results								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	27.0	3,546	0.82	0.63	3	III	0.771	35,414	45,921						
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	7.4	6,910	2.18	0.46	3	III	0.213	13,880	65,300						
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	13.3	5,515	0.90	0.34	3	III	0.381	14,722	38,605						
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	5.9	5,515	1.93	0.46	2	IV	0.237	6,200	26,196						
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	6.0	5,491	1.71	0.41	2	IV	0.239	5,581	23,337						
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	16.7	3,466	2.08	1.39	2	IV	0.670	33,668	50,257						
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	10.9	4,350	1.54	0.67	2	IV	0.437	13,298	30,450	0.420					
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	6.8	2,607	8.47	2.30	2	IV	0.272	17,020	62,568	0.272					
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	22.6	2,163	1.67	1.08	3	III	0.645	30,759	47,694						
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	28.6	1,533	1.28	1.05	3	III	0.818	26,769	32,730						
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.51	35	16.9	2,513	1.81	0.87	3	III	0.483	21,659	44,857						
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.07	35	32.9	2,102	0.13	0.12	3	III	0.941	4,847	5,150						
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	9.7	2,102	3.58	1.16	3	IV	0.324	11,845	36,575						
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	3	NB	1	1.66	30	10.7	2,020	9.28	3.32	3	IV	0.358	35,971	100,596	0.493	0.436				
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	3	SB	1	1.66	30	18.9	1,541	5.28	3.32	3	IV	0.629					48,252	76,742		
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58	30	13.2	1,865	2.65	1.16	3	IV	0.439					14,230	32,451		
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.07	35	33.2	1,865	0.13	0.12	3	III	0.948					4,331	4,569		
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.51	35	21.0	2,325	1.45	0.87	3	III	0.601					24,956	41,501		
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61	35	30.6	1,248	1.19	1.05	3	III	0.875					23,324	26,645		
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63	35	27.9	1,632	1.35	1.08	3	III	0.798					28,715	35,986	0.660	
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96	25	15.9	1,830	3.63	2.30	2	IV	0.636					27,913	43,920	0.636	
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28	25	18.0	3,213	0.93	0.67	2	IV	0.721					16,211	22,491		
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	2	EB	2	0.58	25	18.2	3,187	1.92	1.39	2	IV	0.726					33,570	46,212		
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17	25	6.8	5,219	1.50	0.41	2	IV	0.271					6,019	22,181		
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19	25	4.5	6,176	2.54	0.46	2	IV	0.179					5,263	29,336		
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20	35	9.9	6,176	1.22	0.34	3	III	0.281					12,167	43,232		
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27	35	30.3	2,625	0.53	0.46	3	III	0.866					21,483	24,806		
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37	35	24.8	3,923	0.89	0.63	3	III	0.709					36,010	50,803		
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19	30	4.7	4,448	2.41	0.38	3	IV	0.157					3,993	25,354	0.509	0.582
33	Length of Roadway Section											PM Travel Time				PM Free Flow Travel Time											
34	Totals in the Westbound Direction (PM Peak) =								WB		7.27				39.8	14.7											
35	Totals in the Eastbound Direction (PM Non-Peak) =								EB		7.27				27.6	14.7											
36											Miles				min	min											
37	PM Peak Direction in Gaithersburg Policy Area						GBG		WB		2.25				13.6	4.7											
38	PM Peak Direction in North Potomac Policy Area						NP		WB		0.96				8.5	2.3											
39	PM Peak Direction in Germantown West Policy Area						GTW		WB		4.06				17.8	7.6											
40																											
41	PM Non-Peak Direction in Germantown W. Policy Area						GTW		EB		4.06				12.1	7.6											
42	PM Non-Peak Direction in North Potomac Policy Area						NP		EB		0.96				3.6	2.3											
43	PM Non-Peak Direction in Gaithersburg Policy Area						GBG		EB		2.25				12.0	4.7											
44																											

TPAR12 Sample Calculation for one "Link"

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Model Results								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						

Column AA

$$\frac{\text{PM Peak-Dir. Speed}}{\text{Free Flow Speed}} = \frac{\text{Column S}}{\text{Column R}} = \frac{4.7 \text{ mph}}{30.0 \text{ mph}} = 0.157$$

Sample Calculation: Weight by Vehicle Miles

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Model Results								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						

Column AA

$$\frac{\text{PM Peak-Dir. Speed}}{\text{Free Flow Speed}} = \frac{\text{Column S}}{\text{Column R}} = \frac{4.7 \text{ mph}}{30.0 \text{ mph}} = 0.157$$

Column AB

Veh.-Miles Weighting

Link Distance	x	PM Peak-Dir. Volume	x	**PM Peak-Dir. Speed**		
Column Q	x	Column T	x	Column **S**		
(0.27 mi	x	3,526 veh	x	4.7 mph)	=	3,165

Sample Calculation: Numerator & Denominator

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Model Results								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						

Column AA

$$\frac{\text{PM Peak-Dir. Speed}}{\text{Free Flow Speed}} = \frac{\text{Column S}}{\text{Column R}} = \frac{4.7 \text{ mph}}{30.0 \text{ mph}} = 0.157$$

Column AB

Veh.-Miles Weighting

Link Distance **x** PM Peak-Dir. Volume **x** **PM Peak-Dir. Speed**

Column Q **x** Column T **x** Column **S**

(0.27 mi **x** 3,526 veh **x** 4.7 mph) = 3,165

Column AC

Veh.-Miles Weighting

Link Distance **x** PM Peak-Dir. Volume **x** **PM Peak-Dir. Free Flow Speed**

Column Q **x** Column T **x** Column **R**

(0.27 mi **x** 3,526 veh **x** 30.0 mph) = 20,098

Sample Calculation: Check of the Aritmetic

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Model Results								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						

Column AA

$$\frac{\text{PM Peak-Dir. Speed}}{\text{Free Flow Speed}} = \frac{\text{Column S}}{\text{Column R}} = \frac{4.7 \text{ mph}}{30.0 \text{ mph}} = 0.157$$

Column AB

Veh.-Miles Weighting

Link Distance **x** PM Peak-Dir. Volume **x** **PM Peak-Dir. Speed**

Column Q **x** Column T **x** Column **S**

(0.27 mi **x** 3,526 veh **x** 4.7 mph **)** = 3,165

Column AC

Veh.-Miles Weighting

Link Distance **x** PM Peak-Dir. Volume **x** **PM Peak-Dir. Free Flow Speed**

Column Q **x** Column T **x** Column **R**

(0.27 mi **x** 3,526 veh **x** 30.0 mph **)** = 20,098

$$\frac{\text{AB}}{\text{AC}} = 0.157$$

Sample Calculation: Weights Needed for Segments

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Model Results								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	27.0	3,546	0.82	0.63	3	III	0.771	35,414	45,921						
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	7.4	6,910	2.18	0.46	3	III	0.213	13,880	65,300						
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	13.3	5,515	0.90	0.34	3	III	0.381	14,722	38,605						
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	5.9	5,515	1.93	0.46	2	IV	0.237	6,200	26,196						
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	6.0	5,491	1.71	0.41	2	IV	0.239	5,581	23,337						
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	16.7	3,466	2.08	1.39	2	IV	0.670	33,668	50,257						
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	10.9	4,350	1.54	0.67	2	IV	0.437	13,298	30,450	0.420					
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	6.8	2,607	8.47	2.30	2	IV	0.272	17,020	62,568	0.272					
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	22.6	2,163	1.67	1.08	3	III	0.645	30,759	47,694						
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	28.6	1,533	1.28	1.05	3	III	0.818	26,769	32,730						
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.51	35	16.9	2,513	1.81	0.87	3	III	0.483	21,659	44,857						
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.07	35	32.9	2,102	0.13	0.12	3	III	0.941	4,847	5,150						
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	9.7	2,102	3.58	1.16	3	IV	0.324	11,845	36,575						
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	3	NB	1	1.66	30	10.7	2,020	9.28	3.32	3	IV	0.358	35,971	100,596	0.493	0.436				

Average Level of Service: Gaithersburg Westbound Segment

$$= \frac{\text{Sum of Column AB}}{\text{Sum of Column AC}} = \frac{125{,}928}{300.168} = 0.420$$

Average Level of Service: North Potomac Westbound Segment

$$= \frac{\text{Sum of Column AB}}{\text{Sum of Column AC}} = \frac{17{,}020}{62{,}568} = 0.272$$

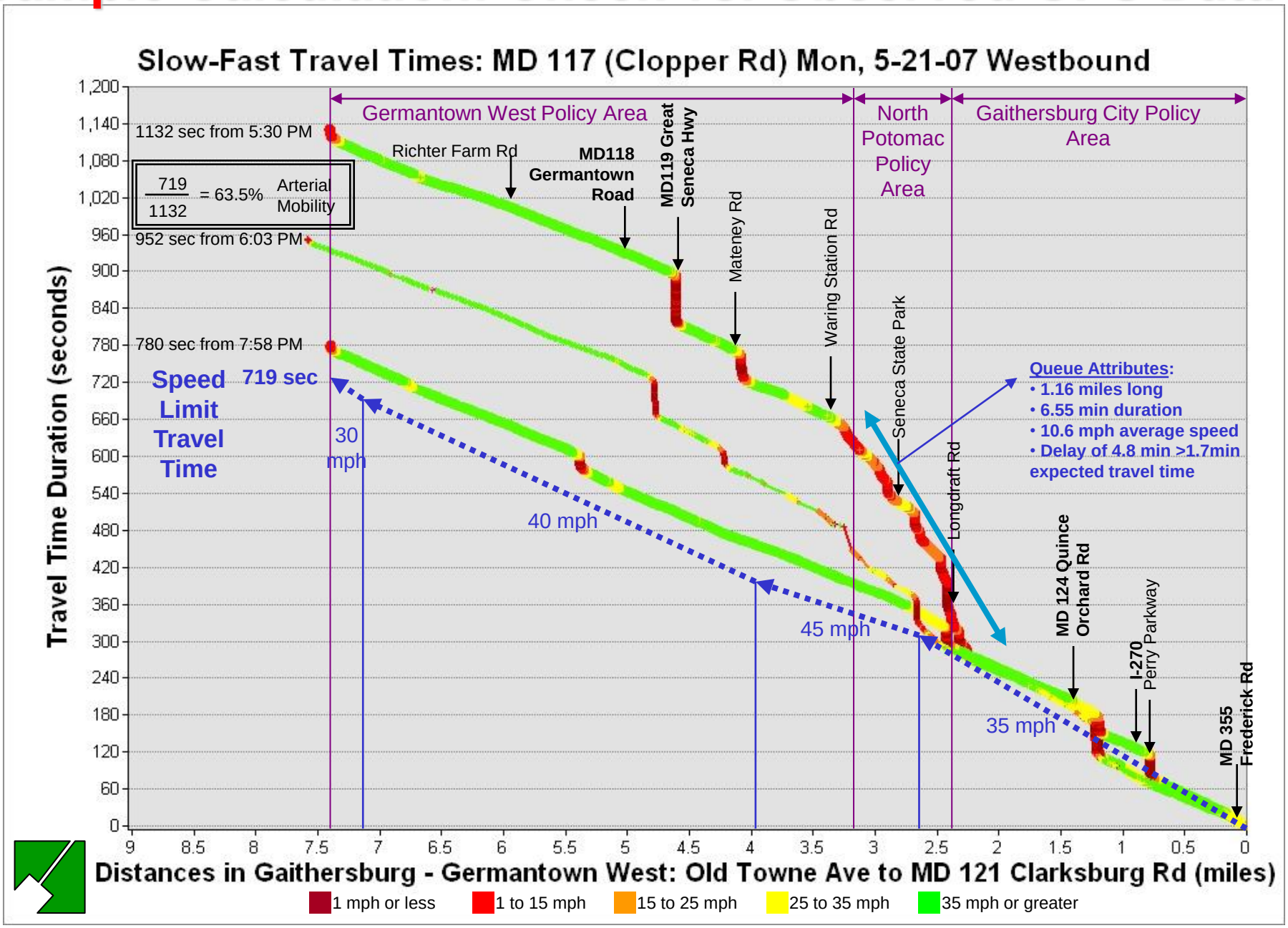
Average Level of Service: Germantown West WB Segment

$$= \frac{\text{Sum of Column AB}}{\text{Sum of Column AC}} = \frac{131{,}858}{267{,}601} = 0.493$$

Average Level of Service: MD117 All Westbound Segments

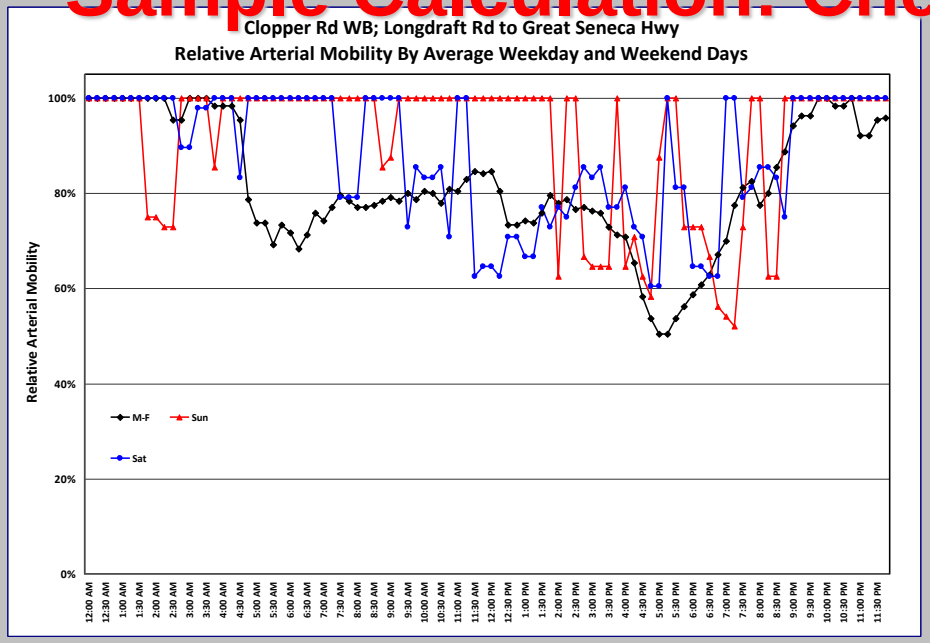
$$= \frac{\text{Sum of Column AB}}{\text{Sum of Column AC}} = \frac{274{,}799}{630{,}333} = 0.436$$

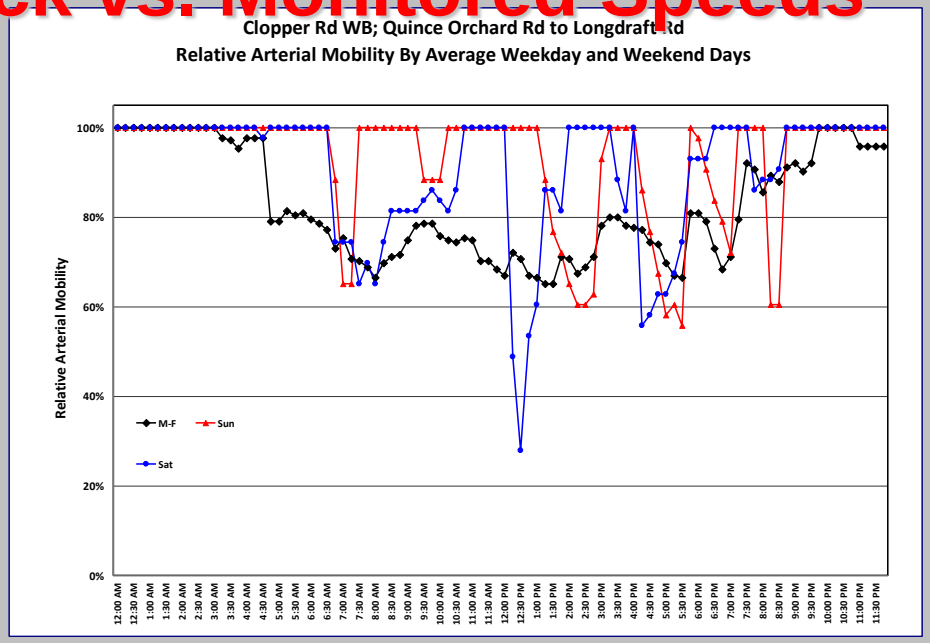
Sample Calculation: Check vs. Observed GPS Data

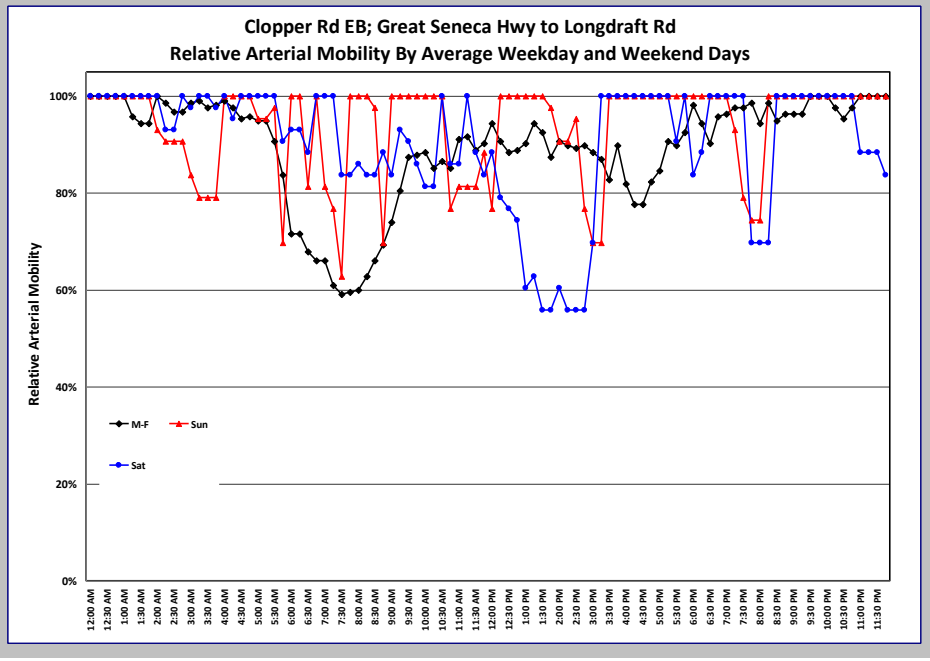


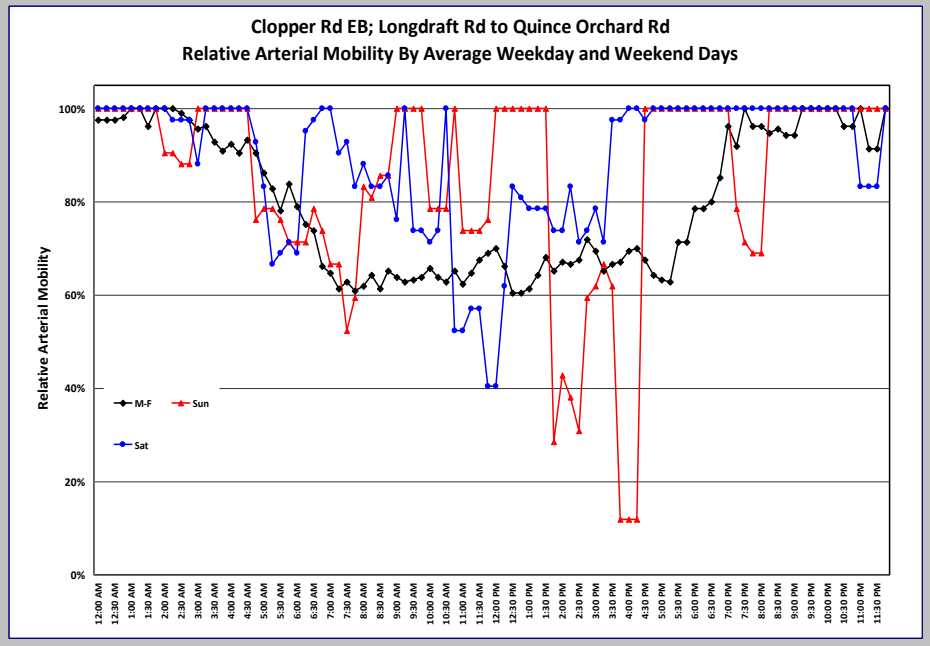
Source File: MD117W339_TT-Dist_070521_Mon_F-S-M_v2LR.jpg Updated: 4-30-08

Sample Calculation: Check vs. Monitored Speeds









Trend of Model Results: MD 117 Example -- 2010

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Results: 2010 Net -- 2010 Dev. Act								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Road Peak Slow-ness	PA Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Road NonPk Slow-ness	PA NonPk Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	5.2	2,725	2.21	0.38	3	IV	0.172	2,668	15,533						
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	31.0	2,326	0.72	0.63	3	III	0.886	26,673	30,122						
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	10.3	6,065	1.57	0.46	3	III	0.295	16,935	57,314						
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	19.4	4,788	0.62	0.34	3	III	0.555	18,592	33,516						
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	6.4	5,326	1.77	0.46	2	IV	0.258	6,519	25,299						
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	8.7	4,777	1.17	0.41	2	IV	0.348	7,057	20,302						
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	10.5	2,210	3.32	1.39	2	IV	0.419	13,439	32,045						
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	6.4	2,675	2.64	0.67	2	IV	0.255	4,772	18,725	0.415					
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	9.6	2,292	6.00	2.30	2	IV	0.384	21,106	55,008	0.384					
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	27.7	1,664	1.36	1.08	3	III	0.792	29,049	36,691						
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	31.2	1,103	1.17	1.05	3	III	0.893	21,025	23,549						
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.51	35	25.6	1,896	1.19	0.87	3	III	0.732	24,787	33,844						
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.07	35	33.1	1,971	0.13	0.12	3	III	0.945	4,563	4,829						
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	11.4	1,971	3.05	1.16	3	IV	0.380	13,023	34,295						
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	3	NB	1	1.66	30	20.4	1,415	4.89	3.32	3	IV	0.678	47,811	70,467	0.689	0.525				
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	3	SB	1	1.66	30	21.3	1,341	4.67	3.32	3	IV	0.712					47,517	66,782		
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58	30	14.9	1,785	2.34	1.16	3	IV	0.497					15,421	31,059		
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.07	35	33.3	1,785	0.13	0.12	3	III	0.950					4,156	4,373		
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.51	35	31.3	1,092	0.98	0.87	3	III	0.894					17,429	19,492		
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61	35	33.3	576	1.10	1.05	3	III	0.952					11,706	12,298		
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63	35	32.7	788	1.16	1.08	3	III	0.933					16,216	17,375	0.743	
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96	25	21.7	1,093	2.66	2.30	2	IV	0.866					22,723	26,232	0.866	
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28	25	16.6	1,747	1.01	0.67	2	IV	0.665					8,129	12,229		
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	2	EB	2	0.58	25	11.9	2,105	2.92	1.39	2	IV	0.476					14,532	30,523		
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17	25	9.8	4,548	1.04	0.41	2	IV	0.391					7,557	19,329		
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19	25	6.2	5,425	1.85	0.46	2	IV	0.246					6,345	25,769		
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20	35	13.0	5,582	0.92	0.34	3	III	0.371					14,483	39,074		
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27	35	32.0	1,887	0.51	0.46	3	III	0.913					16,278	17,832		
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37	35	28.7	3,033	0.77	0.63	3	III	0.821					32,258	39,277		
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19	30	4.7	3,898	2.41	0.38	3	IV	0.157					3,499	22,219	0.500	0.621
33											Length of Roadway Section				PM Travel Time	PM Free Flow Travel Time											
34			Totals in the Westbound Direction (PM Peak) =						WB		7.27				31.8	14.7												
35			Totals in the Eastbound Direction (PM Non-Peak) =						EB		7.27				24.5	14.7												
36											Miles				min	min											

Legend: Average Level of Service

more than	0.501	Avg LOS **A,B,C**
more than	0.400	Avg LOS **D**
more than	0.300	Avg LOS **E**
less than	0.299	Avg LOS **F**

Trend of Model Results: MD 117 Example -- 2018

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Results: 2018 Net -- 2018 Dev. Act								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Road Peak Slow-ness	PA Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Road NonPk Slow-ness	PA NonPk Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,347	2.41	0.38	3	IV	0.157	3,004	19,078						
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	28.5	3,105	0.78	0.63	3	III	0.814	32,726	40,210						
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	8.3	6,621	1.96	0.46	3	III	0.236	14,792	62,568						
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	13.7	5,455	0.88	0.34	3	III	0.391	14,947	38,185						
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	6.1	5,455	1.88	0.46	2	IV	0.243	6,295	25,911						
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	5.5	5,688	1.86	0.41	2	IV	0.219	5,303	24,174						
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	17.0	3,419	2.05	1.39	2	IV	0.679	33,653	49,576						
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	12.6	4,121	1.33	0.67	2	IV	0.505	14,570	28,847	0.434					
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	7.3	2,539	7.90	2.30	2	IV	0.292	17,777	60,936	0.292					
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	23.6	2,070	1.60	1.08	3	III	0.673	30,714	45,644						
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	31.0	1,160	1.18	1.05	3	III	0.886	21,939	24,766						
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.49	35	15.8	2,578	1.86	0.84	3	III	0.451	19,937	44,213						
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.08	35	33.2	1,874	0.14	0.14	3	III	0.948	4,973	5,247						
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	13.0	1,874	2.68	1.16	3	IV	0.433	14,113	32,608						
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	2	NB	1	1.66	30	14.8	1,787	6.71	3.32	3	III	0.495	44,040	88,993	0.562	0.472				
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	2	SB	1	1.66	30	20.7	1,385	4.80	3.32	3	III	0.692					47,695	68,973		
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58	30	15.2	1,774	2.29	1.16	3	IV	0.506					15,610	30,868		
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.08	35	33.3	1,774	0.14	0.14	3	III	0.951					4,722	4,967		
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.49	35	22.1	2,213	1.33	0.84	3	III	0.631					23,941	37,953		
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61	35	32.8	740	1.12	1.05	3	III	0.938					14,817	15,799		
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63	35	31.4	1,068	1.20	1.08	3	III	0.897					21,127	23,549	0.702	
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96	25	21.1	1,177	2.73	2.30	2	IV	0.844					23,828	28,248	0.844	
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28	25	20.2	2,648	0.83	0.67	2	IV	0.807					14,950	18,536		
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	3	EB	2	0.58	25	19.1	3,030	1.83	1.39	2	IV	0.763					33,507	43,935		
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17	25	6.5	5,295	1.56	0.41	2	IV	0.262					5,885	22,504		
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19	25	5.1	5,854	2.24	0.46	2	IV	0.204					5,671	27,807		
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20	35	11.4	5,854	1.05	0.34	3	III	0.327					13,381	40,978		
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27	35	30.5	2,575	0.53	0.46	3	III	0.871					21,188	24,334		
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37	35	26.8	3,596	0.83	0.63	3	III	0.767					35,701	46,568		
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19	30	4.7	4,506	2.41	0.38	3	IV	0.157					4,045	25,684	0.537	0.621
33											Length of Roadway Section				PM Travel Time	PM Free Flow Travel Time											
34			Totals in the Westbound Direction (PM Peak) =						WB		7.26				35.2	14.6												
35			Totals in the Eastbound Direction (PM Non-Peak) =						EB		7.26				24.9	14.6												
36											Miles				min	min											

Legend: Average Level of Service

more than	0.501	Avg LOS **A,B,C**
more than	0.400	Avg LOS **D**
more than	0.300	Avg LOS **E**
less than	0.299	Avg LOS **F**

Trend of Model Results: MD 117 Example -- 2022

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Results: 2022 Net -- 2022 Dev. Act								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Segment Peak Slow-ness	Road Peak Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	3,526	2.41	0.38	3	IV	0.157	3,165	20,098						
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	27.0	3,546	0.82	0.63	3	III	0.771	35,414	45,921						
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	7.4	6,910	2.18	0.46	3	III	0.213	13,880	65,300						
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	13.3	5,515	0.90	0.34	3	III	0.381	14,722	38,605						
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	5.9	5,515	1.93	0.46	2	IV	0.237	6,200	26,196						
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	6.0	5,491	1.71	0.41	2	IV	0.239	5,581	23,337						
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	16.7	3,466	2.08	1.39	2	IV	0.670	33,668	50,257						
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	10.9	4,350	1.54	0.67	2	IV	0.437	13,298	30,450	0.420					
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	6.8	2,607	8.47	2.30	2	IV	0.272	17,020	62,568	0.272					
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	22.6	2,163	1.67	1.08	3	III	0.645	30,759	47,694						
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	28.6	1,533	1.28	1.05	3	III	0.818	26,769	32,730						
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.51	35	16.9	2,513	1.81	0.87	3	III	0.483	21,659	44,857						
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.07	35	32.9	2,102	0.13	0.12	3	III	0.941	4,847	5,150						
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	9.7	2,102	3.58	1.16	3	IV	0.324	11,845	36,575						
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	3	NB	1	1.66	30	10.7	2,020	9.28	3.32	3	IV	0.358	35,971	100,596	0.493	0.436				
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	3	SB	1	1.66	30	18.9	1,541	5.28	3.32	3	IV	0.629					48,252	76,742		
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58	30	13.2	1,865	2.65	1.16	3	IV	0.439					14,230	32,451		
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.07	35	33.2	1,865	0.13	0.12	3	III	0.948					4,331	4,569		
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.51	35	21.0	2,325	1.45	0.87	3	III	0.601					24,956	41,501		
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61	35	30.6	1,248	1.19	1.05	3	III	0.875					23,324	26,645		
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63	35	27.9	1,632	1.35	1.08	3	III	0.798					28,715	35,986	0.660	
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96	25	15.9	1,830	3.63	2.30	2	IV	0.636					27,913	43,920	0.636	
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28	25	18.0	3,213	0.93	0.67	2	IV	0.721					16,211	22,491		
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	2	EB	2	0.58	25	18.2	3,187	1.92	1.39	2	IV	0.726					33,570	46,212		
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17	25	6.8	5,219	1.50	0.41	2	IV	0.271					6,019	22,181		
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19	25	4.5	6,176	2.54	0.46	2	IV	0.179					5,263	29,336		
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20	35	9.9	6,176	1.22	0.34	3	III	0.281					12,167	43,232		
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27	35	30.3	2,625	0.53	0.46	3	III	0.866					21,483	24,806		
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37	35	24.8	3,923	0.89	0.63	3	III	0.709					36,010	50,803		
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19	30	4.7	4,448	2.41	0.38	3	IV	0.157					3,993	25,354	0.509	0.582
33											Length of Roadway Section				PM Travel Time	PM Free Flow Travel Time											
34			Totals in the Westbound Direction (PM Peak) =						WB		7.27				39.8	14.7												
35			Totals in the Eastbound Direction (PM Non-Peak) =						EB		7.27				27.6	14.7												
36											Miles				min	min											

Legend: Average Level of Service

more than	0.501	Avg LOS **A,B,C**
more than	0.400	Avg LOS **D**
more than	0.300	Avg LOS **E**
less than	0.299	Avg LOS **F**

Trend of Model Results: MD 117 Example -- 2040

	A	B	C	D	I	J	K	M	O	P	Q	R	S	T	V	W	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Partial Modeling Inputs											Partial Modeling Results							TPAR Post-Processing of Results: 2022 Net -- 2040 Dev. Act								
2	A	B	ROUTE_ ID2	NAME2	SEQ22	PAF	PAN	FTYPE2	ROADDIR	PMLANE	DISTANCE	FFPMSPD	I6PMSPD	I6PMVOL	PMHTIME6	PMHTIMEFF	AREATP	ARTCLASS	PM Pk Pd Link Slow-ness	Dist x PM Vol x PM PkDir Speed	Dist x PM Vol x FreeFlow Speed	Road Peak Slow-ness	PA Peak Slow-ness	Dist x PM Vol x NonPkDir Speed	Dist x PM Vol x FreeFlow Speed	Road NonPk Slow-ness	PA NonPk Slow-ness
3	3496	3431	MD117	West Diamond Ave	W02	10	GBG	3	WB	1	0.19	30	4.7	4,816	2.41	0.38	3	IV	0.157	4,323	27,451						
4	3431	3734	MD117	West Diamond Ave	W03	10	GBG	2	WB	2	0.37	35	24.7	3,939	0.90	0.63	3	III	0.706	36,015	51,010						
5	3734	3736	MD117	West Diamond Ave	W04	10	GBG	2	WB	2	0.27	35	5.9	7,593	2.73	0.46	3	III	0.170	12,184	71,754						
6	3736	3164	MD117	West Diamond Ave	W05	10	GBG	2	WB	2	0.20	35	9.5	6,255	1.26	0.34	3	III	0.272	11,920	43,785						
7	3164	3299	MD117	West Diamond Ave	W06	10	GBG	2	WB	2	0.19	25	4.4	6,255	2.62	0.46	2	IV	0.174	5,178	29,711						
8	3299	3163	MD117	Clopper Rd	W07	10	GBG	2	WB	2	0.17	25	4.2	6,332	2.41	0.41	2	IV	0.170	4,562	26,911						
9	3163	3838	MD117	Clopper Rd	W08	10	GBG	2	WB	2	0.58	25	11.3	4,295	3.08	1.39	2	IV	0.451	28,112	62,278						
10	3838	3301	MD117	Clopper Rd	W09	10	GBG	2	WB	2	0.28	25	4.5	6,176	3.75	0.67	2	IV	0.179	7,756	43,232	0.309					
11	3301	3977	MD117	Clopper Rd	W10	19	NP	2	WB	1	0.96	25	5.2	2,900	11.04	2.30	2	IV	0.209	14,526	69,600	0.209					
12	3977	3276	MD117	Clopper Rd	W11	13	GTW	2	WB	1	0.63	35	23.7	2,060	1.60	1.08	3	III	0.676	30,709	45,423						
13	3276	3303	MD117	Clopper Rd	W12	13	GTW	2	WB	1	0.61	35	27.2	1,745	1.35	1.05	3	III	0.776	28,924	37,256						
14	3303	3304	MD117	Clopper Rd	W13	13	GTW	2	WB	1	0.49	35	13.3	2,763	2.21	0.84	3	III	0.380	17,985	47,385						
15	3304	3846	MD117	Clopper Rd	W14	13	GTW	2	WB	3	0.08	35	32.9	2,131	0.15	0.14	3	III	0.940	5,611	5,967						
16	3846	3306	MD117	Clopper Rd	W15	13	GTW	3	WB	1	0.58	30	9.3	2,131	3.72	1.16	3	IV	0.312	11,554	37,079						
17	3306	3432	MD117	Clopper Rd	W16	13	GTW	2	NB	1	1.66	30	6.9	2,402	14.41	3.32	3	III	0.230	27,559	119,620	0.418	0.344				
18	3432	3306	MD117	Clopper Rd	E04	13	GTW	2	SB	1	1.66	30	15.6	1,759	6.40	3.32	3	III	0.519					45,447	87,598		
19	3306	3846	MD117	Clopper Rd	E05	13	GTW	3	EB	1	0.58	30	12.6	1,898	2.77	1.16	3	IV	0.418					13,816	33,025		
20	3846	3304	MD117	Clopper Rd	E06	13	GTW	2	EB	3	0.08	35	33.1	1,898	0.14	0.14	3	III	0.947					5,033	5,314		
21	3304	3303	MD117	Clopper Rd	E07	13	GTW	2	EB	1	0.49	35	18.3	2,443	1.61	0.84	3	III	0.523					21,899	41,897		
22	3303	3276	MD117	Clopper Rd	E08	13	GTW	2	EB	1	0.61	35	30.9	1,184	1.18	1.05	3	III	0.883					22,320	25,278		
23	3276	3977	MD117	Clopper Rd	E09	13	GTW	2	EB	1	0.63	35	27.6	1,680	1.37	1.08	3	III	0.789					29,215	37,044	0.598	
24	3977	3301	MD117	Clopper Rd	E10	19	NP	2	EB	1	0.96	25	12.6	2,063	4.58	2.30	2	IV	0.503					24,922	49,512	0.503	
25	3301	3838	MD117	Clopper Rd	E11	10	GBG	2	EB	2	0.28	25	13.8	3,996	1.22	0.67	2	IV	0.552					15,447	27,972		
26	3838	3163	MD117	Clopper Rd	E12	10	GBG	3	EB	2	0.58	25	8.9	4,745	3.93	1.39	2	IV	0.354					24,363	68,803		
27	3163	3299	MD117	Clopper Rd	E13	10	GBG	2	EB	2	0.17	25	4.0	6,659	2.54	0.41	2	IV	0.161					4,550	28,301		
28	3299	3164	MD117	West Diamond Ave	E14	10	GBG	2	EB	2	0.19	25	4.0	7,054	2.84	0.46	2	IV	0.161					5,387	33,507		
29	3164	3736	MD117	West Diamond Ave	E15	10	GBG	2	EB	2	0.20	35	7.1	7,054	1.70	0.34	3	III	0.202					9,967	49,378		
30	3736	3734	MD117	West Diamond Ave	E16	10	GBG	2	EB	2	0.27	35	27.4	3,412	0.59	0.46	3	III	0.784					25,269	32,243		
31	3734	3431	MD117	West Diamond Ave	E17	10	GBG	2	EB	2	0.37	35	14.4	5,349	1.54	0.63	3	III	0.411					28,446	69,270		
32	3431	3496	MD117	West Diamond Ave	E18	10	GBG	3	EB	1	0.19	30	4.7	6,366	2.41	0.38	3	IV	0.157					5,714	36,286	0.345	0.451
33											Length of Roadway Section				PM Travel Time	PM Free Flow Travel Time											
34			Totals in the Westbound Direction (PM Peak) =						WB		7.26				53.6	14.6												
35			Totals in the Eastbound Direction (PM Non-Peak) =						EB		7.26				34.8	14.6												
36											Miles				min	min											

Legend: Average Level of Service

more than	0.501	Avg LOS **A,B,C**
more than	0.400	Avg LOS **D**
more than	0.300	Avg LOS **E**
less than	0.299	Avg LOS **F**

Issue: More Information on Free-Flow Speed

- **Board requested more information on "free-flow speed"**
  - How defined?
  - How determined or calculated?
  - How stable are the defined values expected to be?
- **As currently used it is calculated for each link in model**
  - Feature of MWCOG Model used by Planning Staff
  - Has been used in the modeling for many years
  - A modeling analysis "starts" with a free-flow speed on each link
  - In modeling: traffic increases, link speeds decrease
  - After all traffic assigned, model system reports final link speeds
- **New (2010) version of the Highway Capacity Manual:**
  - **"Free-flow speed represents the average running speed of through automobiles traveling along a segment under low-volume conditions and not delayed by traffic control devices or other vehicles. ..(affected by) … speed limit, access point density, median type, curb presence, and segment length." (Chapter 17, page 32)**

Free-Flow Speed: How Determined? How Stable?

- Model system determines a free flow speed each time using a "look-up" table of Facility Type by Area Type
- There are 7 Facility Types and 7 Area Types:
  - Facility types include Freeway, expressway, major arterial, minor arterial, collector road, ramp, and zone connector
  - Area type varies by population density and employment density within a one-mile radius of the ends of the link
  - The look-up tables that show these variations are available
- In shorter-term modeling the values of free-flow speed are stable as the are stable; in longer term modeling (i.e. 2040) they can vary as densities increase to a next level
- GPS-based probe samples can be used to measure
- Monitored Vehicle Probe Proj. uses a "reference speed"
- Methods from Highway Capacity Manual are designed for operations application; too complex for planning use
- Speed Limits could be used in the TPAR application

Free-Flow Speed: Are there other Options?

- GPS-based probe samples: while they can be easily used to measure a specific roadway, challenges is having enough samples for all roadways
- Monitored Vehicle Probe Project: uses a "reference speed" that appears reasonable, is widespread, and will change over the long term; however, coverage is not complete nor does the link definitions match
- Methods from Highway Capacity Manual are designed for operations application; too complex for planning use
- "Posted Speed Limits" could be used for the TPAR application; they are available for all links; issue of consistency with remainder of the region
- Any change would need to be done as part of the "new" model being implemented over the next few years

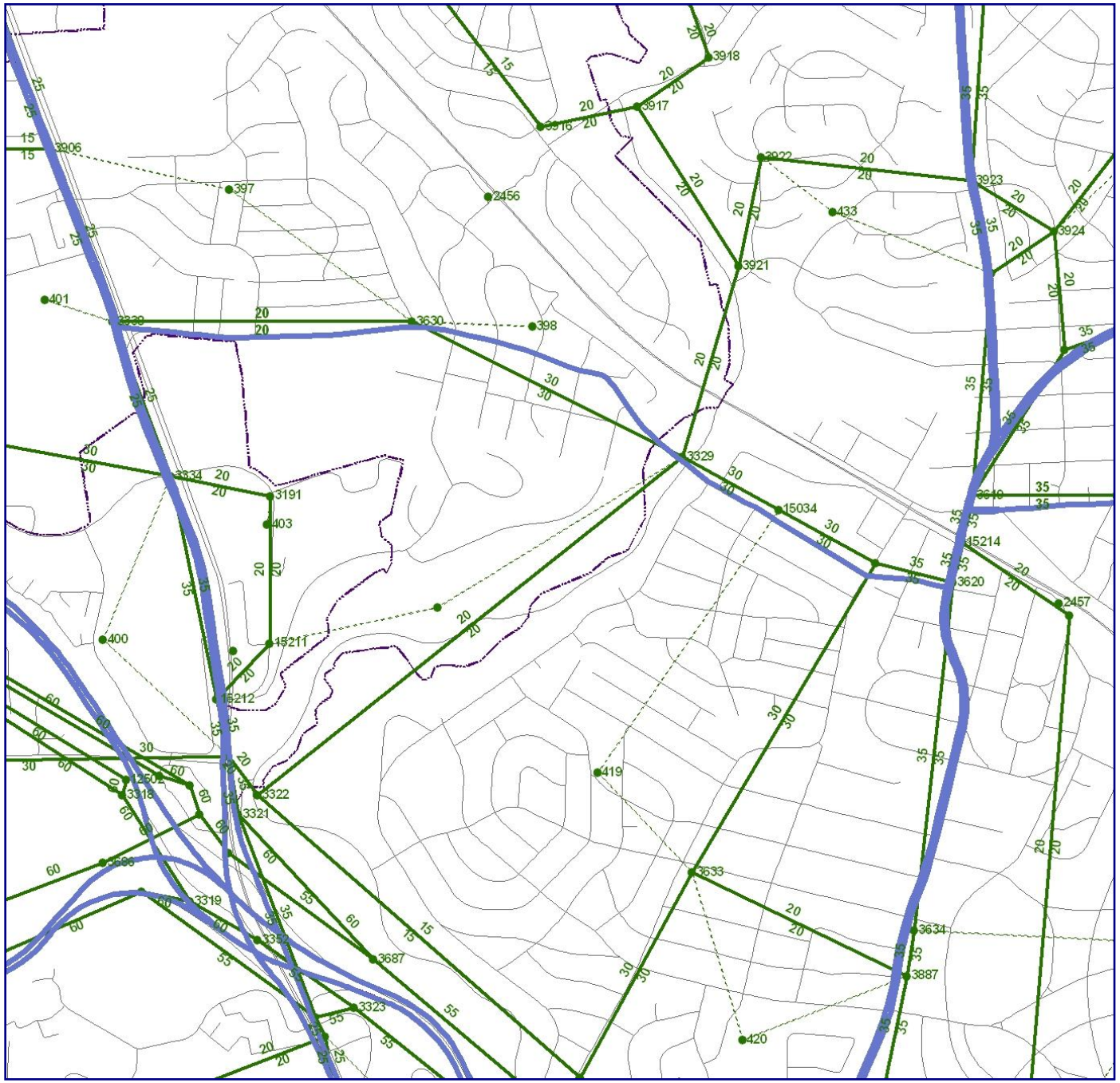
Issue: a Broader Vision for TPAR?

- **Board identified several issues related to a broader vision for TPAR as an element of the Subdivision Staging Policy including:**
  - **Regional interdependencies of future balances between land use planning and the timing of major transportation solutions**
  - **Use of management and operations solutions, including pricing, to better match the demand to the supply of transportation**
- **It is recommended that discussion of these types of issues be reserved for a future presentation to the Board on the Subdivision Staging Policy Process that will take place in June, 2012**

Issue: a Application of TPAR to Policy Areas?

- **Improvements to the Graphics:**
  - Request by MCDOT to edit the roadway graphics for each Policy Area to better differentiate a Policy Area from the surroundings
  - Similar improvement to be made to transit coverage graphics
  - Other errata items to be included in the Policy Area write-ups
- **Policy Area Adequacy – Each road being Adequate?**
  - Issue raised with an example of MD 547 (Strathmore and Knowles Ave) in North Bethesda and Kensington Wheaton; (see monitoring information on next slides)
  - Are there other example to be concerned about in other Areas?
  - TPAR analysis is not a substitute for Project Planning or for Master Plan updates to consider changes to facilities
  - Use the variation from the average standard as an indicator of the need for improvement; the objective is raise the "overall average" to an adequate level – not to have any one roadway be less congested on average than the standard for an area

MD 547 Strathmore and Knowles Avenues



Monitored Speeds: MD 547 Strathmore/Knowles Ave