



Subdivision Staging Policy: Staff Draft



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Description

The Subdivision Staging Policy (formerly the Growth Policy) seeks to ensure timely delivery of public facilities (schools, transportation, water, sewer, and other infrastructure) to serve existing and future development. The Growth Policy Law (Article 3. Sec. 33A-15) requires that a Staff Draft be prepared and sent to the County Council by June 15, 2012.

The Subdivision Staging Policy (SSP) is established to regulate the relative timing of development and facilities. Approved and adopted community master and sector plans regulate the amount, pattern, location, and type of development in the county. The SSP tools promote smarter growth and assure that sufficient funds are available to serve areas where growth is approved.

The Staff Draft Subdivision Staging Policy report is attached to this memo. It fulfills the requirements of the Growth Policy law by providing a status report and trends for land use, population and employment as well as a set of recommendations for subdivision staging.

This report includes the new Transportation Policy Area Review (TPAR) as a major recommendation of the policy. The cost allocation and fees for TPAR are not included in this report because preparing that information has taken longer than expected. It will be published before the Planning Board worksessions and is scheduled to be discussed on July 19, 2012. The attached memo presents new recommendations for the transit adequacy test requested by the Planning Board at previous Planning Board discussions on TPAR.

Summary

Staff recommends that the Planning Board accept the Staff Draft Subdivision Staging Policy as the Public Hearing Draft and set the public hearing date for June 28, 2012.

Previously reviewed and adopted every two years, the Subdivision Staging Policy will now be adopted in the second year of each Council term. Three years have passed since the last policy was updated and in the future the policy update will occur every four years. Article 3, Section 33A-15 requires that the Planning Board prepare:

- A status report on general land use conditions in the county including:
 - Remaining growth capacity of zoned land
 - Recent trends in real estate transactions
 - Level of service conditions of major public facilities and environmentally sensitive areas
 - Other relevant monitoring measures
- A forecast of the most probable trends in population, households and employment for the next 10 years, including key factors that may affect the trends.
- A recommended set of guidelines for the Board, and other agencies as appropriate, with respect to subdivision staging and administration of related laws and regulations which affect growth and development.
- Any other information or recommendations relevant to subdivision staging policy or requested by the Council.

The attached report and appendix contain the required information and present the issues confronting Montgomery County as we continue on the path set by the 2005, 2007 and 2009 Growth Policies. The key recommendations of the Staff Draft 2012-2016 Subdivision Staging Policy are listed below.

Also, Attachment 1 contains additional information on the Transportation Policy Area Review 2012 transit adequacy analysis, the results of which are included in the Staff Draft 2012-2016 Subdivision Staging Policy. This information, which resulted from previous Planning Board Sessions on TPAR, will be discussed with the Board at this session.

Recommendations

1. Adopt the TPAR methodology for determining adequacy of transit and roadway facilities.
2. Determine TPAR fees to be paid by private development based on the cost of improvements needed in each policy area by 2040 divided by the number of new trips projected for each policy area by 2040. Note: The costs and fees will be discussed at the Planning Board worksessions and added to the Planning Board draft of this policy.
3. Ensure that projects are placed into the Facility Planning Program when 10 percent of the needed funds are contributed by the private sector and into the Capital Improvement Program when funding agreements are in place for the remainder of the private share.
4. Update the TPAR test every two years starting in 2014 to assist in incorporating new transportation strategies and data and to assist in fine-tuning the priorities for the CIP.

Local Area Transportation Review

5. Require applicants to analyze queuing and delay at intersections where traffic volumes exceed 85 percent of the Critical Lane Volume standard, per the applicable policy area standard.

6. Develop appropriate volume to capacity standards for intersections where queuing and delay are being analyzed.

Annual School Test

7. Retain the threshold for a school facility payment at school utilization greater than 105 percent and less than 120 percent.
8. Retain the threshold for school moratoria on new residential subdivisions and construction when at school utilization is greater than 120 percent.
9. Update the school facility payment rates to reflect the most recent school construction costs available.
10. Allow the Planning Board to make a mid-cycle finding of school adequacy.
11. Retain the current De Minimis exemption, which allows the Planning Board to approve a subdivision in any cluster where public school capacity is inadequate, provided the subdivision consists of no more than three housing units and the applicant commits to pay a school facility payment as otherwise required.
12. Modify exemption for senior housing such that the Planning Board may approve a subdivision in a cluster where school capacity is inadequate, provided the subdivision consists entirely of housing and related facilities for elderly or handicapped persons or housing units located in an age-restricted section of a planned retirement community.
13. Retain all current waivers of the school facility payment as currently regulated under Chapter 52 of the Montgomery County Code, which includes a waiver for projects located in an enterprise zone (Wheaton CBD and Long Branch) or former enterprise zones as well as a waiver for moderately priced dwelling units (MPDU's) built under Chapter 25A.

Other Requirements

No substantive changes are recommended for the Water and Sewer adequacy test (although some minor changes are proposed for clarity), or for the Police, Fire and Health Services provisions of the policy.

The staff requests that the Planning Board accept the Staff Draft as the Public Hearing Draft and authorize staff to make corrections for clarity and accuracy.

Attachment

1. TPAR memo on transit adequacy
2. Staff Draft Subdivision Staging Policy and Appendix

MD/EG/PD/BG/kr



Subdivision Staging Policy: TPAR Transit Adequacy Test Recommendations

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Description

The proposed criteria for the TPAR transit adequacy test were discussed with the Planning Board conceptually at their May 17th worksession. Much of that discussion focused on the potential for a fourth category of transit adequacy, Urban without Metrorail, which would more be consistent with County’s General Plan. This issue is discussed in more in detail in the **Revised** Staff Draft 2012 Transportation Policy Area Review report which is included as Appendix 2 of the 2012-2016 Subdivision Staging Policy. In this regard, the Board’s attention should focus on two updated sections of the revised report:

- **Section III:** Details of the Proposed New Policy Area Review Process (Part 1: Identify Transit Inadequacies and Solutions) and
- **Section V:** Application of TPAR to Policy Areas and Proposed Subdivisions.

Summary

Staff recommends the establishment of a fourth category of policy area transit adequacy – Urban without Metrorail, but that an implementation hold be put on classifying particular policy areas into that category until the next TPAR review in 2014 unless officials are prepared now to make the necessary commitments to achieving the associated standards for that category by 2022.

The following discussion describes the rationale for this recommendation which was developed in close collaboration with MCDOT staff. The concept of a fourth category was raised by the Board and generally discussed with them at their last worksession on May 17, 2012:

- **Implicit Prior Recognition of a Fourth Category:** Exhibit 3.6 as initially drafted in TPAR10 implied that there could be policy areas that are “Urban without Metrorail” as it focused on Urban areas with Metrorail but also showed a value of an average of less than 14 minutes for Peak Headway for such Urban Areas without Metrorail.

- **Density Trend Analysis Does Distinguish Among Policy Areas:** The material reviewed with the Board on May 17 regarding the trend in population density and employment intensity by policy area showed that it would be possible and feasible to more explicitly distinguish among areas regarding that aspect of being more or less urban-like or suburban-like as well as different from rural.
- **Relationship to the Road Code Categories:** One of the rationales given in the TPAR 10 and TPAR 12 reports was the desirability of using the same set of terms used to differentiate among areas in the Road Code. In the discussion at the Board, Edgar Gonzalez of MCDOT noted that Road Code staff discussions had in addition to density, identified several other urban characteristics including: (a) mixed land uses, (b) close proximity of buildings to the street right-of-way, (c) substantial building heights, (d) significant pedestrian activity, and (e) sufficiently wide sidewalks. Other amenities such as street trees, landscaping, furniture, and even art were also considered. Most of these aspects are urban design considerations that are helpful in characterizing the quality of places but are of minor impact on the regional and/or within-county movement of vehicles and people in public rights-of-way of sufficient function and capacity to generally serve the travel demands. On a related note, although jobs-to-housing ratios information was prepared for the last Board worksession but was not discussed, Staff's view is that this information it is not a particularly helpful factor to distinguish among different Policy Areas.
- **The Three Transit Service Factors are Behaviorally Based:** The three current factors are: (1) coverage, how close in space are potential users to the service, (2) peak headway, how frequently in time is the service provided so as to be more convenient to users, and (3) span, over what time duration during a typical weekday is the service available to potential users. Even though these are input metrics they are still reasonable indicators of user behavior and are pragmatic enough to be tracked for changes over time.
- **Manageable Increments of Transit Service Improvements – Conditional Improvements to Attain Peak Headway Standards Countywide:** The set of conditional improvement to the Peak Headways identified in the 2012 TPAR Report would results in attaining the peak headway standards throughout the County if implemented by the 10-year time horizon of 2022. The additional capital and cumulative operating costs over that 10-year period is currently estimated at about \$64 million. There appears to be sufficient bus garage capacity in the near-term to serve the likely number of additional buses in service and spares to provide this service increment, which would be about 35 to 40 in total. The estimated number of buses equates to about a 10 to 12 % increase in the Ride-On bus fleet over a 10-year period. The forecasted growth in trip-ends in the County from the development forecasts for this 10-year period is also on the order of a 10% to 12% increase. Thus, such a level of investment over the next 10 years seems reasonable even with the currently difficult fiscal conditions.

- Uncertainty of the Affordability of Meeting Regulatory Standards within a 10-year Time Horizon for a Fourth Category:** A major concern regarding the establishment of a fourth category and making commitments to achieve the new standards for that category within a 10-year period is the likely larger extra cost increment beyond that of meeting the current standards. The additional capital and cumulative operating costs over that 10-year period is currently estimated at about \$95 million. There is also uncertainty whether there would be sufficient bus garage capacity within the 10-year period to serve all of the estimated additional 55 buses with spares.
- Reliance on Incremental Solutions while Simultaneously Pursuing More Comprehensive Ones:** It is also unclear whether such a dual set of improvements would reinforce or conflict with the project planning objectives and particular plans for the CCT transit improvement that has been underway for a number of years, and the second set in particular that would be focused in the I-270 Corridor. The CCT as Bus Rapid Transit will require a comprehensive restructuring of the local bus services throughout the I-270 Corridor. It is possible that interim investment in new buses to serve that corridor could be redeployed if appropriate with some effort and cost, perhaps even to other locales in the County. On the other hand the mix and size of the buses may not be a good fit with the bus restructuring needs. If an investment was made, and those particular buses would not be a good fit for restructuring, they still may be of value with respect to giving added flexibility to the overall, Countywide bus replacement program and forestall some on-going investment in that program.
- Financial Commitment First to Attaining the Standards as Proposed, then Work on New Commitments to General Plan Implementation:** There is much current fiscal uncertainty with respect to transportation financing at the Federal and State levels as well as large maintenance needs for the regional transit system. It would be very desirable to revise the proposed Policy Area categories to have a fourth category of Urban without Metrorail. However, trying to obtain local fiscal commitments to implement the appropriate standards may become very stressful. The funding priority should be for the local Ride-On bus services generally in accord with the first set in the draft TPAR 12 report, which would meet inadequacies associated with current bus transit services throughout most of the County. However, the Board and Council with Executive review could recommend that the fourth category be defined now but put a hold on implementation of commitments to achieve those standards until the next TPAR review in 2014. That would give the elected officials and the Board more opportunity to see how the TPAR system is performing before they consider making very tough financial commitments in these fiscally uncertain times. Planning Staff also points out that not all of the five policy areas being considered for classification as “Urban without Metrorail” need to be so classified at the same time. Thus for example, the officials could consider making such classifications incrementally, one Policy Area at a time, and stage this desirable approach more gradually and at a more affordable, effective, and manageable pace.

Attachment

Revised Staff Draft 2012 Transportation Policy Area Review Report, June 2012, Section III and V

Section III: Details of the Transportation Policy Area Review Process

The Transportation Policy Area Review (TPAR) process is an important element of the Subdivision Staging Policy. A precursor approach was enacted locally four decades ago as the Adequate Public Facilities Ordinance (APFO). Three decades ago the Growth Policy Report series recognized the need for an areawide type review of a more forward looking balance between programmed transportation improvements and proposed new subdivisions. In the mid 1980's and through the 1990's that process to regulate such future balances became the Annual Growth Policy (AGP). During the past decade the basic process was briefly suspended and then reestablished as the Policy Area Mobility Review (PAMR), which is the process currently in effect until recommendations of the Subdivision Staging Policy to change that policy are approved by the County Council.

The Master Plan decision making process needs to consider traffic conditions in a long-range time frame and sets a delicate balance between development activity, transportation infrastructure, and other factors at the time of build-out. Typically, the development and infrastructure included in a Master Plan is intended to be completely constructed within a 20 to 40 year stage of time. One of the critical issues that residents, businesses, officials and their planning staff, and transportation agencies collectively face is how to address the existing levels of congestion in the present and during the regulatory planning stage in the near future. It is not satisfactory to wait for the planned transportation infrastructure to be in place in order to achieve the desired master planned transportation and development balances.

The following graphic is a framework to interrelate the balancing process at different stages over time. The framework also includes a monitoring and decision-making stage during which the performance of the transportation system is assessed. Three main stages needing balance are: (1) regulatory planning stage, (2) transportation improvement stage, and (3) master plan stage. TPAR is a process that periodically examines the Countywide and Policy Area balances in a consistent manner at the same time for each of these main three stages.

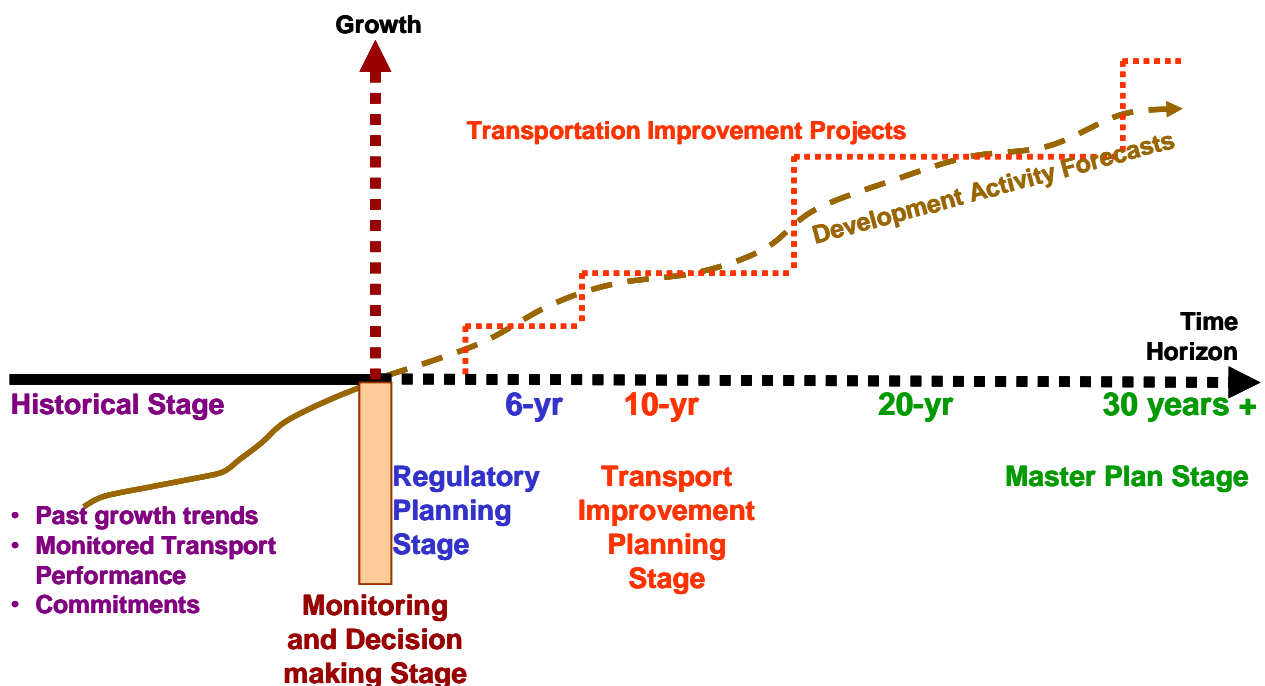


Exhibit 3.1: TPAR Framework for Development Activity and Transportation Concurrency

TPAR better enables elected officials to give guidance to the: (a) Planning Board in regulatory planning and master planning activities, and (b) Executive and the Montgomery County Department of Transportation (MCDOT) in planning and programming transportation improvements and services. Having a more prominent, cooperative, and coordinative role for MCDOT is an important innovation associated with TPAR. Appendix B has been provided that outlines the cooperative coordination roles that have been forming between the Planning Staff and the Transportation Planning staff of MCDOT for each part and step of the TPAR process.

Achieving balance between development activity and infrastructure, or at a minimum, consistently managing or reducing the level of imbalance, is one of the critical roles of TPAR. To this end, selection of the central time stage to use in TPAR is critical. A 10 year time stage was selected based on the following, mainly transportation improvement, considerations:

- Development activity forecasts for the County and the Washington Region are reported in five year increments up to 30 years into the future (Cooperative Forecasts)
- The current “pipeline” for approved residential subdivisions Countywide has about 7 to 8 years of growth; and the “job pipeline” has about 13 to 15 years of growth.
- A typical road project that adds capacity to the road network takes anywhere from 8 to 12 years to complete, from the time it is first added to the County’s Capital Improvements Program (CIP) or the Maryland Department of Transportation Consolidated Transportation Program (CTP).
- Major transit projects such as the Purple Line or Corridor Cities Transitway (CCT) that involve Federal funding and requirements may take as long or even longer than 12 years.
- Capital Projects are typically programmed over a period of 6 years or more, and financed over an even longer time period through bonds and other instruments.
- The life expectancy of a new bus is roughly 12 years and replacement cycles need to be set to take such aging into account in conjunction with fleet and garage expansion.

Thus, the TPAR analysis for Transit and Roadway Adequacy mainly uses the ten year time stage. For purposes of the full and long-term accounting of costs and the fair allocation of the same, a longer-term time horizon is needed for that part of the proposed TPAR process and the 30 year Forecast of development activity is used as a benchmark in that part of TPAR. While the term of master plan stage is used here and is associated with this 30 year forecast, TPAR is not to be construed as a comprehensive reassessment of any master plan or the worthiness of any of the component parts of an approved master plan. The regulatory planning stage is linked with the approved CIP and CTP and those fully-funded projects that can be implemented by the 6 year end of those documents.

The following parts of Section III describes in detail each of the five Parts of the TPAR process:

- Identify Transit Inadequacies and Solutions
- Identify Roadway Inadequacies and Solutions
- Allocate Costs for Improvements
- Program Public Commitments
- Monitor and Report

1: Identify Transit Inadequacies and Solutions:

Exhibit 3.2 shows the six main steps associated with identifying transit inadequacies and solutions. Please note that the term “transit” also accounts for Transportation Management Districts (TMDs) and their associated activities.

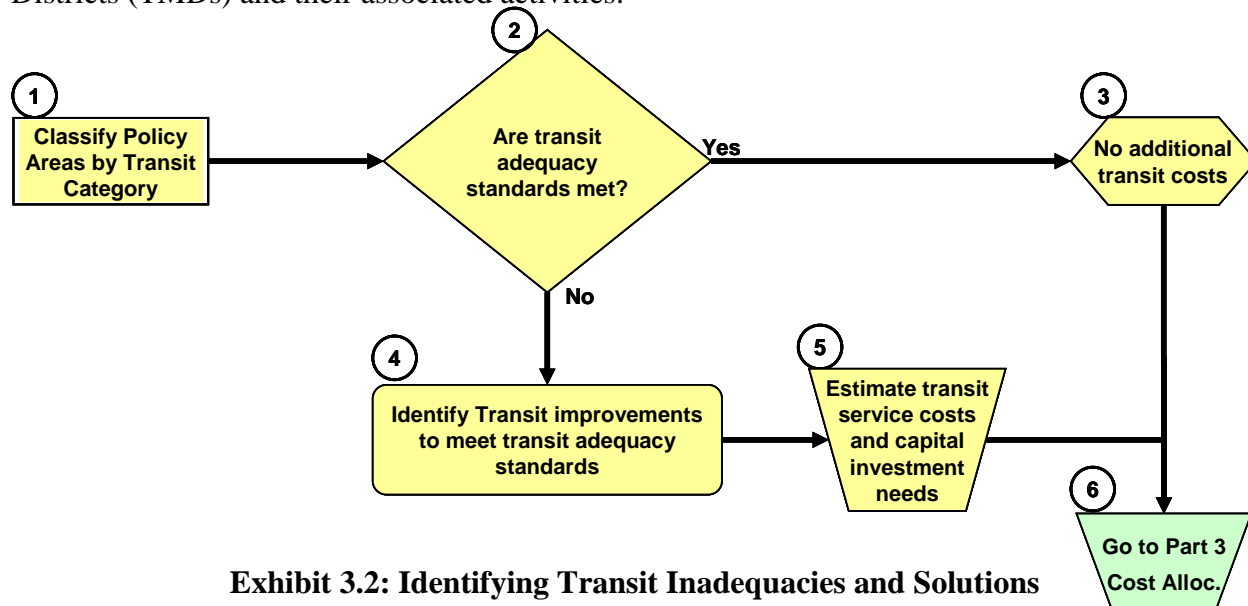


Exhibit 3.2: Identifying Transit Inadequacies and Solutions
 (Source: Proposed TPAR Report, April 2010)

TPAR takes into direct consideration the different forms of Transit Service provided or planned for in the County: Heavy Rail (Metrorail), Commuter Rail (MARC), arterial and local Bus Service, future Light Rail Transit (LRT), future Bus Rapid Transit (BRT), and indirectly Transportation Demand Management (TDM) activities. Some of these forms of transit service are currently outside of the County’s direct operational and financial control. Therefore, the TPAR Review is focused primarily on the provision of Bus Service and improving TDM services, while accounting for the importance and value of the more fixed-track forms of transit.

Major studies of a potential BRT system and supporting service characteristics are currently underway. To date there is no clear indication from the BRT studies of a route or routes that could be implemented within the 10 year transportation improvement stage of TPAR. The transit planning sketch-level methodology, discussed below, that is a refinement to TPAR is too broad and general a method for its results to be an analytic determinant of the feasibility of a BRT route. However, when one or more routes and their service characteristics are specified, including any modifications to the current bus service in that corridor, then the transit adequacy part of the TPAR process will be able to account for such types of transit improvements.

Step 1 – Classify Policy Areas by Density and Transit Categories: The first transit related step shown in Exhibit 3.2 is to classify Policy Areas in accordance with defined categories of density and transit service. TPAR defines three distinct categories for the County as a function of the development characteristics of each Policy Area expressed in terms of densities and type of transit service. (A map of Policy Areas and their abbreviations is located in the introduction to Section VI of this document.) The names given to the defined categories are consistent with those used by the County Council in the adoption of the Road Code, which uses the same designations although they are defined differently. Each Policy Area is classified as either:

Urban, Suburban or Rural, as defined and discussed next. Key policy issues for the Subdivision Staging Policy are: (1) how to distinguish over time between the urban and suburban policy area categories, and (2) when does a particular policy area transition from suburban to urban?

Urban Policy Areas are those Policy Areas with (a) higher population and/or employment densities, measured in terms of the number of people and employees per gross square mile, as well as (b) significant amounts of transit service including combinations of Metrorail Service, extensive and/or intensive bus service, and/or future LRT or BRT service. Two sub-categories of Urban Policy Areas are being provided – with and without Metrorail.

Suburban Policy Areas are those Policy Areas that have intermediate or moderate levels of population and employment density and usually just bus transit service, although they may also have Commuter Rail service with far-apart-spaced stations. An area having LRT or BRT service might not be the determinant that a particular area is no longer a Suburban Policy Area. Rather, such transitions of one or more Policy Areas being designated as an Urban Policy Area would be made as part of the periodic review and updates of the Subdivision Staging Policy. Such reviews need to consider forecast population and/or employment densities as well as the programmed quantity and forecast performance quality of the transit services.

Rural Policy Areas are those Policy Areas located primarily in the Agricultural Reserve of the County. These areas are characterized by very low population and employment densities and have very limited transit service.

Exhibit 3.3a shows the proposed initial TPAR classification of each Policy Area by just three of the transit service and density categories. Exhibit 3.3b shows the expected classification of each Policy Area by all four transit service and density categories, which includes the category of Urban Policy Areas without Metrorail. The General Plan of the County envisioned that the areas that generally correspond to the five Policy Areas, with the future designation of Urban without Metrorail, would be urban. Thus the Subdivision Staging Policy is providing a means to transition overtime for those five Policy Areas from being classified as “Suburban” to be designated as “Urban without Metrorail”.

In Exhibits 3.3a and 3.3b the six right-most columns gives the recent population and employment densities as well as those forecast for the 10-year time of 2022 and the long-term one of 2040. The forecast densities are shown as rounded estimates. Trend analysis of those current and forecast densities indicates that values of 5,000 persons per square mile and/or 2,500 employees per square mile generally distinguish urban from suburban. Various site-design related features such as minimal setbacks, substantial building heights, mixed land uses, and significant pedestrian activity and sufficiently wide sidewalk width are often associated with being urban. However, accounting for such micro-level features is beyond the scope of an areawide process such as TPAR. The six leftmost columns of Exhibits 3.3a and 3.3b, after the area name column, identify the current or future areawide quantity or presence of transit services. The question of which comes first, the density or the transit service is a rhetorical one looking to the past. However, it is a very important policy issue when looking towards the future and a decision needs to be made by the elected officials that a particular Policy Area should transition from a suburban one to an urban one. Specific recommendations are given later in this document in Section V that addresses that issue once enough other information has been assembled. The sequencing of the rows in these two exhibits is covered later in the discussion of Step 4.

Policy Areas by Three Categories of Type of Transit and Population and Employment Density for TPAR 2012 (6-7-12)										Forecasts of Population and Employment Densities			
	Number of Bus Routes			Metro Rail?	MARC Com-muter Rail?	Future Light Rail and/or BRT?	Gross Area of the Policy Area (sq. mi.)	Pop. Density in 2010 (person per sq. mi.)	Emp. Density in 2010 (emp. per sq. mi.)	2022		2040	
	Total of all Routes	Peak Period Only	All-Day Routes							Popula-tion Density	Employ-ment Density	Popula-tion Density	Employ-ment Density
"Urban" Policy Areas with Metrorail													
Silver Spring/Takoma Park	35	14	21	Y	Y	Y	10.49	8,622	4,376	9,900	4,800	10,300	5,400
North Bethesda	15	4	11	Y	Y	Y	9.25	5,216	7,430	7,400	8,800	9,500	10,600
Kensington/Wheaton	29	12	17	Y	Y		19.26	4,853	1,230	5,600	1,400	6,000	1,500
Bethesda/Chevy Chase	17	6	11	Y		Y	20.24	4,962	4,339	5,800	4,800	6,100	5,100
Rockville City	16	2	14	Y	Y	Y	13.64	4,314	5,794	5,300	6,900	6,100	7,700
Derwood	7	2	5	Y	Y		8.22	2,274	2,556	2,850	3,100	4,000	4,000
"Suburban" Policy Areas													
R&D Village	5	2	3			Y	2.38	3,076	8,764	4,100	11,400	9,100	17,700
Gaithersburg City	10	1	9		Y	Y	11.03	5,446	4,967	6,400	6,000	7,600	7,600
Fairland/White Oak	14	7	7				20.66	3,700	1,495	3,700	2,000	3,700	2,400
Germantown West	9	2	7		Y	Y	10.98	5,652	1,347	5,900	1,800	6,900	2,900
Montgomery Village/Airpark	9	3	6				9.41	5,472	1,372	5,300	1,300	5,600	1,400
Aspen Hill	11	3	8				13.05	4,644	478	4,900	550	4,600	560
Germantown East	5	2	3			Y	6.57	3,568	1,310	3,800	2,100	4,400	3,600
Cloverly	2	2	0				9.83	1,621	137	1,600	160	1,600	160
North Potomac	7	3	4				10.49	2,570	1,427	2,600	160	2,900	170
Olney	5	4	1				17.36	1,887	317	2,000	320	2,100	330
Potomac	10	2	8			Y	28.07	1,696	431	1,800	520	1,800	530
Clarksburg	2	1	1			Y	14.91	934	255	2,200	460	2,600	1,300
"Rural" Policy Areas													
Rural West	1	1	0		Y		132.90	157	20	160	20	170	20
Damascus	1	0	1				9.42	1,119	248	1,190	280	1,350	280
Rural East	1	0	1				117.18	289	48	310	60	330	60

Exhibit 3.3a: Categorization of Policy Areas by Three Density and Transit Elements

Policy Areas by Four Categories of Type of Transit and Population and Employment Density for TPAR 2012 (6-7-12)										Forecasts of Population and Employment Densities			
	Number of Bus Routes			Metro Rail?	MARC Com-muter Rail?	Future Light Rail and/or BRT?	Gross Area of the Policy Area (sq. mi.)	Pop. Density in 2010 (person per sq. mi.)	Emp. Density in 2010 (emp. per sq. mi.)	2022		2040	
	Total of all Routes	Peak Period Only	All-Day Routes							Popula-tion Density	Employ-ment Density	Popula-tion Density	Employ-ment Density
"Urban" Policy Areas, with Metrorail													
Silver Spring/Takoma Park	35	14	21	Y	Y	Y	10.49	8,622	4,376	9,900	4,800	10,300	5,400
North Bethesda	15	4	11	Y	Y	Y	9.25	5,216	7,430	7,400	8,800	9,500	10,600
Kensington/Wheaton	29	12	17	Y	Y		19.26	4,853	1,230	5,600	1,380	6,000	1,450
Bethesda/Chevy Chase	17	6	11	Y		Y	20.24	4,962	4,339	5,800	4,800	6,100	5,100
Rockville City	16	2	14	Y	Y	Y	13.64	4,314	5,794	5,300	6,900	6,100	7,700
Derwood	7	2	5	Y	Y		8.22	2,274	2,556	2,800	3,100	4,000	4,000
"Urban" Policy Areas, without Metrorail													
R&D Village	5	2	3			Y	2.38	3,076	8,764	4,100	11,400	9,100	17,700
Gaithersburg City	10	1	9		Y	Y	11.03	5,446	4,967	6,400	6,000	7,600	7,600
Montgomery Village/Airpark	9	3	6				9.41	5,472	1,372	5,300	1,320	5,600	1,420
Germantown West	9	2	7		Y	Y	10.98	5,652	1,347	5,900	1,810	6,900	2,920
Germantown East	5	2	3			Y	6.57	3,568	1,310	3,800	2,140	4,400	3,600
"Suburban" Policy Areas													
Fairland/White Oak	14	7	7				20.66	3,700	1,495	3,700	2,000	3,700	2,350
Aspen Hill	11	3	8				13.05	4,644	478	4,900	550	4,600	560
Cloverly	2	2	0				9.83	1,621	137	1,600	160	1,590	160
North Potomac	7	3	4				10.49	2,570	143	2,600	160	2,900	170
Olney	5	4	1				17.36	1,887	317	1,960	320	2,120	330
Potomac	10	2	8			Y	28.07	1,696	431	1,770	520	1,820	530
Clarksburg	2	1	1			Y	14.91	934	255	2,170	460	2,620	1,300
"Rural" Policy Areas													
Rural West	1	1	0		Y		132.90	157	20	160	20	170	20
Damascus	1	0	1				9.42	1,119	248	1,190	280	1,350	280
Rural East	1	0	1				117.18	289	48	310	60	330	60

Exhibit 3.3b: Categorization of Policy Areas by Four Density and Transit Elements

Step 2 – Are Transit Adequacy Standards Met?: TPAR uses bus transit quality of service for each of these three TPAR Policy Area categories by using three “**transit service performance factors**” to assess the adequacy of the transit service of each Policy Area. The performance factors and the standards given here are consistent with the 2008 Montgomery County Strategic Transit Plan and are also based on guidance from various Master Plans and Sector Plans. The three transit service performance factors are specified as the following:

- **Coverage of Service:** In general the factor of coverage indicates how close in space are potential users to the service. The particular measure is the percentage of the area of a Policy Area located within a certain distance from Metrorail Station, Light Rail Station and Ride On and Metrobus service. While the selection of what distances to use is in part a research question, a reasonable and pragmatic choice was made to use two of several such walk-access measures used by the travel demand forecasting model. In particular, the values of a one mile walk of a Metrorail station or one-third of a mile walk of a bus stop were selected. Transit users access transit by other means as well such as Park-and-Ride, Kiss-and-Ride, or bicycling and those ways of accessing transit are included in the travel forecasting but as a judgment, explicitly accounting for them in this performance factor would add too much complexity and lose some transparency.
- **Peak Headways:** In general the factor of peak headway indicates how frequently in time is the service provided so as to be more convenient to users. The particular measure is the weighted average of the frequency of service of the different bus routes operated by Metrobus and Ride On in the Policy Area – specifically how frequently, on average, the buses run during the weekday evening peak period. In areas where future LRT or BRT systems are to be provided, the averages are adjusted to reflect the presence (or future presence) of those systems.
- **Span of Service:** In general the factor of span indicates over what time duration during a typical weekday is the service available to potential users. The particular measure is the average time duration on weekdays that bus service is scheduled averaged only for that subset of routes that provide “all-day” service but not any routes with split-service in the AM and/or PM. For example, in an urban area, buses may operate for 17 hours a day or longer, such as from 5:00 AM to 10:00 PM on weekdays.

Exhibit 3.4a: Transit Quality of Service Factors Standards for Montgomery County

Factors Characterizing Bus Transit Quality of Service in Montgomery County[#]			
Transit Service Area Categories	Coverage: (percent of area within a 1 mile walk of Metro and/or 1/3 mile walk of bus)	Peak Headways: (equal to or less than ___ minutes between buses on average in Peak Hour)	Span of Service: (equal to or more than ___ hours in duration per weekday on average)
Urban with Metrorail	Greater than 80%	20 minutes	17 Hours
Urban without Metrorail	Greater than 50%	14 minutes	14 Hours
Suburban	Greater than 30%	20 minutes	14 Hours
Rural	Greater than 5%	30 minutes	4 Hours

updated 6/7/2012

[#] = Consistent with the 2008 Montgomery County Strategic Transit Plan and based on guidance from various Master Plans and Sector Plans

Part of Step 2 is to specify or amend a set of “regulatory standards” of transit adequacy, particularly for bus transit services. Exhibit 3.4a above is that set of bus Transit Service Adequacy Standards, for each of the three factors of adequacy, for each of the four Transit Policy Area Categories. TPAR is more than a regulatory approach and it is also intended to give guidance to the needed and desirable levels of investment in transportation. As such, it is also needs to identify performance targets for these three service factors towards which service improvements can be aimed and not just provide minimal regulatory adequacy standards.

Exhibits 3.4b, 3.4c, and 3.4d present these sets of “planning targets” for the three service factors and for the four Policy Area Categories. Arrows are shown going away from the standards towards the targets. The graphics also show the ranges of values for the factors that would be considered as being inadequate for that particular factor and Policy Area Category. Having a result for any factor lying within the “ranges” between the standards and the targets would be adequate performance.

TPAR requires the analysis of the bus transit services in each Policy Area for adequacy, contrasting the services provided to the Coverage, Peak Headway, and Span standards for Urban, Suburban and Rural areas, respectively. A Policy Area is found to provide **adequate** transit service when **all three** service factors meet the minimum standards. If inadequacy in any one of the three factors associated with the bus transit network is determined in Step 2, then solutions need to be identified in Step 4, as discussed later. There may be some special circumstances in selected Policy Areas where an exception to this policy could be made for one of the factors.

Exhibit 3.4b: Transit Adequacy Standards – Targets for Coverage

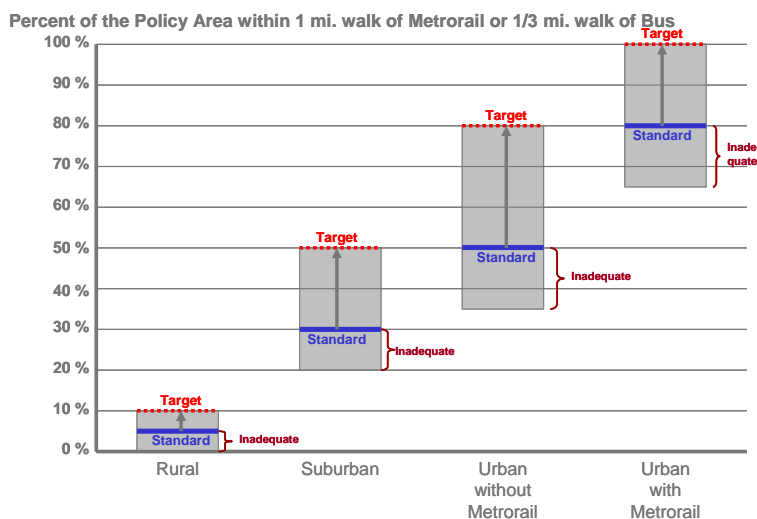


Exhibit 3.4c: Transit Adequacy Standards – Targets for Peak Headway

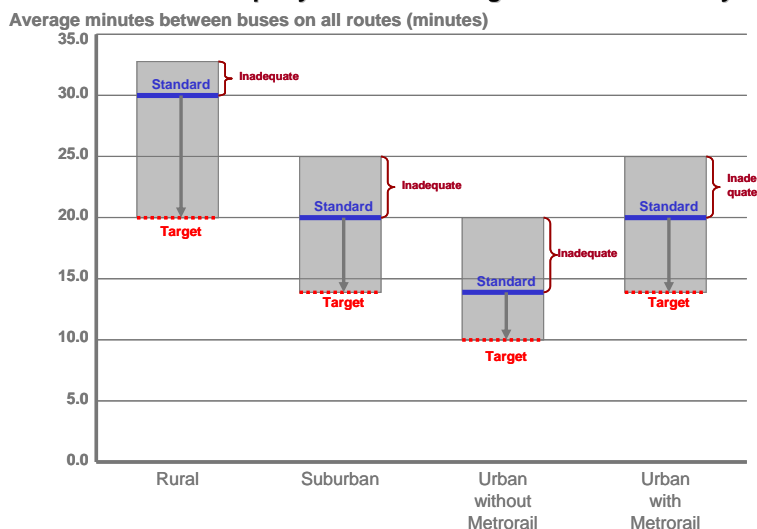
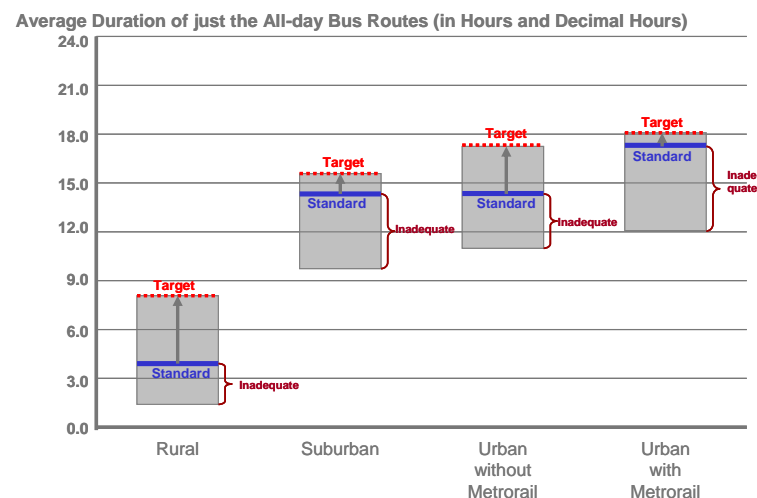


Exhibit 3.4d: Transit Adequacy Standards – Targets for Span of Service



To improve understanding of how identifying solutions might typically work in practice, Exhibit 3.5 shows general solutions to improve bus transit service factors to meet the standards if one of the factors was found not to be adequate.

Exhibit 3.5: General Solutions to Achieve Transit Adequacy

Transit Inadequacy Related to:	General Solutions to Achieve Transit Service Adequacy
Coverage	Implement more bus routes serving more areas closer to the population or employment areas within the Policy Area
Peak Headway	Add more frequent bus service during the peak periods to reduce the time between the arrival of buses (headway) serving the Policy Area
Span of Service	Increase the number of hours the bus service is provided for selected routes serving the Policy Area

Exhibit 3.6 on the next page is a summary of results of the bus Transit Adequacy Analysis of the current bus services in each Policy Area. That summary is structured only using three of the Policy Area Categories, which given the results is taking a conservative approach. Specifically, the service factors were applied to each Policy Area in the County based on bus service information for Ride-On and MetroBus at the beginning of 2012. The highlighted areas in bright yellow with red numbers indicate the transit service factors that are not achieving that TPAR adequacy standard for those Policy Areas. Particularly noteworthy is that 14 of the 19 Policy Areas are not attaining the Peak Headway standards for current service conditions. In order to attain the status of adequacy, the general types of solutions outlined in Exhibit 3.5 above would have to be implemented by the 10-year transportation improvement stage, which is 2022, in the effected Policy Areas. While the preparation of Exhibit 3.6 nominally concludes Step 2 of the Transit Adequacy Analysis, in order to prepare that summary of results various aspects of the analytic procedures that are also useful in Step 4 need to be set up and applied in Step 2.

Step 3 – No Additional Transit Costs: If Step 2 shows that standards are met in each of the Policy Areas, then the analysis proceeds to Step 3 of the Transit Adequacy Analysis, and then immediately on to Step 6.

Step 4 – Identify Transit Solutions to meet Transit Adequacy Standards: The discussion of Coverage given above and the text in Exhibit 3.6 indicates the specific definition used for the factor of Coverage – the percent of each Policy Area within 1 mile of a rail station or 1/3 of a mile of a bus stop. This definition of Coverage results in there being a very wide range of values for the 19 Policy Areas, from a high of about 96% to a low of about 7% of the area of each Policy Area. It can be seen by inspection of Exhibit 3.6 that the sequence of rows used for each Policy Area is in order of decreasing coverage across the three Transit Service Categories. That is an intentional choice of how to sequence the Policy Area rows to present the summary results. Being sequenced by decreasing Coverage makes it easier for the reader to see patterns of inadequacy in that transit service factor, and perhaps the other two factors as well. This sequence of Policy Area ordered by decreasing Transit Coverage is the same sequence that was used to sequence of rows in Exhibit 3.3 above; and as the reader will see the sequence of discussion of the individual Policy Areas in Section VI of TPAR. This sequencing approach is similar to the one used in the Roadway Adequacy Analysis, which sequences the road within a Policy Areas summary in accord to decreasing congestion in the peak direction of traffic flow.

Transit Adequacy Analysis Results TPAR 2012 (6-4-12)				
	Number of Bus Routes	Coverage (Percent of area within 1 mile rail; 1/3 mi.of bus)	Peak Headway by Bus in PM Peak Hour (minutes)	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	15.6
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%	21.0	17.9
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				

Exhibit 3.6: Results of the Transit Service Adequacy Analysis

This discussion now turns to refined methods that have been selected and added to this part of the TPAR process of the analysis associated with the Transit Adequacy Analysis. There was little direct experience to draw upon from the prior AGP or PAMR processes, nor from the overall state-of-the-practice, each of which have involved less analysis of transit than of roadways. As such a considerable portion of the work for this report was focused on practical TPAR refinements to develop better methods for Transit Adequacy Analysis.

In seeking and analyzing particular solutions a judgment was made to first focus or start with the Transit Service Factor of Peak Headway in conjunction with developing and applying a Transit sketch-planning approach. The other two factors are considered in this approach, but at a later time. Cooperative coordination was carried out with the transit planning staff of MCDOT to obtain their current “transit profiles”, which are operationally oriented summaries of the characteristic features of the Ride-On bus routes. An earlier version of a prior year was used in the Transit Adequacy Analysis associated with the Proposed TPAR Report of the Executive in 2010. Similar profile-type information was obtained from staff of the Washington Metropolitan Area Transit Authority (WMATA) and integrated into the Transit sketch-planning analysis set-up. Information in these profiles includes:

- Bus service headways by four main time periods of a weekday
- Route service durations that could be used to calculate the Span of Service for each route
- Other information such as the number of buses needed to meet the bus scheduling requirements; the number of daily bus trips; the average number of daily riders; and the average number of riders per bus trip
- Identifiers were added, in particular which Policy Areas are served by each bus route.

The next part of the Transit Adequacy Analysis is a Transit sketch-planning approach, which is a method to first graphically array maps of route coverage and graphs of the scatter of Peak Headway versus Span for each route in a Policy Area. Second, that information was then organized by Policy Area and appropriate averages for Peak Headway and Span of Service were calculated and overlaid on each of the scatter graphs. Third, those maps and graphs were shared and reviewed with MCDOT staff. Those Coverage maps and Peak Headway versus Span graphs are part of the graphics shown for each Policy Area in Section VI of this TPAR report.

MCDOT transit planning staff was able to use that organized information to identify: (a) 9 Policy Areas that could benefit from improved Peak Headways, and (b) a target number of total buses that could be used to improve headways. The Transit sketch-planning set up was then used, with the support of MCDOT staff, to identify and select about 13 bus routes to directly serve those 9 areas, allocate buses to routes, and then recalculate the average Peak Headway. That recalculation verified that if those buses would be added to the specified routes, then the resulting Peak Headways would enable those specific Policy Areas to attain adequacy. Since those routes also serve other Policy Areas there would be an indirect improvement in Peak Headways in about 8 other Policy Areas. In five of those the indirect affect would be to attain Peak Headway adequacy. The last part of this TPAR refinement was to “test” those potential improved headways using the Travel Demand Model, the first time Planning Staff had tried such an analysis. The general results of that analysis are discussed in Section V and Section VI of this TPAR Report along with that of a second set of Peak Headway improvements that would be needed for adequacy if 5 of the Policy Areas were classified as Urban without Metrorail..

Step 5 – Estimate Transit Service Costs and Capital Investment Needs: It will help with understanding to discuss this step in a later Part 3 of this Section III

2. Identify Roadway Inadequacies and Solutions

Exhibit 3.7 identifies six main steps associated with the second part of the TPAR process, identifying roadway inadequacies and solutions. Please note that the term “roadway” also accounts for traffic operations, bikeways, walkways, and their associated activities. The numbering of these steps starts with 11 to help differentiate this part of TPAR from the prior part on Transit Adequacy.

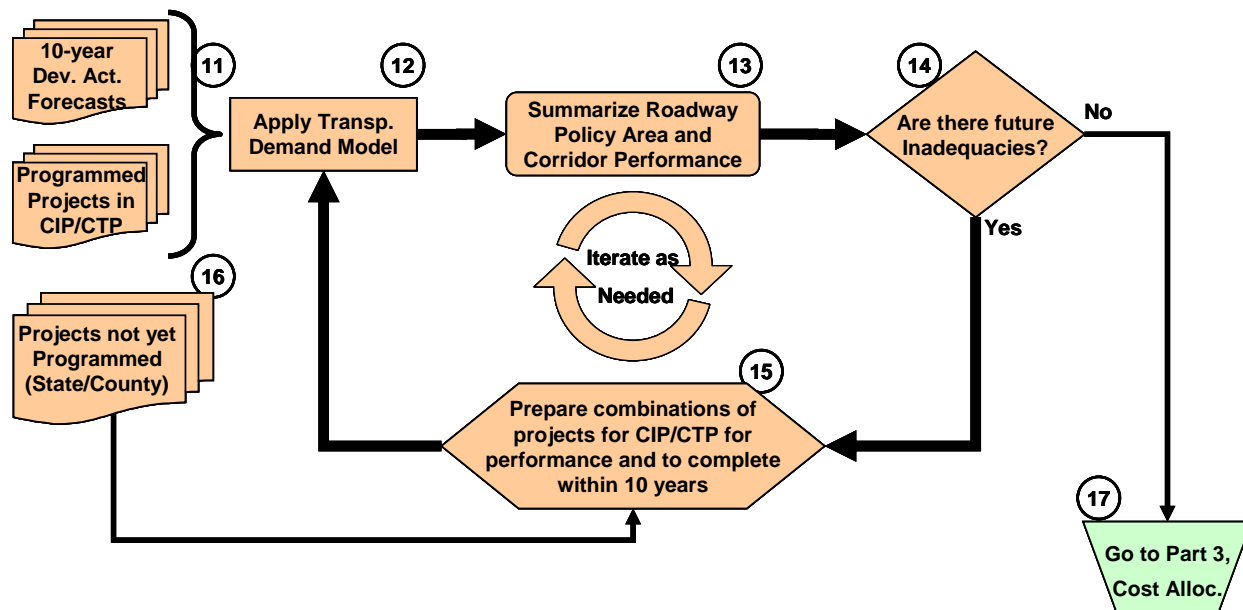


Exhibit 3.7: Identifying Roadway Inadequacies and Solutions

(Source: Proposed TPAR Report, April 2010)

TPAR takes into direct consideration the main current and future network of roadways in the County irrespective of which governmental agency built, maintains, or operates the road. Most of the main roads are the responsibility of either the Maryland Department of Transportation’s (MDOT) State Highway Administration (SHA) or the Montgomery County Department of Transportation (MCDOT). The recently opened MD 200 (Intercounty Connector) as a toll road is being managed and operated by the Maryland Transportation Authority (MdTA), an affiliated agency of MDOT. The Cities of Rockville and Gaithersburg have some roads that are mainly local roads but also some roads are major enough to be included in the TPAR roadway analysis.

There are roads that function as arterial roads that are owned and operated by the Department of Parks of the Maryland National Capital Park and Planning Commission (MNCPPC). The National Park Service (NPS) also has similar park-oriented roads that function such that they are also included in the TPAR roadway analysis. On the other hand, the Roadway Adequacy Analysis does not directly account for truly local streets, minor roads, and even some of the minor arterials. Those very local streets and roads have low amounts of traffic and the TPAR analysis accounts for them only in an indirect manor – but their adequacy is not assessed.

Step 11A – Gather Information on Projects of the CIP and CTP: This first step involves gathering the most current information from the County’s Capital Improvement Program (CIP), the Consolidated Transportation Program (CTP) of MDOT, and other similar approved programming documents. A list is then developed of that subset of projects that would be

constructed and operating by the end of the sixth year of those capital programs. Many but not all CIP or CTP projects provide added “capacity” to the roadway network. Those documents also contain many other important and necessary projects that are there for other concerns such as safety improvements, roadway preservation and maintenance, more efficient traffic operations, sound reduction, other environmental protection related projects, as well as Enhancement Projects that address aesthetics considerations or reduction of community impact. The CIP and CTP are also multimodal documents and differentiation needs to be made in the summaries. The list of projects is presented and discussed later in Section V.

Step 11B – Gather Information about Forecasts of Development Activity: The TPAR assessment examines future balances between existing plus programmed transportation improvements from the prior step, with development activity forecasts from this step. This step gathers current information from the Regional / County Cooperative Development Forecast prepared by MNCPPC for the County in cooperation with the Metropolitan Washington Council of Governments (MWCOCG) and other jurisdictions throughout the Washington Metropolitan Region. For the sake of simplicity, this is referred to as the *Cooperative Forecast*. The Cooperative Forecast projects household and employment growth in the County in five year increments to 2040. The Cooperative Forecast is updated regularly and adopted by MWCOCG for planning purposes in the region. The current forecasts are termed Round 8.0, with modifications for the White Oak Science Gateway (WOSG), which is referred to in the table by the initials. An extraction from those forecasts, summarized by Policy Area in the County, and interpolated between the 5-year increments, is given next in Exhibit 3.8. Additional information about the Cooperative Forecasts is available from various sources. More discussion of the forecasts for each of the Policy Areas is given in Section VI.

Abrev- iation Policy Area Name		Forecasts of Development Activity by Policy Area							
		Households (Round 8.0)				Employment (Round 8.0 with WOSG)			
		2010	2018	2022	2040	2010	2018	2022	2040
AH	Aspen Hill	24,699	24,894	24,920	25,017	7,175	7,228	7,242	7,317
BCC	Bethesda / Chevy Chase	39,621	43,340	44,446	47,688	87,464	94,653	97,941	102,733
CLK	Clarksburg	4,270	7,878	10,030	13,767	2,545	4,449	6,844	19,446
CLV	Cloverly	5,312	5,370	5,399	5,421	1,607	1,607	1,607	1,607
DAM	Damascus	3,562	4,011	4,049	4,658	2,616	2,672	2,630	2,653
DER	Derwood	6,157	7,087	8,665	12,928	20,937	20,995	25,561	32,470
FWO	Fairland / White Oak	28,004	28,370	28,569	29,263	30,013	37,835	41,953	48,587
GBG	Gaithersburg City	24,182	25,151	27,631	33,657	53,185	63,676	65,685	83,974
GTE	Germantown East	8,097	8,410	9,005	11,116	9,896	11,915	14,033	23,460
GTW	Germantown West	22,203	23,097	24,366	30,194	14,883	16,974	19,830	32,038
KW	Kensington/Wheaton	36,836	38,850	40,032	43,574	25,769	26,234	26,575	27,969
MVA	Mont. Village/Airpark	18,520	18,630	18,650	18,682	11,594	12,238	12,457	13,381
NB	North Bethesda	20,615	25,193	26,741	36,305	68,402	77,812	81,675	98,270
NP	North Potomac	9,085	8,987	9,452	10,725	1,572	1,615	1,666	1,800
OLY	Olney	11,455	11,957	12,400	13,361	5,532	5,584	5,604	5,721
POT	Potomac	17,131	17,877	17,690	18,029	12,296	14,359	14,475	14,828
RDV	R&D Village	2,364	4,159	3,814	9,777	20,052	23,656	27,163	41,969
RKV	Rockville City	24,226	27,441	29,179	34,404	74,800	87,030	93,852	105,725
SSTP	Silver Sp./ Takoma Park	35,746	39,888	40,920	44,155	46,862	48,385	50,274	56,409
RurE	Rural East	11,528	11,761	12,256	12,679	5,653	6,243	6,456	6,855
RurW	Rural West	6,887	7,248	7,383	7,600	3,147	3,155	3,156	3,163
Montgomery County Total =		360,500	389,599	405,597	463,000	506,000	568,315	606,679	730,375

Exhibit 3.8: Forecast of Households and Employment by Policy Area to 2040

Step 12 – Apply the Transportation Demand Model: TPAR uses the 10-year Cooperative Forecast of development activity, and the roadway and transit capital projects programmed for completion in the 6-year County CIP and the State CTP, as the input to the localized version of the Regional Travel Demand Model that is managed by Planning Department staff. The Regional Travel Demand Model is developed and used by the National Capital Region Transportation Planning Board (TPB), which is staffed by the Transportation Planning Department of MWCOG. This regional model is periodically updated and must be certified for use by the United States Department of Transportation for its approved use in the Regional Air Quality Analysis mandated by the United States Environmental Protection Agency (EPA). Versions of the regional model have been refined over many years and applied to various countywide assessments, master plan development, and to the AGP, PAMR, and now TPAR. The Travel Demand Model provides consistent and reliable results for use as a tool in the travel forecast for future transportation conditions of this analysis.

The cooperative work done by and for MCDOT in proposing the general TPAR approach relied on the Planning Staff applying the Travel Demand Model to a series of “comparison combinations”, which are an agreed to set of: (a) current development plus future development activity and (b) existing transportation plus programmed CIP and CTP projects as well as potential improvements to the transportation system that are not yet programmed. The term of “conditional project” is used for the subset of potential future projects not yet programmed that the MCDOT would recommend to be likely new projects to be added to the next CIP and CTP. The term “conditional” recognizes that the actual decision making authority rests with the Executive and Council for the inclusion of a new CIP project as well as with State officials with regard to CTP projects. That subsequent set of decision making activities regarding the actual programming of one or more new projects is the “transportation planning improvement stage” discussed in the introduction to this Section.

In the TPAR Analysis the Travel Demand Model is applied in an iterative fashion. Referring back to Exhibit 3.7 it shows that steps 12 through 16 and back to 12 again are applied iteratively and with the intent of going back and around through several cycles through these steps:

- **Step 12:** Analysis of a comparison combination using the Model
- **Step 13:** Summarization of the raw modeling results using post-processing methods
- **Step 14:** Review and assessment for potential future inadequacies
- **Step 15:** Refine and/or revise the comparison combinations to test potential projects
- **Step 16:** Consideration of prior recommendations for needed projects, and back to
- **Step 12:** Reapply the model to the new comparison combination of future conditions.

Such an iterative process works best when there is a high degree of coordination, cooperation, and information sharing particularly between Planning Staff and staff of MCDOT. Cooperation is also needed from staff of other agencies such as MDOT/SHA and MWCOG. During implementation of the TPAR process a set of roles and mutual expectations has developed that are outlined in Appendix C, Cooperative Coordination Roles for TPAR, which applies to all of the steps, not just these of the Roadway Adequacy Analysis.

Step 13 – Summarize Roadway Performance by Policy Area and Arterial Segments: To facilitate coordination among staffs and later with decision makers and various it is necessary to summarize in several ways the various raw results and outputs of applying the Travel Demand Model. The methods and techniques of summarization are referred to as “post-processing”. One post-processing summarization method developed for and used in the Roadway Adequacy

Analysis is a conversion of the results using spreadsheets that array representations of the roadways, directional “links” in the modeling system, so that they are organized in order of Policy Area and as well as individual links for the same roadway where traffic is moving in the same direction. The post-processing conversion can then be used to determine which of the two directions of flow is more peaked. That enables there to be summaries by: (1) Policy Area, (2) roadway within each Policy Area, and (3) peak or non-peaked flow direction.

Those spreadsheets are then used as inputs to various graphics that help communicate the summary results. An example of such a graphic is given in this part of Section 3. Such summary graphics are used more extensively in the discussion of Section V and Section VI. These summaries and graphics are tailored to match the two basic geographic scales of analysis of the assessment: (a) Policy Area-by-Policy Area on a countywide basis, and (b) within each Policy Area, an arterial segment -by-arterial segment basis. A 10 year transportation improvement planning stage basis is the main time stage used in the assessment.

Step 14 – Assess Future Inadequacies of the Roadway Network: The assessment of the adequacy of the roadway network is done on an areawide basis for each Policy Area as a whole. That is consistent with prior versions of the APFO, the AGP, and the current PAMR. One new feature of TPAR is having information that distinguishes congestion by that which would occur in the peak directions of traffic in each Policy Area as well as the level of congestion in the non-peak directions of traffic. The term “directions” is used in the plural because in all Policy Areas there tends to be two peak flow directions and two non-peak flow directions that flip-flop from the AM peak to the PM peak. For the PM peak in most Policy Areas, and for roads within them, the peak flow is northbound and eastbound. Which directions are the peak directions or non-peak is not predetermined as an input to the modeling analysis. Rather, it is a result of the modeling and the relative patterns of household and employment locations and amounts locally in a Policy Area, throughout the County, and across the region. Another new feature of TPAR is also having a summary of the distribution among the arterial roadways serving a Policy Area as to their average peak and non-peak congestion levels.

The measure of overall roadway performance for each Policy Area is the **average** PM peak period congestion for the peak directions of traffic. That performance measure can be derived from the Travel Demand Model and the post-processing of the results. The performance measure for individual roadways can also be monitored and if enough samples or observations are made then theoretically an areawide **average** can also be estimated for observed traffic.

The performance measure is then calculated by using: (1) the average link-speed by direction of travel that is a raw result of the Travel Demand Model, and (2) dividing that by the “free-flow speed” for that link and direction of travel. The values used for the free flow speed are inputs to the modeling and are used by the model as one of the parameters in forecasting the amount of travel on each of the modeled roadway links. Those free flow speed values come from the regional modeling inputs prepared by MWCOG. As an example, if the average free flow speed in the peak direction is 40 mph and the modeled average PM speed is 30 mph then the congestion measure is 30 divided by 40, which equals 0.75 or 75%; if the average modeled speed was 20 mph then the congestion measure would be 0.50 or 50%; and if the average modeled speed was 15 mph then the congestion measure would be 0.375 or 37.5%.

Using the ratios or percentages allows for comparison among different roadway types and roadways of the same type that may have different free flow speeds as that can vary by location

within the region. Using the ratios or percentages also facilitates calculating an average for all of the roadways modeled in a Policy Area by using a weighted-average that accounts for different contributions to the average between high volume roads and more lightly traveled roads. The networks used in the Travel Demand Model use all freeways, major highways, major arterials, and some minor arterials. However as noted in the introduction to this Part, the Roadway Adequacy Analysis does not directly account for truly local streets, minor roads, and even some of the minor arterials. Those very local streets and roads have low amounts of traffic and the TPAR analysis accounts for them only in an indirect manor – but their adequacy is not assessed. The average congestion is summarized in the assessment only for major highways, major arterials, and some minor arterials – freeways while accounted for in the overall modeling are not included. That is consistent with prior versions of the APFO, the AGP, and the current PAMR.

The Roadway Adequacy Analysis considers the “network effect” of improvements added to other Policy Areas. For example, if a new project is added to the network in Germantown, it may also help sufficiently reduce congestion in a nearby area, say Clarksburg. Through the iterative process of adding specific, potential, roadway improvements, and combinations, it is possible to establish combinations of new roads or widenings that will bring balance to, or significantly improve the performance of, the roadway network in more than one Policy Area.

Another aspect of this Step is to discuss what standards to use in determining adequacy. For decades the Transportation profession world-wide has been using a publication of the Transportation Research Board, the *Highway Capacity and Quality of Service Manual*, often termed the Highway Capacity Manual (HCM) for short. The latest version of the HCM was published and released in January 2011 and it uses the measure of link speed by direction as the performance measure for arterials. While the prior version of the HCM classified arterial roadways into four categories, the new HCM makes no distinction between such major or minor arterial roads. The HCM has not evolved to having a method for an areawide measure of roadway performance nor of standards for that idea.

The HCM does have a standard method of defining different Quality of Service levels for any arterial road. It is basically the same measure that is being used in TPAR to measure performance of individual roadway link-segments – that of the **average** speed of traffic compared to the free flow speed, expressed as a percentage or ratio. Associated with the HCM method are “Level of Service” grades for ranges of those ratios or percents. The following are the ranges defined in the latest HCM associated with each of the six specified arterial Levels of Service:

LOS A	85% or greater
LOS B	70% to 85%
LOS C	50% to 70%
LOS D	40% to 50%
LOS E	30% to 40%
LOS F	30% or less

This standard is a consistent yardstick and whether the measured value for a particular roadway is adequate is a local determination of what degree of congestion along the measurement scale is adequate or inadequate. The TPAR Roadway Adequacy Assessment is building upon this HCM approach in two ways. Firstly is to define an “**areawide average**” as being a volume-weighted average of all of the modeled arterial roads within a Policy Area and differentiated by peak and non peak traffic directions. Secondly is to adapt this standard scale of performance and accept

that it also applies to this “areawide average” performance measure. Then it would be a local determination as to which level or levels constitute adequacy for a whole Policy Area.

The TPAR Roadway Adequacy Analysis retains and accepts the classification of each Policy Area by its level of transit service: Urban (with and without Metrorail), Suburban and Rural. Using the above discussion TPAR specifies the following acceptable levels of average roadway congestion levels in the peak traffic directions within each Policy Area, where the Adequacy Standard differs for Urban, Suburban, and Rural Policy Areas, as shown in Exhibit 3.9.

Exhibit 3.9: Standards of Acceptable Roadway Average Level of Service

Proposed Roadway (Arterial) Level of Service Standards	
Policy Area Categories	Acceptable Average Arterial Level of Service
Urban with Metrorail	Average congestion of "D/E" borderline in the peak flow directions
Urban without Metrorail	Average congestion of "D/E" borderline in the peak flow directions
Suburban	Average congestion of Mid-"D" or less in the peak flow directions
Rural	Average congestion of "C/D" borderline in the peak flow directions

The last main aspect of this Step is to show an example of how all of the discussion from above comes together in a countywide assessment of Policy Areas of the County with respect to their average performance of the roadways within each area. Exhibit 3.10, on the next page, presents the countywide summary of the analysis results of one of the comparison combinations. This comparison combination used: (1) the 10-year Cooperative Forecasts that were discussed above in Step 11B, (2) a roadway network representative of the 10-year transportation improvement stage that consisted of: (a) existing roads plus, (b) the programmed CIP and CTP projects plus, (c) a few conditional roadway projects, as well as (3) representation of a conditional bus transit project to improve Peak Headways in 9 Policy Areas. The following notes should be used in reading the results in the Exhibit.

- The vertical “green-hatched” bars show the **range** of the average of roadway speeds by direction of travel in relation to the “free flow speed”, or LOS, for each Policy Area in the PM peak period.
- The bottom of the bar shows the average LOS in the peak direction of travel. The top of the bar shows the average speed (LOS) in the non-peak direction.
- The measurement scale weighted average LOS is shown on the left side of the chart.
- Horizontal dotted orange lines are shown to depict the adequacy standards (LOS) for the Rural, Suburban and Urban (with Metrorail) Policy Areas, from left to right, which graphically corresponds to the Standards of Adequacy given in Exhibit 3.9 above.

A review of the results depicted in the Exhibit 3.10 for the Base Case scenario indicates that for this combination of future development activity and transportation network improvements that three Policy Areas could have **average** road congestion in the peak traffic directions that are more congested (below the adequacy standards shown) by 2022. Please note again that the measurement scale used on the left side of Exhibit 3.10 shows the same **average** Level of Service scale as discussed above on the previous page. The mathematical notation of having a “short horizontal bar” to denote an average that is placed above each of the Level of Service “letters” is there as a reminder that the measure being used is intended to represent **average** conditions.

There is another important caveat in reviewing these types of summary charts. The chart should be interpreted such that for this combination of future development activity and transportation network improvements three Policy Areas **could** have average road congestion in the peak traffic directions that are more congested (below the adequacy standard shown) by 2022. That would likely be the case, and here is the caveat, unless enough or appropriate other "conditional projects" are programmed in the intervening time and would be operational by 2022. Please note that it is anticipated that when one or more Policy Areas are classified as Urban without Metrorail that the sequencing of the Policy Area-Bars in exhibits such as 3.10 may be changed so that they are immediately to the left of the bar for the Derwood (DER) Policy Area.

Section V and Section VI give the full Roadway Adequacy Assessment in conjunction with the Transit Adequacy Assessment and discusses the analysis results for several of the same comparison combinations. Those discussions are intended to provide pertinent information that can be used in the support of various staging related decision making activities.

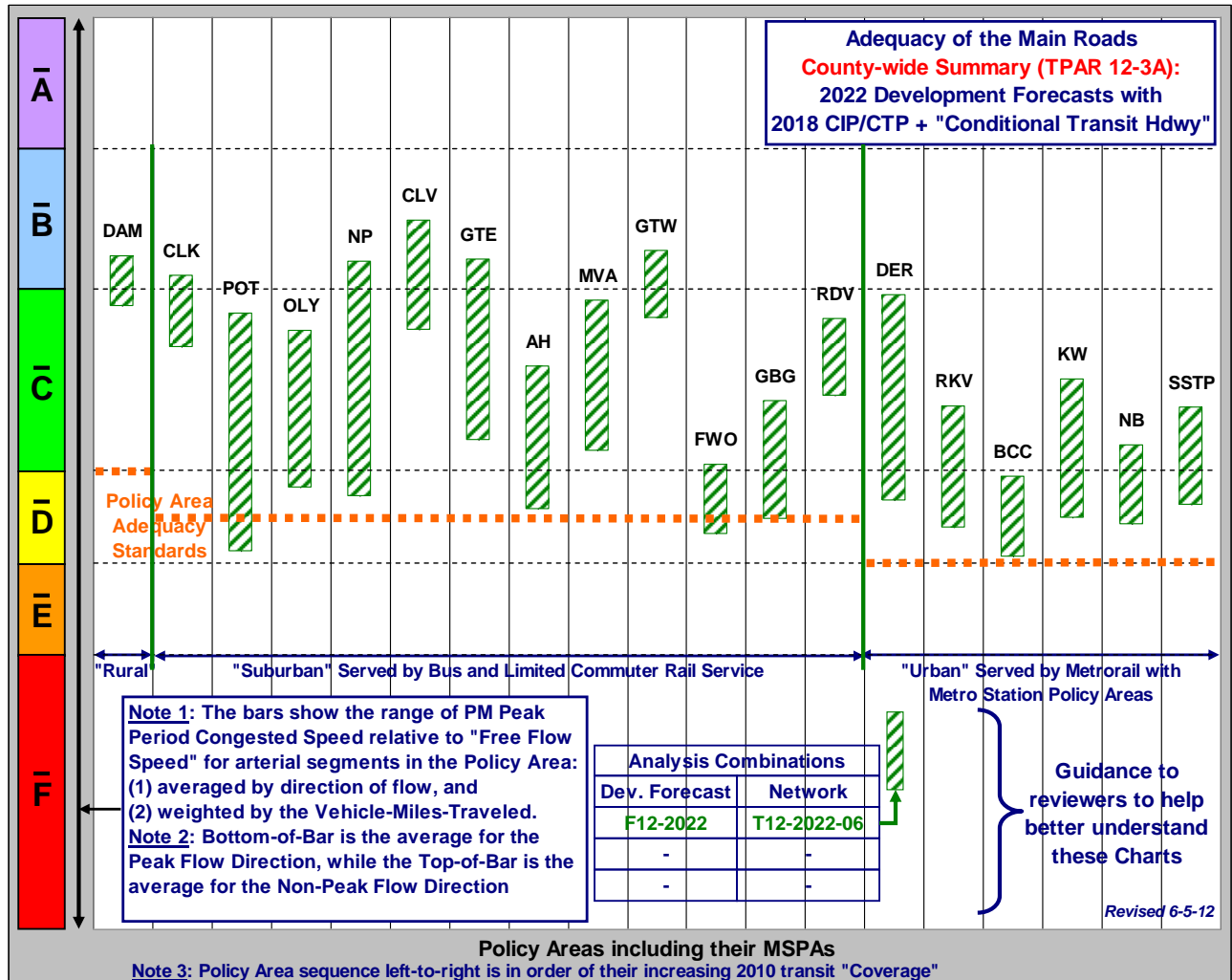


Exhibit 3.10: Example of a Countywide Summary of Average Congestion Levels by Policy Area.

Step 15 – Prepare Additional Comparison Combinations for Further Assessment: The purpose of this step is to refine and/or revise the comparison combinations to test other potential projects, or to conclude that no further Roadway Adequacy Assessments are needed for TPAR for this cycle.

To move a Policy Area that has average roadway performance that is more congested on average than the specified standard for that Area, the TPAR process is used to identify and select potential transportation roadway improvements from the resources of Step 16. Given sufficient time and resources the new comparison combination goes through an iteration cycle and the results are reviewed and assessed. When adequacy is attained it is concluded that no further Roadway Adequacy Assessments are needed for TPAR for this cycle,

Step 16 – Potential Projects Not Yet Programmed:

As part of the development of the proposed policy, MCDOT obtained from the MNCPPC a list of all future un-built roadway and bikeway projects in each County Master Plan. MCDOT together with MNCPPC then reviewed and validated the list, and classified each project as a developer or County responsibility. The list of road projects to be built or widened by the public sector is broken down by Policy Area and displayed in Appendix C.

In addition, it has been a regular practice over recent years for the locally elected officials to prepare a list of transportation improvement priorities to be reviewed with members of the Maryland Legislature and then submitted to MDOT for their consideration. Those lists may also be a resource in this Step as they might have worthy projects that are not identified in the Master Plans, such as a project that is mainly safety related.

Part 3: Allocate Costs for Needed Improvements

As indicated in Exhibit 3.11, the TPAR recommends implementation of a public – private cost sharing arrangement to fund projects to raise Policy Areas to transportation adequacy in the future. TPAR provides a methodology to: (1) estimate costs; (2) implement improvements and; (3) allocate costs to the public and private sectors. In developing this methodology, it is recognized that the implementation of solutions does not always involve the same time frames.

For example, some bus related transit improvements can be added more easily, as well as incrementally, on an annual basis relative to roadway improvements to meet the adequacy standard within the established time frame. This is particularly the case when service Span is increased by providing bus service for more hours during the day. On the other hand, improving Peak Headways or coverage in an area typically may initially require the acquisition of new buses. There is typically 12 to 18 months duration from the time a bus is ordered to the time it is put into daily service. Other major capital transit projects, such as a BRT System, the Purple Line or the Corridor Cities Transitway can be as lengthy and complex as building a major road.

In the example of roadway projects under current MCDOT procedures, implementation of a road project starts with Facility Planning Phases 1 and 2 during which a project is programmed for:

- Final design
- Right of way acquisition, and
- Construction

That last decision of programming for construction takes place only after completion of Phase 2, which is at about 35 percent of the engineering.

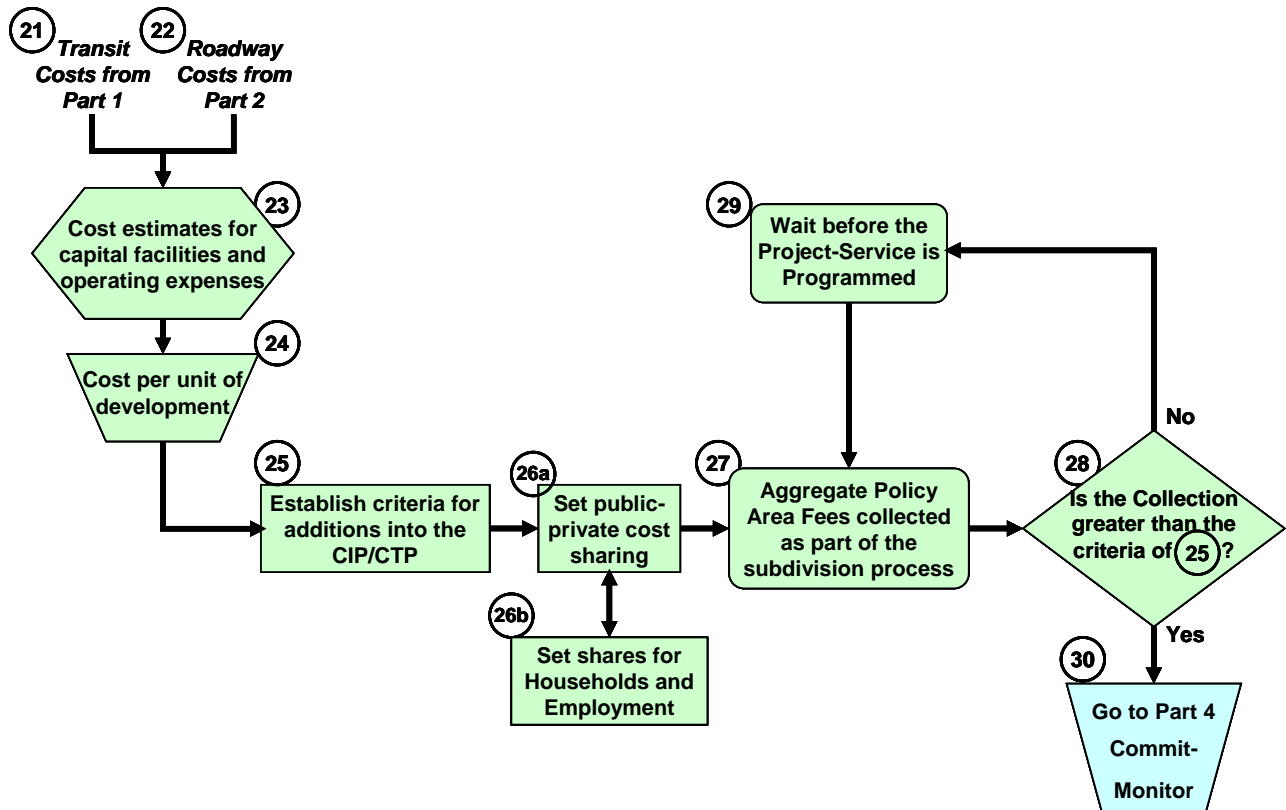


Exhibit 3.11: Develop and Allocate Costs of the Needed Improvements
 (Source: Proposed TPAR Report, April 2010)

Depending on the complexity of a project, this implementation process can take up to 12 years. TPAR recommends that the existing process of developing roadways be streamlined to ensure timely completion of road projects designated as **solutions** to congestion problems. Once completed, the life expectancy of a roadway capital project will provide its basic function for a very long period of time as compared to the 12 year average life expectancy of a bus.

Step 23 – Cost Estimates for Capital Facilities and Operating Expenses: The allocation of cost shares between public agencies and private development indicated in Exhibit 3.11 should take into consideration the different life expectancies of the service or capital project. In the case of bus transit services needed to improve performance in the ten year period, cost estimates can be prepared and a share assigned to the increased forecast development in the next ten year period. Public shares of this type of cost are typically budgeted in the annual operating budget of the County.

However, in the case of a road or a large capital transit project, an issue of fairness arises in assigning the total private share of roadway cost to the forecast development that takes place in the next ten years. Doing so would place the entire burden of the cost on the first ten years of development. Future development beyond the 10 year forecast would be able to enjoy the benefit of the capital project at no cost, receiving “free rider” benefits. If such a policy was implemented, then it would act as a deterrent for building in the near future. That in turn could create a possible barrier to the sustained economic development of the County, as most developers would wait for another project to go first and let the other project pay the private share.

Step 24 – Cost per Unit of Development: With the goal of encouraging economic development, TPAR proposes that all capital project costs associated with the construction of road capital projects in a Policy Area be estimated and then prorated. With this approach, the total cost of needed projects in each Policy Area is prorated by the 30 year forecasted increase in units of development in the same Policy Area. This yields a **cost per unit of development** for each Policy Area. This cost per unit of development can be more fairly allocated to all future development, not only to that development that may occur in the first ten years of the policy. It is recognized that this aspect of the TPAR process varies from the 10-year time stage used elsewhere in the process. The goal is to determine a more equitable private contribution while bringing an area to an adequate level of performance. Specifically, for roadway projects as well as **major** capital transit projects such as a BRT system, the CCT and the Purple Line, TPAR costs would be determined as described below:

1. Using the Department’s transportation demand model, estimate the total number of evening peak period “trip-ends” (by policy area) forecast to occur first by the 2022, 10-year time horizon, and then by the 2040, long-term time horizon. An initial example of such an incremental trip-end by Policy Area summary is given in Exhibit 3.12.
2. Using a list of un-built Master Planned transportation projects, identify those projects that are needed to pass the adequacy standard for each policy area assuming a year 2040 time horizon.
3. Estimate the costs, by policy area, associated with the projects identified in Step 2.

For the local bus transit (Ride On) system, TPAR costs by policy area would be determined using a combination of annualized capital costs plus annual operating cost for the additional bus service to bring policy areas into transit adequacy, as identified in the adopted TPAR Report.

Exhibit 3.12: Summary of Trends in Trip-Ends by Policy Area

Trend in PM Peak Hour (5-6PM) Total Person Trips for All Trip Types (Motorized)		Total Trip Ends by TPAR Policy Area	Total Trip Ends by TPAR Policy Area	Total Trip Ends by TPAR Policy Area	2010 to 2022 Total Trip End Growth by Policy Area	2010 to 2040 Total Trip End Growth by Policy Area	2010 to 2022 Percent Growth of Total Trip Ends by Policy Area	2010 to 2040 Percent Growth of Total Trip Ends by Policy Area
		in 2010	in 2022	in 2040				
SSTP	Silver Spring/Takoma Park	73,954	81,663	86,302	7,708	12,347	6.9%	4.8%
NB	North Bethesda	71,912	88,557	109,630	16,646	37,718	14.9%	14.7%
KW	Kensington/Wheaton	81,431	87,796	92,809	6,366	11,378	5.7%	4.4%
BCC	Bethesda/Chevy Chase	120,712	133,624	140,377	12,912	19,664	11.5%	7.7%
RKV	Rockville City	89,051	103,476	116,078	14,425	27,028	12.9%	10.5%
DER	Derwood	28,862	34,137	43,591	5,276	14,729	4.7%	5.7%
RDV	R & D Village	14,105	19,997	34,442	5,892	20,337	5.3%	7.9%
GBG	Gaithersburg City	98,339	112,333	135,701	13,994	37,362	12.5%	14.6%
GTW	Germantown West	50,584	54,602	67,692	4,018	17,108	3.6%	6.7%
MVA	Montgomery Village/Airpark	51,136	51,028	52,486	(108)	1,350	-0.1%	0.5%
GTE	Germantown East	24,787	27,223	34,692	2,436	9,905	2.2%	3.9%
FWO	Fairland/White Oak	71,163	70,953	76,244	(210)	5,081	-0.2%	2.0%
AH	Aspen Hill	43,248	43,823	42,371	574	(877)	0.5%	-0.3%
CLV	Cloverly	10,505	10,553	10,640	48	135	0.0%	0.1%
NP	North Potomac	20,011	19,876	22,233	(135)	2,223	-0.1%	0.9%
OLY	Olney	30,823	31,819	34,266	996	3,443	0.9%	1.3%
POT	Potomac	47,997	51,069	52,113	3,072	4,117	2.7%	1.6%
CLK	Clarksburg	11,673	26,538	38,056	14,865	26,383	13.3%	10.3%
DAM	Damascus	12,931	13,791	15,280	860	2,349	0.8%	0.9%
RurE	Rural East	31,560	33,382	35,504	1,823	3,944	1.6%	1.5%
RurW	Rural West	17,767	18,345	18,763	578	995	0.5%	0.4%
Total Trip Ends to / from Policy Areas		1,002,549	1,114,588	1,259,270	112,039	256,721	100.0%	100.0%
					11.2%	25.6%		

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 31 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) 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 proceeds 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.

Step 27 – Aggregate Policy Area Payments Collected as Part of the Subdivision Process:

The decisions made in the public/private partnership to fund the transportation improvements will result in the imposition of a TPAR payment, similar in nature to those set up under the Policy Area Mobility Review (PAMR) in policy areas which require mitigation. This TPAR payment would be assessed on each unit of development in a given Policy Area and then collected as part of the Subdivision Approval Process, prior to the release of building permits. The collection of this payment must be tracked for each Policy Area and the expenditure of the payment must be programmed in the Policy Area where the TPAR payment is collected, except when the minimum TPAR payment is collected, as discussed in the following paragraph. The TPAR cost allocation process will ensure that new development will contribute toward the transportation improvements to support it.

TPAR also proposes a maximum and minimum TPAR payment. In areas where the private burden may be too high, the payment should be no larger than the payment under PAMR, or the equivalent of \$11,700 per trip (or as adjusted, see below). In those areas where the transit and roadway adequacy standards are both met, a minimum TPAR payment should be levied. This minimum TPAR payment would 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. As a starting point for public discussion, a minimum TPAR Payment at 10 percent of the maximum payment is recommended, or the equivalent of \$1,700 per trip generated by the development. Both the maximum and minimum TPAR payment would be adjusted every July 1, on the basis of a national or regional construction cost index.

Steps 28 and 29 – Triggering the Criteria Set in Step 25 to Initiate Proposed Programming:

The MCDOT will use the cost allocation based criteria identified in Step 25 above to be a trigger to recommend the initiation of a project into the CIP of the County. If the needed project in a Policy Area is a CTP project of MDOT, then MCDOT will work with locally elected officials to help advance that project in the CTP review and approval process. As indicated by Step 29 in Exhibit 3.11, there could be considerable time passed between triggering of a recommendation and actual approval taking place to have a specific project or service be approved as being programmed. That process is discussed more in Step 32 of the next Part of the TPAR Process.

Part 4: Program Public Commitments

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 3.13 below indicates the general sequence of these activities related to the programming of public commitments. (See Steps 31 – 34 below).

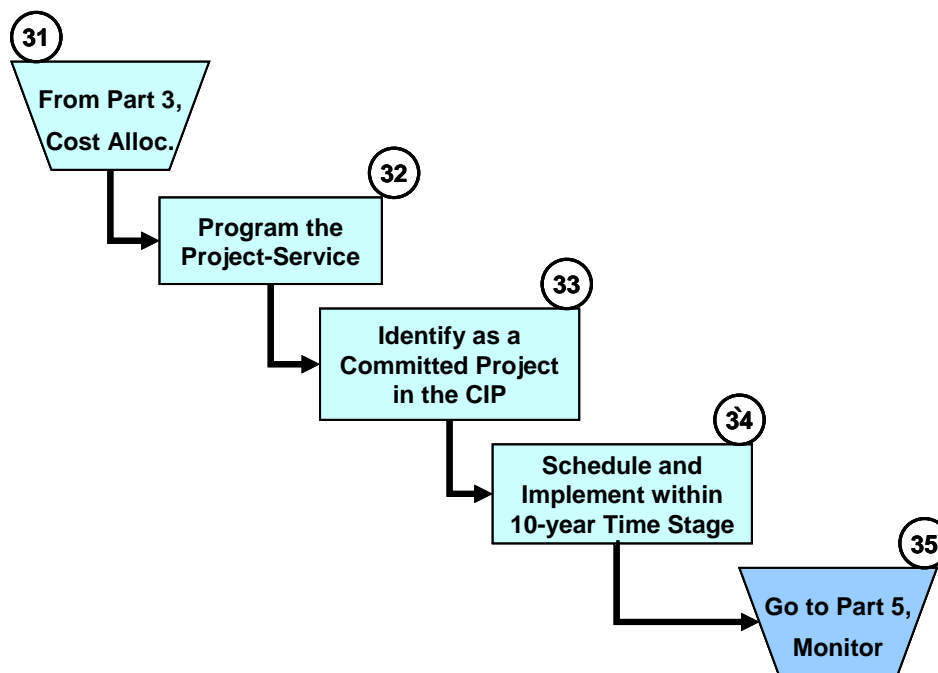


Exhibit 3.13: Programming Public Commitments – Monitor and Report Progress
 (Source: adapted from the Proposed TPAR Report, April 2010)

Step 32 – Program the Project and/or Service: As noted in the Part 3 discussion above, elected officials can use the TPAR to better stage growth by **specifying the collection level** that triggers the programming of projects in each Policy Areas. That is shown 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.

Step 33 – Identify as a Committed Project in the CIP: Feedback from the stakeholder meetings conducted during the development of the proposed TPAR 10 process indicated that a key element of the policy must be the firm commitment by elected officials that the identified capital roadway project or transit service will be implemented. There was significant agreement among stakeholders, that if development is approved, the public sector should provide the necessary infrastructure or services to serve the transportation demands imposed by that development in a timely manner. How to do the same for the CTP needs to be addressed.

Step 34 – Schedule and Implement within the 10-Year Time Stage: During the stakeholder meetings referenced above, multi-year payment options for the TPAR payments were suggested so that those who must pay the new payment have some cash flow to lessen their burden at the start of the development activity. To address this matter, the following process is suggested to be implemented during the Development review process:

1. The development application identifies the: (a) Policy Area of the proposed development, (b) nature and size of the proposed development, and (c) expected total peak period trip generation.
2. MCDOT determines the TPAR payment required based on the cost per unit of development in the Policy Area. If there are improvements that can be made by the project, these may be substituted for all or part of the payment if recommended by MCDOT.
3. Planning Board approves the development, with conditions, including assurance that the TPAR payment will be made or transportation improvements (if substituted for some or all of the payment) will be constructed (permitted and bonded) at time of building permit. If the amount of development is changed during the approval process, MCDOT would recalculate the payment.
4. Developer either pays the TPAR payment or posts an irrevocable letter of credit for the payment at time of building permit. If the latter, the five-year time period for payment starts. At this point, the developer has met his/her obligations under TPAR and can proceed with the next steps in the subdivision process. The payment or approved irrevocable letters of credit will be considered a part of the collection of the TPAR payment for purposes of programming projects or transit services.
5. MCDOT will track the revenues collected in coordination with the Departments of Finance and the OMB, and recommend programming of projects as appropriate.

5: Monitor and Report on TPAR Results and on Transportation System Performance

The final part of the overall TPAR process is a dual set of processes. The first is a new activity aimed at better assuring a balance over time between new development activity and the implementation of transportation facilities and services programmed in part to serve the new development activity. The second is recognition of the continued importance of the Mobility Assessment Report, which was started in 2004 and has been evolving since then, and focuses on the monitoring and reporting of transportation system performance. Each of those are discussed separately next.

Monitor and Report on TPAR Results: The monitoring of the key components of the TPAR administrative processes would need to begin in the year after the approval of TPAR. This monitoring and reporting process would be a joint annual effort between MCDOT and Planning Staff with MCDOT taking the responsibility for drafting a joint report and presentation of results and recommendations.

Exhibit 3.14 below shows various steps needed to monitor and report on TPAR results, including making recommendations for revised or new transportation improvement solutions. The monitoring and reporting is performed in the context of the 10-year transportation planning implementation stage.

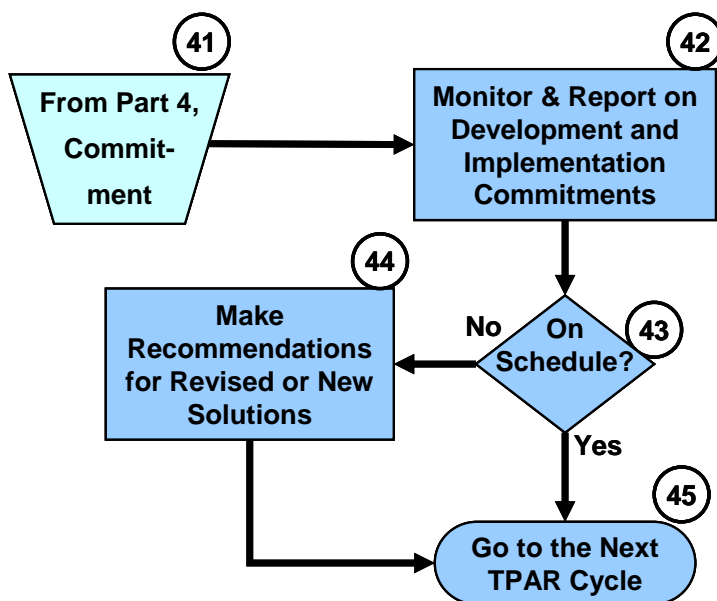


Exhibit 3.14: Process to Annually Monitor and Report on TPAR Results
(Source: adapted from the Proposed TPAR Report, April 2010)

Step 42 and 43 – Monitor and Report on Development and Implementation Commitments: The list of elements that must be monitored and possible actions to remedy any imbalance follows:

- (a) Development Approvals and Building Permits Issued:
If the rate of growth is continuously and sufficiently higher than projected, then additional infrastructure facilities or transit services may need to be programmed. If

the growth occurs significantly more slowly, then public sector financial commitments could perhaps be delayed but not removed from the capital programs.

- (b) Timely Implementation of the Programmed Transportation Projects:
Once a TPAR project is programmed in the CIP or CTP its progress towards implementation must be tracked and reported on a quarterly or semi-annual basis.
- (c) Collection and Dedication of TPAR payments by Policy Area:
This information can be used by agency staff to alert elected officials in the need for timely programming of projects as was discussed above for Step 28 of Part 3, Develop and Allocate Costs for the Needed Improvements.
- (d) Ongoing Costs of Infrastructure and Improved Transit Services:
Payments generated by each unit of development must be adjusted on a biennial basis to reflect the updated costs of the infrastructure. Such updated costs would be associated with: (1) the biennial update of the CIP, (2) annual provisions in the Operating Budget for new or improved transit services, and (3) the annual review and publication of the update of the CTP by MDOT. Once a project funded with TPAR Payments is programmed for design, it should remain in the CIP unless it is delayed for implementation or technical reasons.
- (e) Current Non Auto Driver Mode Share (NADMS) Percentage Goals:
For those Policy Areas where the Council has approved specific NADMS goals, the monitoring report should also present the results of the progress in reaching the mode share goals for those Policy Areas. This element should also become part of the monitoring of transportation system performance.

A key objective of this monitoring process is to ascertain the degree to which the development activity and/or the transportation improvements are “on schedule”

Step 44 – Recommendations for Revised or New Solutions: The integrated monitoring and reporting of these elements must be a cooperative effort between the Executive Branch, the MDOT, and Planning Staff of MNCPPC. Specific responsibilities must be outlined for each unit of government. No one agency has sole responsibility for the different monitoring and reporting elements of TPAR. Appendix B gives an outline of the current expectations for the general role responsibility for each of the five main parts of TPAR, including this part of the monitoring and reporting.

One key element of the reporting requirement must be the analysis and perhaps recommendations for adjustment of the different components of TPAR to better achieve future the transportation - development activity balances at regulatory planning stage and at the transportation planning implementation stage.

Once again, it is best for the smooth development of the County and acceptance by residents if the recommendations are the result of a joint MNCPPC – County Executive Branch effort. The continued economic development of the County and the timely provision of transit services and roadway improvements merit the cooperative efforts of all agencies involved.

Monitoring and Reporting on Transportation System Performance: This is seen as a parallel process to the monitoring and reporting of the TPAR results. Exhibit 3.14 above is oriented primarily to the administrative aspects of the TPAR results. This part of the process is oriented to the monitoring of the performance of the transportation system in the county. As such Exhibit 3.14 does not implicitly deal with this process.

Currently the MNCPPC produces a *Mobility Assessment Report (MAR)* that gathers, assembles, and analyzes various aspects of how well the transportation system is performing in general, as well as for particular types of facilities and even particular facilities. The MAR is budgeted to be carried out once every two years. The most recent report was presented to Council in 2011.

The 2010 Report of the Executive on *Moving Toward a New Transportation Policy Area Review* commented on the need for this process of monitoring transportation system performance. The report said that this type of monitoring may be used in support of TPAR, with specific adjustments that provide more consistency and continuity of effort than the present methodology. For example, the actual performance of arterials could be monitored to serve as a check on the modeled results.

The work associated with preparing this TPAR report did begin to address the feasibility of two innovative ways to more effectively monitor transportation system performance, in particular that of measuring average automobile and transit vehicle speeds on a sample of arterials in the County.

- **Monitoring Average Arterial Speed Using Data from the Vehicle Probe Project and Archived Samples of Private Sector Data of Monitored Average Speeds:** The 2011 MAR presented the initial results of the utility of using estimates of vehicle speeds that are prepared by a private sector company, INRIX and through a contract with the I-95 Corridor Coalition is cooperatively purchased. The data is used in Travel Information Systems in different ways such as producing the travel times now being posted on overhead roadway information signs of MDOT. The work in the 2011 MAR was based on a small sample from archives of that data source purchased by MNCPPC.

Subsequent to that the MWCOG made a more comprehensive purchase in the summer of 2011 from the archives of INRIX for a full set of data for arterials throughout the Washington Region for the time period of 2010. For this TPAR work Planning Staff was able to obtain permissions to also use part of regional sample of MWCOG and to begin testing ways in which that new source of monitored transportation system performance data could be used.

The Center for Advanced Transportation Technology (CATT Lab) of the University of Maryland maintains the archive of the INRIX data purchased through the I-95 Corridor Coalition and is part of the team assisting Planning Staff on TPAR. They and staff of MWCOG provided guidance to Planning Staff on extracting samples of data set on arterial travel speeds purchased by MWCOG. Samples were analyzed on the average weekday speeds for three arterial roadway sections in the Bethesda Chevy Chase Area that was considered in the parallel work on the LATR Refinements being done in conjunction with this TPAR work.

- **Monitoring the Average Speed of Bus Transit Service Using Changes in Locations of Buses from Archived Samples of Bus Location Data:** The Ride-On System of MCDOT has as a management feature a system that uses Global Positioning Systems (GPS) on Ride-On buses that in the transit management and operations profession is termed an Automatic Vehicle Location (AVL) System. As part of support for gather data on transportation system performance in the Washington region, the CATT Lab of UMD has been gather and archiving that AVL data from MCDOT, but had not yet begun a program to analyze and summarize the data into various types of information. The CATT Lab has also been similarly gathering and archiving bus AVL data from the Metrobus system of WMATA, but for that too they had not yet begun to analyze that data source.

As part of the work on TPAR the staff at the CATT Lab began testing the use of the AVL data to see whether new metrics related to transportation system performance of transit service and/or arterial performance could be developed for use in the TPAR monitoring transportation system performance activities. Samples of AVL data from the Ride-On system for buses traveling on MD 355, US 29, and on Randolph Road were selected and summarized.

A general conclusion of both of these tests of new data sources for the more effective monitoring transportation system performance appears promising. Planning staff will continue to research using these new data sources for their use in the next Mobility Assessment Report.

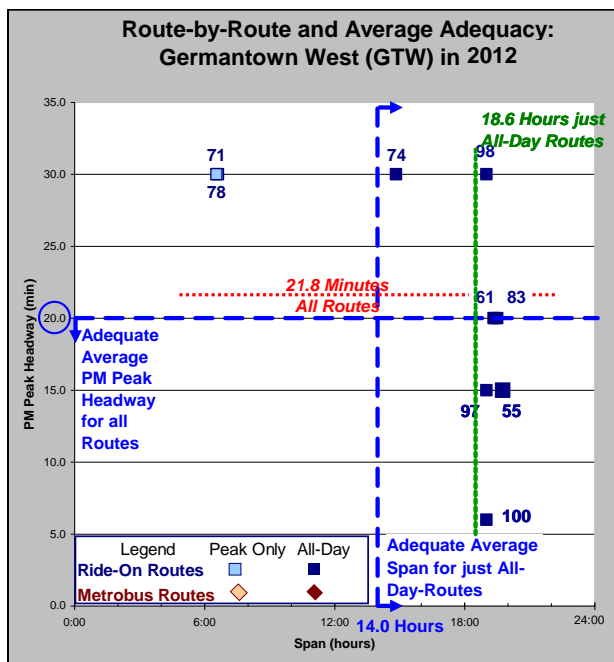
Section V: Applying TPAR to Policy Areas and Local Area Transportation Reviews

For this first full implementation of TPAR Planning Staff, MCDOT staff, along with support of a consultant team separately analyzed the transit and roadways systems in accord with the steps outlined and discussed above in Section III. This Section reports on the countywide results by Policy Area of applying the TPAR process using the three time stages of: (1) regulatory stage of 2018, (2) transportation improvement stage of 2022, and (3) a test of development activity at the master plan stage using the Cooperative Forecasts for 2040.

This Section summarizes these general results for the three stages first in terms of potential transit solutions. Then the roadway adequacy is reviewed and summaries of the results for a set of comparison combinations of future transportation networks and future development activity are presented. Then an outline of how TPAR applies in general to the review of a new subdivision. The application of the TPAR approach to each of the specific Policy Areas is covered subsequently in Section VI.

Countywide Solutions for Transit Adequacy

Peak Headway Solutions for Current Inadequacies in 9 Suburban Policy Areas: As discussed above in Section III, Part 2 of this Report, Transit Adequacy was analyzed with the assumption of current bus service by WMATA and Ride On, as well as the presence of the Metrorail and MARC Commuter Rail system. Adequacy is measured in terms of three transit related factors of Coverage, Peak Headway, and Span of Service, as defined in Section III. The resultant Transit Adequacy Analysis found that many of the Suburban Policy Areas currently have inadequate Peak Headway and that would continue until one or more solutions are programmed. The general solution would be to add more frequent bus service during the peak periods to reduce the average time headway between buses serving those Policy Areas.



Cooperatively with MCDOT, a potential conditional project has been identified that could directly attain Peak Headway standards in nine Suburban Policy Areas and indirectly attain the Peak Headway standards in five of the Urban Policy Areas with similar inadequate Peak Headway. Exhibit 5.1 is an example for Germantown West (GTW) and shows the variations in Peak Headway and Span for the 9 bus routes serving the area. The X-axis shows Peak Headways per route while the Y-axis shows the Span per route, and the points are labeled to show the route numbers. This Exhibit shows that the average Peak Headway for all routes is about 21.8 minutes and the average span for just the all-day routes is about 18.6 hours. The potential conditional solution to improve Headways could add buses on three of those routes.

Exhibit 5.1 Peak Headway vs. Span Example Chart

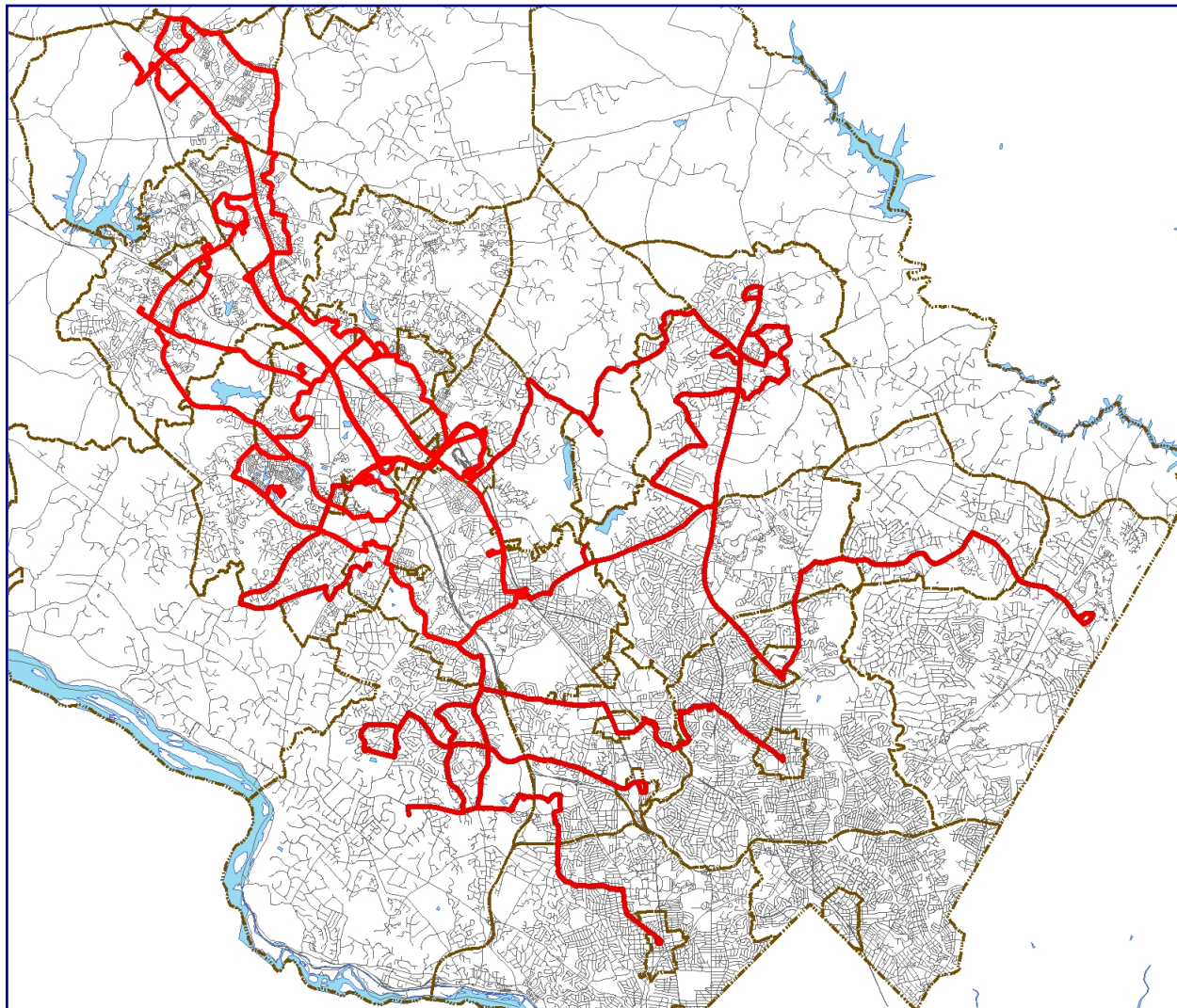


Exhibit 5.2 Potential Conditional Bus Project to Increase Peak Headways (Set 3A2)

MCDOT transit planning staff was able to use information organized in this manner to identify: (a) 9 Policy Areas that could benefit from improved Peak Headways, and (b) a target number of buses, in the range of 25 to 35 new buses, that could be used to improve headways. The Transit sketch-planning methodology was then used, with the support of MCDOT staff, to identify and select about 13 bus routes to directly serve those 9 areas, an allocation of buses to routes, and then a recalculation of the average Peak Headway. The revised allocation of buses that was tested (termed Set 3A2) added 32 buses (plus 15% for spares) to those routes and it is estimated that would attain the Peak Headway standards. That number of buses (including spares) is about 11% of the current Ride-On bus fleet. Exhibit 5.2 above is a graphic that shows the coverage of those routes that would potentially have improved Peak Headways and their broad coverage across much of the County. It is possible because of the addition of one or more buses to a route that the route Coverage in some of the Policy Areas could be increased at essentially no extra costs. That in particular may be the case for some of those few Policy Areas that are also inadequate with respect to Coverage, such as North Potomac, Olney, and Rockville City. This TPAR analysis assumes that would be a feature of this potential conditional project.

That recalculation verified that if those additional buses would be added to the specified routes then the resulting Peak Headways would directly enable those specific Policy Areas to attain adequacy. In addition, since those routes also serve other Policy Areas there would be indirect improved Peak Headways in about eight additional Policy Areas. In five of those Policy Areas the indirect affect would be to also attain Peak Headway adequacy. However, all of this recognizes that the actual decision to propose all of these bus service changes is a responsibility of MCDOT and that they may choose to implement this conditional project differently than described here. The route locations are shown only in general terms and are not a commitment to any particular route improvement.

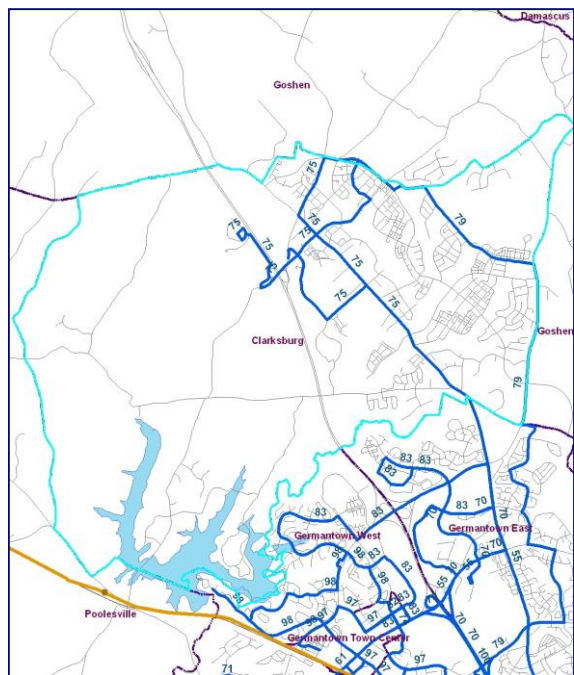
As a conclusion, this conditional project, which could be implemented over a few years, could:

- Help all of the Policy Areas of the County attain Peak Headway adequacy.
- Help three or perhaps four of the Policy Areas with inadequate Coverage to have some minor restructuring of the exiting routes to attain adequate Coverage.
- Help the Cloverly Policy Area where Span of Service is currently inadequate attain adequacy if the one likely route that would serve that Policy Area would be changed by MCDOT to have it provide the minimal all-day service for a Suburban Policy Area.

Transit Solutions for Span: With the one change in the Span of Service for Cloverly just given above, all of the Policy Areas would be adequate for the factor of Span of Service.

Transit Solutions for Coverage: There are two Policy Areas that would remain with inadequate Coverage. Adequacy for Coverage could be attained in one case by some minor re-routing of buses serving the Derwood Policy Area at the discretion of MCDOT, which could be accomplished in conjunction with the potential conditional project for Peak Headways as Derwood would be one of the Policy Areas otherwise being indirectly affected. An option for a possible restructuring of routes is to have one of the several routes that approach the Shady Grove station use Needwood Road, which currently does not have bus service.

Exhibit 5.3 Coverage for Clarksburg

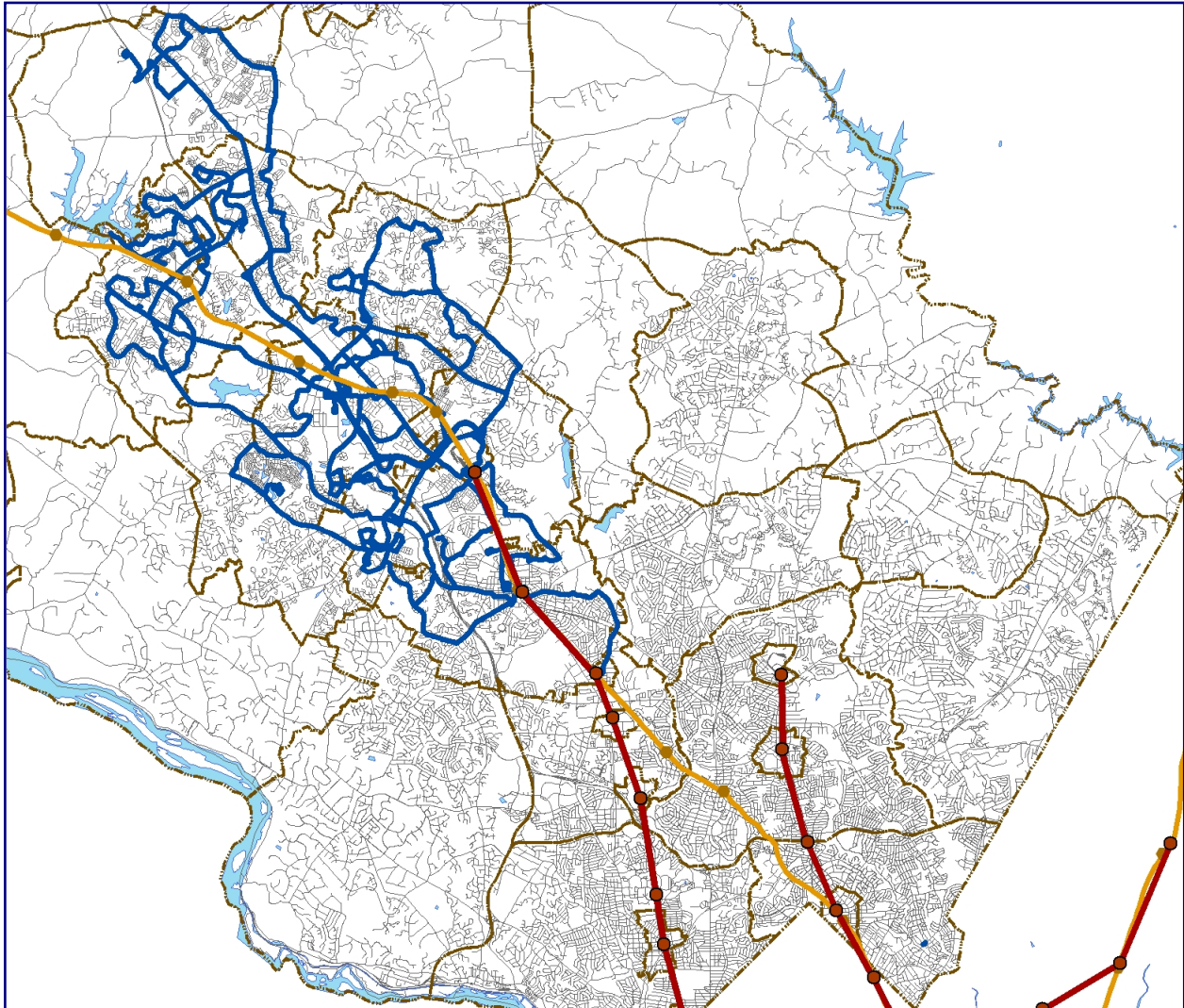


The second case, the Clarksburg Policy Area, would require an exception by policy. About 16% of the CLK Policy Area is located within 1/3 of a mile of one of the 2 bus routes currently serving the area. Exhibit 5.3 shows where in particular bus service coverage is provided in the CLK area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore, transit coverage in the CLK Policy Area is not yet adequate. A temporary and interim exception is recommended to have that standard only apply to the area of CLK east of I-270, in which case the Coverage is adequate for a Suburban area. A refinement to this exception is needed for the Cabin Branch area located west of I-270 (i.e., the triangular-shaped area bounded by I-270, MD 121 and West Old Baltimore Road). The exception would also apply to that area when master-planned development comes on line and bus service is made available to support that development.

— Ride-On Route and # — Metrobus Route and #

Countywide Solutions for Peak Headway Adequacy if Five Suburban Areas are Classified as being Urban without Metrorail Policy Areas

Following the approach of the Transit Adequacy Analysis just discussed, a similar analysis was performed to generally determine how much additional transit service would need to be added to the five current Suburban Policy Areas, which could be reclassified as Urban without Metrorail. That set of potential bus route Peak Headway improvements is being termed Set 4B2, and their likely Coverage is shown in Exhibit 5.4.



This Transit Adequacy Analysis builds upon the discussion given above on page 14 in Section III, Part 1. The particular challenge in this Transit Adequacy Analysis was first to seek attaining the Peak Headway standards for “Urban without Metrorail” Policy Areas, which from Exhibit 3.4a above on page 16 is an average of 14 minutes between buses in the PM Peak Period. It appears conceptually possible to add enough potential bus service increases to most but not all of the existing routes serving those five areas that could: (a) just attain the Peak Headway in some of those five areas, and (b) be somewhat towards the planning target in the other areas as some routes serve adjacent areas. Exhibit 5.4 is also intended to illustrate that the pattern of Set 4B2 bus service improvements would complement and connect with the three end stations on the Metrorail Red Line as well as five commuter rail stations. That would provide good connections to those regional transit services and have the potential to serve more of the overall travel.

It is estimated that it would take about 48 additional new buses in Set 4B2 (in addition to the 32 buses estimated above to attain Suburban standards for existing services in Set 3A2). A factor of 15% also needs to be added for spare buses that are needed for effective operations. From a Subdivision Staging Policy perspective it would seem that the first Transit Adequacy solution, Set 3A2 discussed to obtain the Suburban standards, would be programmed first. Thus to accomplish both policy objectives would require about a total of 80 new buses plus 12 for spares, which is about 26% of the current Ride-On bus fleet including spares. That level of commitment would add buses to 18 routes, 6 of which would likely be improved in the first improvement set. That set of 18 likely routes is identified in Exhibit 5.4 shows a concentration of bus routes in the I-270 Corridor between Rockville and Clarksburg. Perhaps as few as five of the bus routes serving that combined group of Policy Areas would not need to have their bus service improved.

Generalized Consideration of Capital and Operating Costs: Current capital costs for purchasing new clean diesel buses of about 40 seats varies between \$0.5 and \$0.6 million dollars per bus depending upon the purchase size and mix of hybrid buses. Current operating costs for putting a new bus into peak period operations of about 6 hours is about \$0.12 to \$0.15 million annually for labor and direct operating expenses such as fuel. The direct number of required buses is used for the operating expenses but the direct plus spare number of buses is used in the capital costs. Thus using those factors the 10-year capital and operating cost for Set 3A2 would be about \$64 million while the 10-year capital and operating cost for Set 4B2 would be about \$95 million more, or a total for both sets of about \$160 million. Additional cost considerations and perhaps a more refined set of cost estimates are still being worked on to be ready in time for future worksessions for the Subdivision Staging Policy.

Consideration of Bus Garage Capacity: It is also unclear whether such a large relative increase in the Ride-On bus fleet would require expansion of the current and/or programmed bus garages, which could add a substantial cost impact and possible physical constraint to proceeding with such a full expansion. There are currently three garage facilities for the Ride-On fleet that service the fleet of about 350 buses, which includes the spares. The facility in the Silver Spring area is at its capacity and services about 150 buses. The Equipment Maintenance and Operations Center (EMOC) near Shady Grove is in the last phase of a programmed expansion and service about 200 buses when completed in the next year or two. Rental space is used near Nicholson Court for about 75 to 100 of the smaller buses used for service. Thus starting in about two years out there will be garage capacity to serve about 75 more buses and perhaps a few more. There have been plans and a PDF in the CIP for a North County Maintenance Depot that was anticipating being able to serve up to 120 Ride-On buses. However, the planning for that is on an indefinite hold pending resolution of various environmental concerns. Planning for the CCT as a BRT and for other BRT services and their specialized large capacity buses requirements have been working on their own options for garage, maintenance, and operation center locations and are a major cost factor in those transportation planning activities.

Recommendations: It is the Planning Staff recommendation that the first set (Set 3A2) of transit adequacy improvements are necessary and would constitute an increase in Ride-On bus service that is perhaps somewhat more than 10% of the current bus fleet. Such a level of improvement over the next 10 years seems reasonable even with the currently difficult fiscal conditions. That level of transportation improvement is likely to have capital and operating costs that would enable the elected officials to make a commitment to them over the next few years so as to be implemented within the 10-year time horizon of 2022. There appears to be sufficient garage

capacity to serve such an addition to the Ride-On fleet. The benefits of that investment, as shown in Exhibit 5.2 above, would accrue generally Countywide and as such TPAR Payments derived from the generally identified costs should be allocated Countywide.

While this second set of transit adequacy solutions is desirable from an implementation perspective of the General Plan, it is questionable whether in these times of financial uncertainty in general, and for transportation investments in particular, that timely commitments could be made to this second Set 4B2. It would seem more appropriate to put energy first into making the budget commitments to successfully program the expansion of the local Ride-On bus services to meet inadequacies associated with current bus transit services.

It is also unclear whether such a set of improvements would reinforce or conflict with the project planning objectives and particular plans for the CCT transit improvement that has been underway for a number of years. The CCT as a BRT will require a comprehensive restructuring of the local bus services throughout the I-270 Corridor. It is possible that interim investment in new buses to serve that corridor could be redeployed if appropriate with some effort and cost, perhaps even to other locales in the County. On the other hand the mix and size of the buses may not be a good fit with the bus restructuring needs. If an investment was made, and those particular buses would not be a good fit for restructuring, they still may be of value with respect to giving added flexibility to the overall, Countywide bus replacement program and forestall some on-going investment in that program.

In conclusion, it is recommended that the Board and Council, with Executive review, (a) establish a fourth Policy Area Category of “Urban without Metrorail” now but (b) put an implementation hold on making commitments to achieve those standards until the next TPAR review in 2014. That would give the elected officials and the Board more opportunity to see how the TPAR system is performing before they consider making very tough financial commitments in these fiscally uncertain times. Planning Staff also needs to point out that not all of the five Policy Areas that under this approach could be classified as “Urban without Metrorail” need to be so classified at the same time. Thus for example, the officials could consider making such classifications incrementally one Policy Area at a time and stage this desirable approach more gradually and at a more affordable, effective, and manageable pace.

Countywide Solutions for Roadway Adequacy and Costing Analysis

The overall Roadway Adequacy Analysis steps were discussed above in Section III, Part 2. This part presents and discusses the main countywide roadway adequacy results of applying the TPAR approach. Three main stages are presented in terms of the comparison combinations that were analyzed, although other comparison combinations were considered. The three main comparison combinations and their associated future networks and development activity forecasts are as follows:

- **Regulatory Planning Stage**, which uses the 2018 network with programmed CIP and CTP projects and 2018 development activity
- **Transportation Planning Improvement Stage**, which uses a 2022 network with the prior projects plus new conditional projects and 2022 development activity and
- **Transportation Master Plan—Costing Stage**, which uses the same network as the first but with 2040 development activity.

Exhibits 5.4a and 5.4b include the results of one of the first steps of the Roadway Adequacy Assessment, which is to prepare a list of programmed roadway and transit projects organized by Policy Area. That was the list of projects used in the Regulatory Planning Stage part of the analysis. The list also contains several potential conditional projects which were used in the Transportation Planning Improvement Stage part of the analysis. The list has also been augmented to more clearly identify longer range Master Plan projects that are being used in the longer-term Costing Analysis, as per the discussion in Section III on page 30 for Steps 23 and 24. For ease of review, Exhibit 5.4a is associated with County wide projects and those in the Urban Policy Areas with Metrorail and Exhibit 5.4b for projects in the remainder of the Policy Areas. This is also anticipated in helping in the Costing Analysis that is still under review.

Program Document	Staging of County CIP, State CTP and Master Plan Projects Used in TPAR 2012 (updated to 6-6-12)					Cond. Proj. by 2022	MP Proj. by 2040
	Project Name	Improvement Type and/or Limits	Policy Area	Open by 2012	Prog. by 2018		
CTP	Intercounty Connector (MD 200)	I-370 to I-95 (6 lane freeway)	Countywide	Y	Y	Y	Y
CTP	Intercounty Connector (MD 200)	I-95 to US 1 (4 lane freeway)	Countywide	N	Y	Y	Y
CTP	Intercounty Connector (MD 200)	Collector/Distributor Lanes along I-95, MD 200 to MD 198	Countywide	N	Y	Y	Y
CTP	Purple Line LRT	<i>Project Planning may be sufficient if conditional funding approved</i>	Countywide	N	N	Y	Y
CLRP	Corridor Cities Transitway BRT	Shady Grove to Metropolitan Grove	Countywide	N	N	Y	Y
CLRP	Corridor Cities Transitway BRT	Metropolitan Grove to Clarksburg	Countywide	N	N	N	Y
CIP	Equip Maint Oper Ctr (EMOC)	Bus Garage expansion to serve Ride-On buses	Countywide	N	Y	Y	Y
CIP	North County Depot	Bus Garage expansion to serve Ride-On buses	Countywide	N	N	Y	Y
CIP	Ride-On Peak Headway Cond Imp	Peak headway improvements: assumption of 13 routes in 9 Areas	Countywide	N	Some	Y	Y
CTP	Paul S. Sarbanes Transit Ctr	Silver Spring Metro/MARC/Ride-On	SSTP	N	Y	Y	Y
CIP	Citadel Ave. Extended	Marinelli Rd to Nicholson Lane (2 lanes)	NB	Y	Y	Y	Y
CIP	Montrose Parkway West	Montrose Rd to Hoya St. (4 lanes)	NB	Y	Y	Y	Y
CIP	Nebel St. Extended	Chapman Ave. to Randolph Rd (4 lanes)	NB	Y	Y	Y	Y
CIP	Chapman Ave Extended	Randolph Rd to Old Georgetown Rd (2 lanes)	NB	N	Y	Y	Y
CIP	Montrose Parkway East	Parklawn Dr to Veirs Mill Road (MD 586) (4 lanes)	NB	N	Y	Y	Y
CIP	Montrose Parkway East	MD 355/Montrose Parkway Interchange to Parklawn Dr (4 lanes)	NB	N	Y	Y	Y
CTP	Rockville Pike (MD 355) / Montrose Parkway Interchange	Includes connection on Montrose Parkway West from Hoya St to Randolph Road	NB	N	Y	Y	Y
CTP	Georgia Ave (MD 97)	Interchange of Georgia Avenue (MD 97) with Randolph Rd	KW	N	Y	Y	Y
CIP	Forest Glen Metro Underpass	Underpass of Georgia Ave (MD 97) Pedestrians/Bike Improvement	KW	N	N	Y	Y
CTP	Connecticut Ave. (MD 185)	I-495 to Jones Bridge Road (BRAC project) (add 4th SB Lane)	BCC	N	Y	Y	Y
CTP	Connecticut Ave. (MD 185)	Manor Road to I-495 (BRAC project) (Add 4th NB lane)	BCC	N	Y	Y	Y
RKV			RKV				
CIP	Redland Rd	Crabbs Branch Way to Needwood Rd (4 lanes)	DER	Y	Y	Y	Y
CIP	Redland Rd	Needwood Rd to Baederwood Lane (3 lanes)	DER	Y	Y	Y	Y
CLRP	MidCounty Highway	Shady Grove Rd. to ICC (4 lanes)	DER	N	N	N	Y

Exhibit 5.4a: Transportation Projects in the Road Adequacy and Cost Analysis; Part A

Program Document	Staging of County CIP, State CTP and Master Plan Projects Used in TPAR 2012 (updated to 6-6-12)					Cond. Proj. by 2022	MP Proj. by 2040
	Project Name	Improvement Type and/or Limits	Policy Area	Open by 2012	Prog. by 2018		
			RDV				
CIP	Watkins Mill Rd Extended	MD 355 to MD 117, without a connection yet across I-270 (4 lanes)	GBG	Y	Y	Y	Y
CTP	Watkins Mill Rd Bridge of I-270	(interchange would be a separate and later project)	GBG	N	N	Y	Y
CTP	Watkins Mill Rd Interchange	Interchange of I-270 with Watkins Mill Road Extended	GBG	N	N	Y	Y
CTP	MidCounty Highway	Middlebrook Road to Montgomery Village Ave (MD124) (4 lanes)	GBG	N	N	Y	Y
CIP	Fairland Rd Improvement	US 29 to Prince George's County line (3 lanes)	FWO	Y	Y	Y	Y
CIP	Greencastle Road	Greencastle Ridge Terrace to Fairland Park Entrance (4 lanes)	FWO	Y	Y	Y	Y
CTP	Columbia Pike Interchange	Interchange of Columbia Pike (US 29) with Fairland Road	FWO	N	N	Y	Y
CIP	Father Hurley Blvd Extended	Wisteria Dr to Germantown Rd (MD 118) (4 lanes)	GTW	Y	Y	Y	Y
CIP	Century Boulevard	Complete connecting loop road to Crystal Rock Drive (4 lanes)	GTW	N	Y	Y	Y
CLRP	Dorsey Mill Rd Bridge over I-270	Century Blvd to Observation Drive	GTW	N	N	Y	Y
CIP	Snouffer School Road	Sweet Autumn Drive to Centerway Road (5 lanes)	MVA	N	Y	Y	Y
CIP	Snouffer School Road North	Centerway Rd to Ridge Heights Drive (4 lanes) (Webb Tract)	MVA	N	Y	Y	Y
CTP	Woodfield Rd. (MD 124)	Airpark Road to Fieldcrest Road (6 lanes)	MVA	Y	Y	Y	Y
CIP	Goshen Road	Odenhal Road to Warfiled Road (widen to 4 lanes)	MVA	N	Y	Y	Y
			AH				
CLRP	Dorsey Mill Rd Bridge over I-270	Century Blvd to Observation Drive	GTE	N	N	Y	Y
CLRP	MidCounty Highway	Middlebrook Road to Ridge Road (MD 27) (4 lanes)	GTE	N	N	N	Y
CLRP	MidCounty Highway	Middlebrook Road to Montgomery Village Ave (MD124) (4 lanes)	GTE	N	N	N	Y
			CLV				
CTP	Clopper Road Widening (MD 117)	Watkins Mill Road to Game Preserve Road	NP	N	N	Y	Y
			OLY				
			POT				
CIP	Stringtown Road	MD 355 to St. Clair Rd / Snowden Farm (4 lanes)	CLK	Y	Y	Y	Y
Private	Snowden Farm Parkway	MD 355 to MD 121 (2 lanes); Md121 to MD 27 (4 lanes)	CLK	N	Y	Y	Y
Private	Little Seneca Parkway	MD 27 to MD 355 (4 lanes)	CLK	N	Y	Y	Y
CIP	Woodfield Rd Extended	North of Main St. (MD 108) to Ridge Rd (Md 27) (2 lanes)	DAM	Y	Y	Y	Y

Exhibit 5.4b: Transportation Projects in the Road Adequacy and Cost Analysis; Part B

The left most column of the two-part Exhibit indicates the basic source document for the project that includes the MDOT CTP, the County’s CIP, the Constrained (Fiscally) Long-Range Transportation Plan (CLRP) of MWCOG, and private/public projects associated with approved developments. The project name and then the improvement type and/or limits are given next followed by the abbreviation for the Policy Area that is directly served by the project, or whether the project is considered a County wide one. If a project spans two or more adjacent areas it generally is listed in each Policy Area.

The four right-most columns are indications of staging-status for purpose of the adequacy and costing analyses. The first two of the staging-status columns are applicable to the Regulatory Planning Stage, which includes consideration of Local Area Transportation Reviews (LATR). The first of those columns has green shading with bolded “Y” for Yes; or gray shading and a gray “N” for No. The same general format is used for the next column but light-yellow shading is used instead. A non-shaded row in the second staging-status column indicates that project was previously available for the prior stage.

The last two right-most columns are used to indicate whether a new project is beginning to be considered as a “conditional project” by the 10-year time horizon of 2022, or as a longer-term “costing-related” project that could address anticipated remaining deficiencies associated with the Transportation Planning Improvement Stage, where such costing projects have three gray-No’s to the left. A few rows in the Exhibits are blank indicating that no programmed, conditional, or costing projects have been identified for that Policy Area. Some of the projects listed associated with the last two columns are still in a state of flux and may be changed as part of the final costing analysis.

Regulatory Planning Stage: Exhibit 5.6 presents the results of the Roadway Adequacy Analysis for the Regulatory Planning Stage using the 2018 network with programmed CIP and CTP projects and 2018 development activity. This comparison combination is similar in terms of its input assumptions to that which would be used in the current PAMR analysis except there the amount and pattern of the development activity would be based on the “pipeline” of approved development. As discussed in the example of a similar chart in Section II, Part 2, the “brown-hatched” bars show (a) the **range** of the average of roadway speeds by direction of travel in relation to the “free flow speed”, or LOS, for each Policy Area in the PM peak period, (b) the bottom of the bar shows the average LOS in the peak direction of travel, and (c) the top of the bar shows the average speed (LOS) in the non-peak direction.

The results indicate reading from left to right that two Policy Areas (Potomac and North Potomac) for this combination of network and development would be slightly more congested on average than their standard. Two other Policy Areas (Fairland White Oak and Gaithersburg) would have their peak direction average congestion levels being very close to the standard. Additional information is presented in Section VI for all of the Policy Areas that indicates which of the roadways in each area has peak direction congestion more congested than the standard for the area and which roadways are less congested on average than the areawide standard.

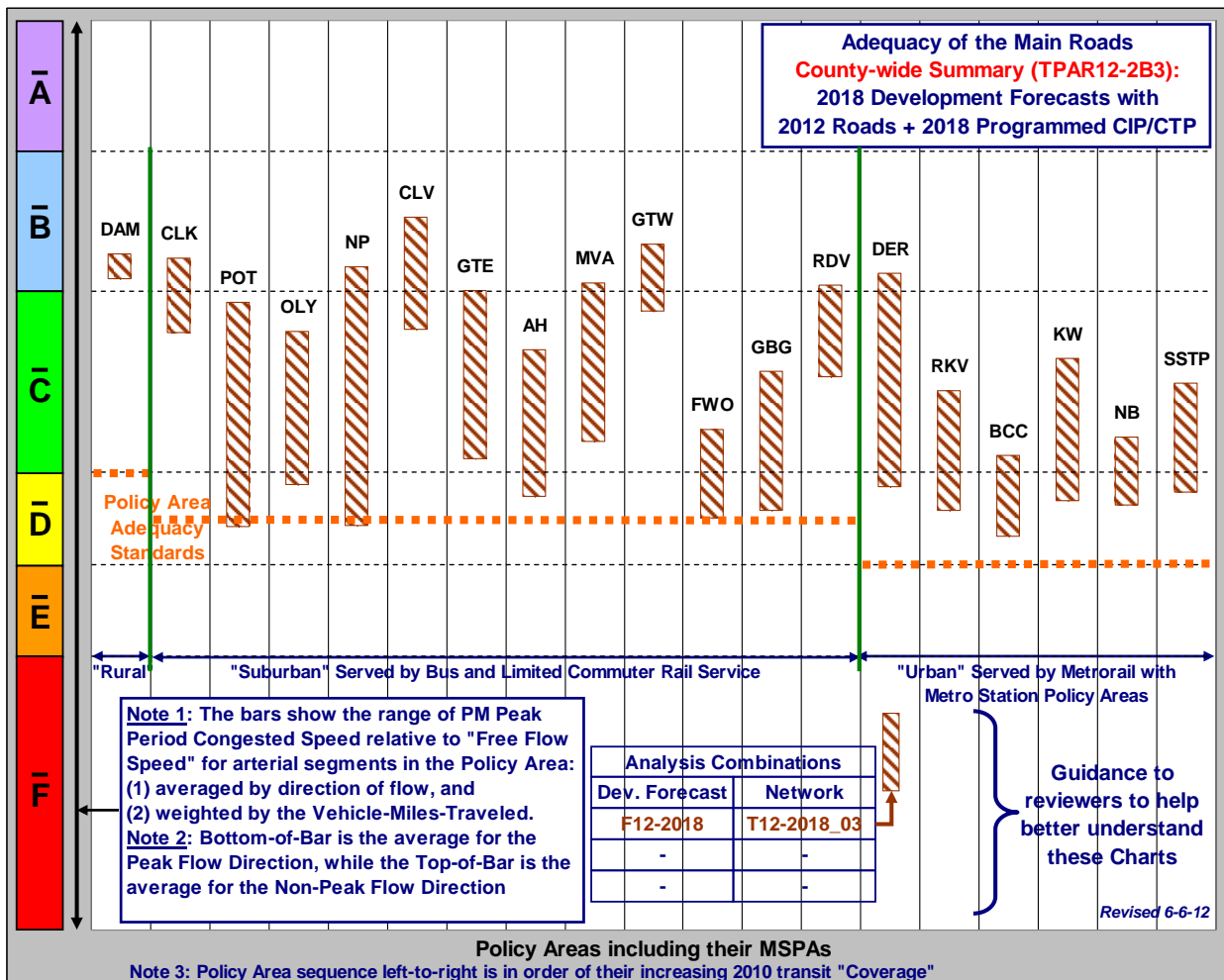


Exhibit 5.6: Countywide Results for the Regulatory Planning Stage

Transportation Planning Improvement Stage: Exhibit 5.7 presents the results of the Roadway Adequacy Analysis for the Transportation Planning Improvement Stage using: (a) development activity for 2022 and (b) the 2022 network with programmed CIP and CTP projects and the conditional projects from Exhibit 5.5. This comparison combination is a new feature of TPAR and is designed to give better guidance to MCDOT in the programming activities. Similar to the preceding chart, the “green-hatched” bars show (a) the **range** of the average of roadway speeds by direction of travel in relation to the “free flow speed”, or LOS, for each Policy Area in the PM peak period, (b) the bottom of the bar shows the average LOS in the peak direction of travel, and (c) the top of the bar shows the average speed (LOS) in the non-peak direction.

The results indicate reading from left to right that two Policy Areas (Potomac and Fairland White Oak) for this combination of network and development would be more congested on average than their standard. Three other Policy Areas (Aspen Hill, Gaithersburg, and Bethesda Chevy Chase) would have their peak direction average congestion levels being very close to the standard. Additional information is presented in Section VI for all of the Policy Areas that indicates which of the roadways in each area has peak direction congestion more congested than the standard for the area and which roadways are less congested on average than the areawide standard. The need for consideration of additional potential conditional projects is part of those discussions in Section VI for each of the Policy Areas.

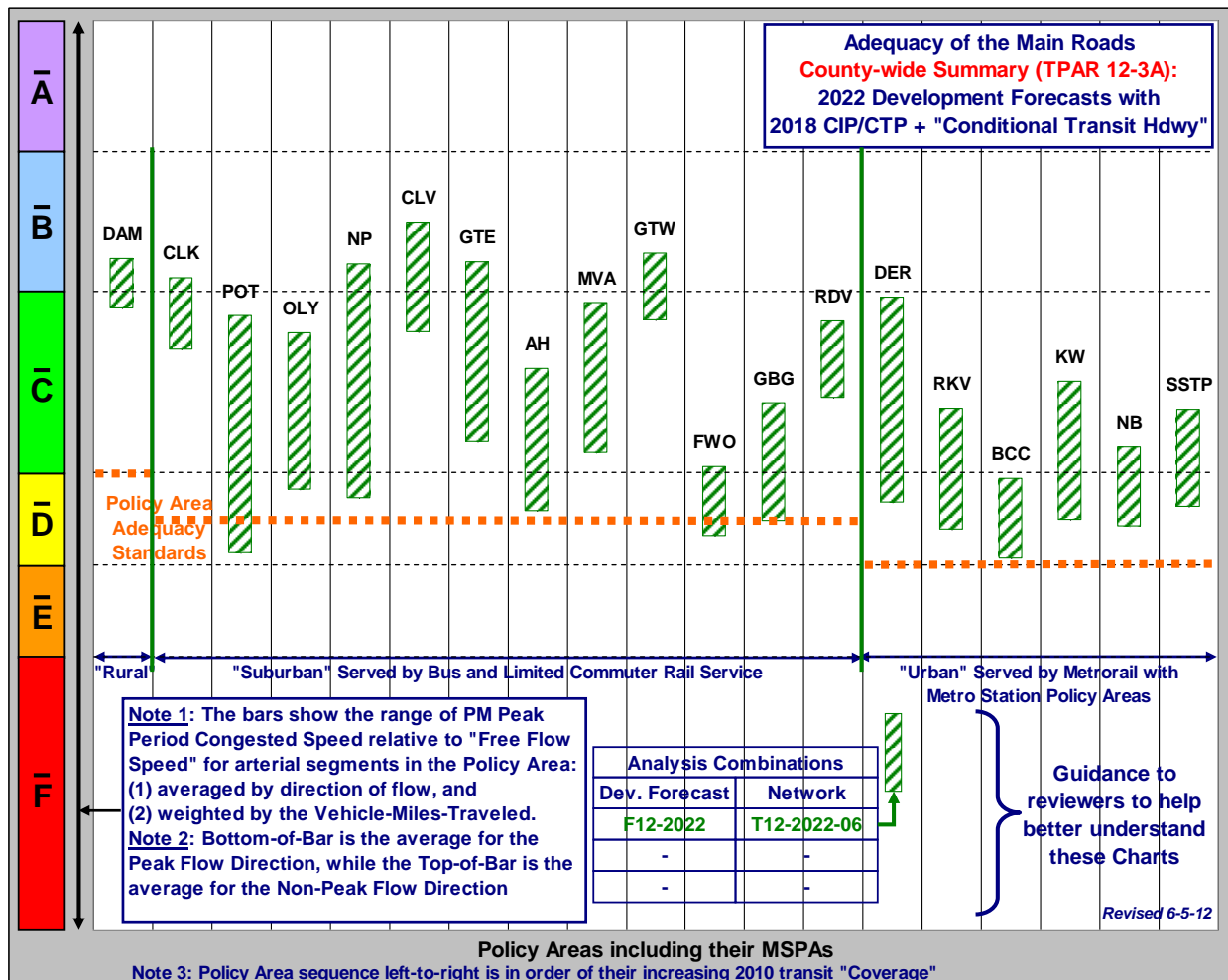


Exhibit 5.7: Countywide Results for the Transportation Planning Improvement Stage

Transportation Master Plan—Costing Stage: Exhibit 5.8 presents the results of the Roadway Adequacy Analysis for the Master Plan – Costing Stage using the 2018 network with programmed CIP and CTP projects and 2040 development activity. This comparison combination is a new feature of TPAR and is designed to give improved guidance to MCDOT on how to better allocate the future cost of transportation improvements in different Policy Areas.

It is recognized that this is mostly a hypothetical comparison combination and is not at all likely to happen. It makes the point, however, that if no additional projects would be added to the CIP and CTP and development proceeded as in the Cooperative Forecasts for 2040 then the degree of congestion in many Policy Areas of the County would be severely congested on average and most of the remaining Policy Areas would have average congestion near their standard.

Additional information on this combination is also presented in Section VI for all of the Policy Areas that indicates which of the roadways in each area would be the most impacted by this hypothetical combination. In those discussions, this comparison combination is also a good indicator of which roadways in each Policy Area would be most in need of improvement.

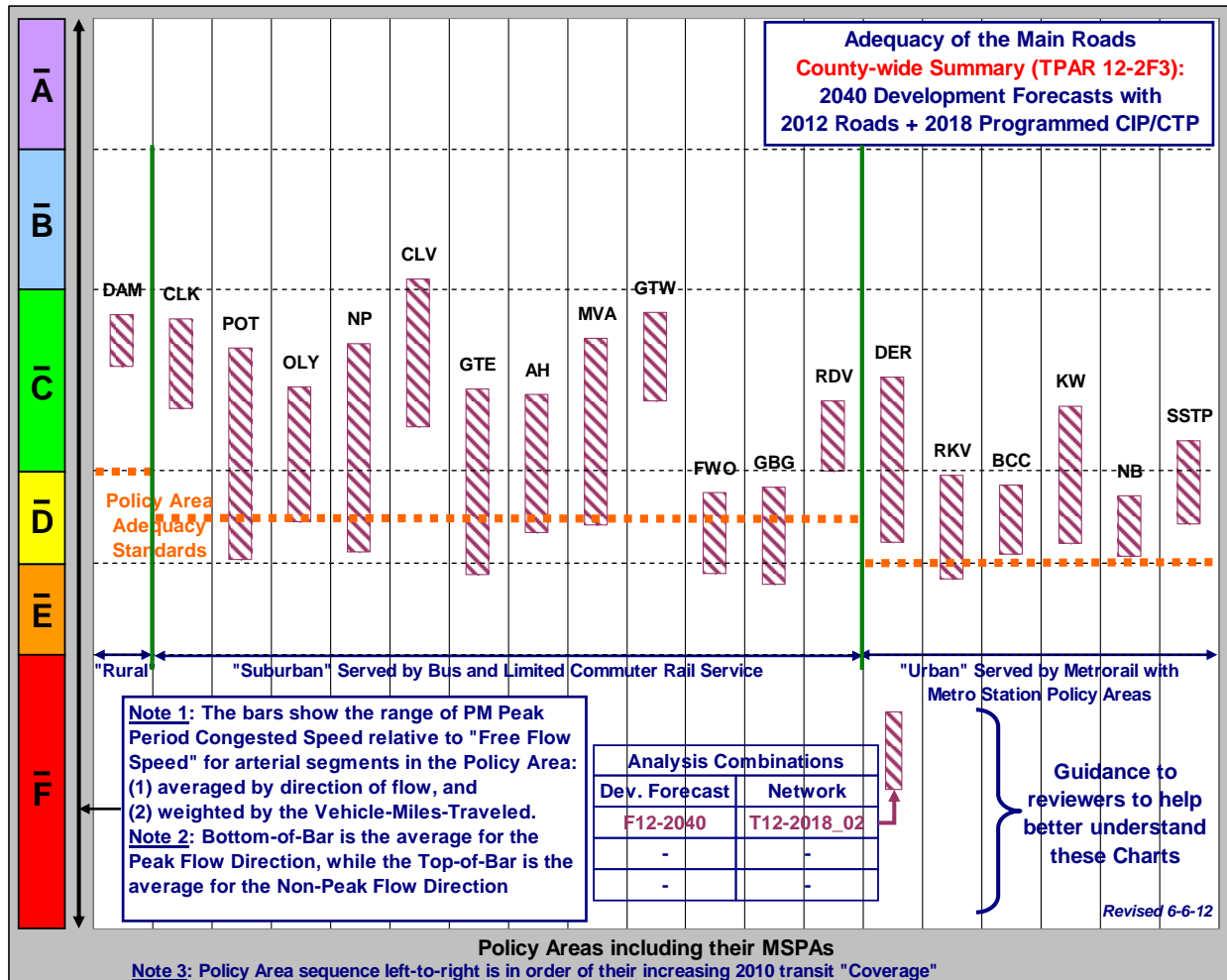


Exhibit 5.8: Countywide Results for the Master Plan – Costing Stage

[NOTE: The costing analysis that is still being developed and it is anticipated to be located at this place in the TPAR Report.]

Application of TPAR to a new Subdivision Development: To facilitate understanding from the perspective of the development community, we present the following outline of the TPAR Process for developers:

1. Developer identifies the Policy Area of the proposed development at the Preliminary Plan stage, the nature and quantification of the proposed development, and expected peak trip generation of the proposed subdivision.
2. Planning Board reviews the development and if approved the development, with whatever modifications if any, transmits to the Departments of Permitting Services and Transportation the relevant information of the approval, including:
 - a. Approval number
 - b. Location of the Policy Area
 - c. Approved number of housing units or square feet of development
 - d. Expected number of peak trips generated by the development.
3. Developer notifies MCDOT of the information in 2, and the number of units or square feet of development to be submitted for approval in a given record plat, *prior to the approval of the record plat*. (Note: a subdivision may be broken down into several record plats during its implementation).
4. MCDOT estimates the TPAR payment associated with the record plat, and provides identification of the account where monies should be recorded.
5. Developer either pays the TPAR payment or posts an irrevocable letter of credit for the payment. If the latter, a five-year time period for payment starts. At this point, the developer has met his/her obligations under TPAR and can proceed with the next steps in the subdivision process.
6. MCDOT records the information and maintains the running totals of collection per Policy Area, and the breakdown for transit and roadway improvements. Information to be readily available to the public.
7. Are roadway or transit improvements ready for programming? If so, MC DOT requests formal programming of the improvements
8. MCDOT maintains and tracks letter of credit collections and deadlines.
9. MCDOT / MNCPPC Monitor and Report

Section VI presented next in this Report indicates the TPAR results for each of the Policy Areas.