# DRAFT
# 2012 Transportation Policy Area Review

Prepared by:

Motion Maps, LLC

SABRA, WANG & ASSOCIATES, INC.
Engineers • Planners • Analysts

For the Montgomery County Planning Department

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## Acknowledgements

(To be entered later)

# Transportation Policy Area Review for 2012

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## Section I: Introduction

The Planning Board was charged with refinement of the methodology developed by the Montgomery County Department of Transportation (MCDOT) to replace the policy area test for transportation adequacy in the current Subdivision Staging Policy (formerly known as the Growth Policy). The current test is known as Policy Area Mobility Review (PAMR) and the proposed replacement is called the Transportation Policy Area Review (TPAR).

The MCDOT consulted a wide array of stakeholders, including civic leaders, the business community, developers, advocacy groups, technical experts, staff, and policy makers, for their ideas and feedback. The Transportation, Infrastructure, Energy and Environment Committee of the Montgomery County Council reviewed the proposal and agreed that TPAR should:

1. Be simple to understand and monitor
2. Balance congestion levels with approved development and needed transportation infrastructure in accordance with Approved Master Plans
3. Provide greater assurance that transportation improvements that form the basis for approval of new development actually take place
4. Encourage continued economic development while maintaining quality of life
5. Be based on Approved Master Plans
6. Study transit and travel demand management **separately** from arterial roadways and bicycle and pedestrian improvements
7. Tie the Growth Policy firmly to the Montgomery County Capital Improvements Program (CIP), the State of Maryland Consolidated Transportation Program (CTP) and the Montgomery County Operating Budget
8. Forecast future transportation performance to identify future inadequacies that could result in the programming and construction of additional transportation projects
9. Identify solutions to the forecasted transportation inadequacies and monitor progress on development activity and on the timely provision of transportation solutions.
10. Reflect understanding of stakeholder feedback
11. Maintain quality of life
12. Apply additional public and private resources to the timely provision of new facilities

The County Council asked that the Planning Department undertake a study to refine the process, conduct a countywide application of the roadway and transit mobility assessments and prepare a proposal to implement the TPAR process in advance of the Subdivision Staging Policy. The results of this effort are contained in this report.

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## Section II: Overview of the Proposed New Policy Area Review Process

The new TPAR identifies inadequacies and solutions specific to each Policy Area. The basics of the proposal consist of five parts as shown in Exhibit 2.1. The interrelationships the parts are very important to the overall effectiveness of TPAR. These interrelationships are discussed in some detail along with the steps to carry out each of the five parts in Section III of this TPAR Report.

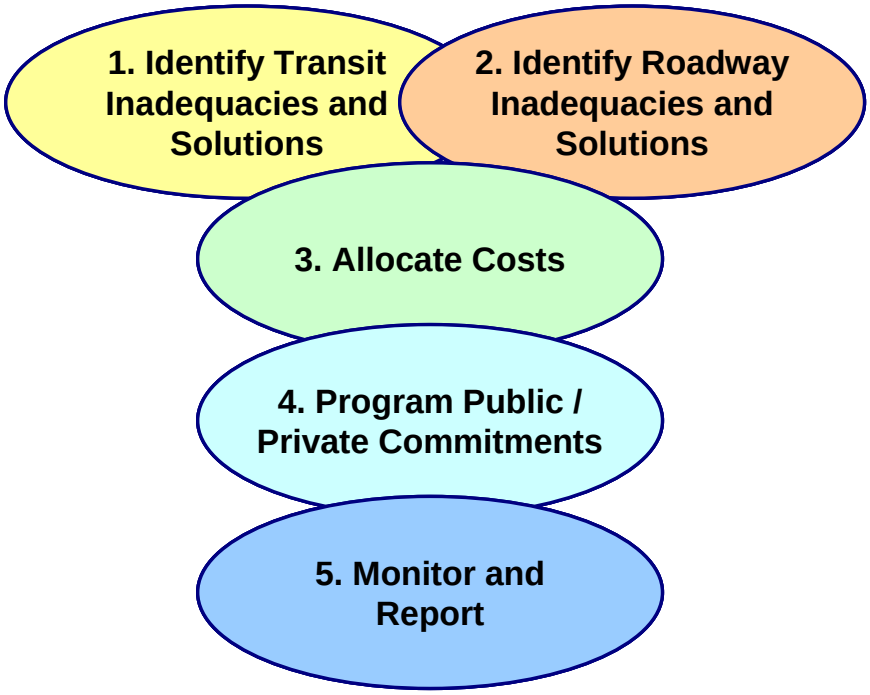



**Exhibit 2.1 Parts of the Transportation Policy Area Review Process**

1. Establish adequacy standards for the provision of transit services, identify future transit inadequacies, and develop a set of proposed transit improvements

2. Identify roadway inadequacies and solutions an average of ten years ahead of the adoption of a given Growth Policy, based on the approved forecast of development activity for the same 10-year time period.

3. Develop cost estimates for the transit and roadway solutions identified in the previous two parts, and allocate costs to each Policy Area.

4. Establish when a capital project or major transit service improvement will be programmed, and the level of public – private cost participation for each policy area.

5. Implement a monitoring and reporting mechanism to determine that (a) the assumed development is in fact taking place in accord with the forecasts, (b) ensure that the supporting transportation improvements are proceeding in concert as budgeted, and (c) support programs to monitor actual transportation system performance. Recommend specific actions to ensure better balance between transportation and development activity in the target year(s).

Development of this application of the TPAR Review involved close coordination between the Planning Board and MCDOT. Forecasts of development activity and travel demand modeling are the responsibility of the Planning Board; while capital programming, project development and implementation, and roadway and transit operations are the responsibility of MCDOT. TPAR engenders a close working relationship to ensure that development activity forecasts and transportation infrastructure improvements take place in concert and not at cross purposes or independent from each other. This process continues and will be strengthened as the process is reviewed by the public, decision-making bodies and finalized.

**The Proposed TPAR Policy in a Nutshell**

This summary presents a synopsis of the proposed Transportation Policy Area Review in order to facilitate the reading and understanding of this document:

1. The policy's intent is to provide guidance in the subdivision development review process to ensure balance, or progress toward balance, between development activity (based on the adopted cooperative forecast, rather than the pipeline of approved development projects) projected ten years forward and the provision of transportation services (both transit and roads) within the same time frame.

2. To that end, the policy suggests that standards of **transportation adequacy** be established for each Policy Area in the County, for transit services and for roadway levels of congestion. For this purpose, the proposed policy suggests all Policy Areas be classified as being urban, suburban, or rural.

3. A Policy Area is in adequate balance when both transit services and roadways are projected to meet the transportation adequacy standards in the ten year period.

4. If a Policy Area is projected not to meet the adequacy standards ten years from the adoption of the policy, then the County must program the transit services and/or road improvements in the Operating Budget or CIP to meet the 10-year forecast of development activity.

5. The capital transit and roadway improvements to be programmed must come from the Adopted and Approved Master Plans that cover the specific Policy Area where the inadequacy may exist.

6. The proposed improvements are to be funded through public-private partnership, with different levels of participation, based on public policy considerations of where growth is most desirable. Growth will be allowed in all Policy Areas of the County, in accordance with their Adopted Master Plans. No moratorium is proposed anywhere due to inadequate areawide transportation, but in turn, County residents must be assured that adequate transportation improvements will be implemented in a timely manner to support the growth.

7. Suggestions for the public-private cost sharing proposal are:
    a. The private participation will be met by a TPAR payment, which may differ by Policy Area and the size of the development. Such payment is analogous to the PMAR payments under the current policy. That payment must occur prior to

building permit, in the form of cash or through an irrevocable letter of credit, or similar surety, due within five years from the date of the building permit approval. It may be amortized over a period of several years. All payments collected in this process must be tracked and spent in the Policy Areas for which these funds are collected or on projects that will have a direct benefit to the Policy Area.

b. To meet the public participation component, the County must program the transit services and/or road improvements to ensure the "solutions" are in place and operational within the ten year time frame. Capital projects programmed and funded with TPAR payments be postponed only due to technical implementation issues, and cannot be eliminated.

8. Once a predetermined threshold of private payments has been collected, a capital project and/or transit service improvement must be programmed to bring the Policy Area into the adequate standard. Depending on the complexity and size of the improvement, engineering and design funds may have to be programmed in advance of private funds being collected. This will be determined through the CIP process.

9. Finally, the proposed policy recommends critical monitoring and reporting of key elements of the policy. These elements include the monitoring of development activity and the programming and implementation of transit services and capital transportation projects. The policy recommends the preparation of an annual report on the trends during the prior year, and recommendations for action to ensure that the desirable balance between development activity and transportation is achieved in the 10-year period. Support for the monitoring and reporting of transportation system performance is also an element of this policy.

**Benchmarking Peer Jurisdictions with Areawide Transportation Review Processes**

One of the initial tasks that was done in preparing this report was to conduct a benchmarking review of a sample of peer jurisdictions nationally who are known to thought to have an areawide transportation review process for the impact of proposed development. Exhibit 2.2 on the next page identifies the names of all of the jurisdictions who were contacted. Those whose names are in larger, red font were those who were found to be were found to be closer peers and who have a functioning areawide transportation review process.

In total thirteen jurisdictions were contacted and/or researched on their websites about their process. A questionnaire was developed and in some cases filled in by staff of those jurisdictions and in other cases the pertinent features about their process were filled in by the consultant team. Some of this was done in conjunction with all getting information on their Local Area Transportation Review procedures as well.

Seven main features of Areawide Transportation Reviews are identified and assessed in this peer comparison:

- Cumulative impacts versus Development of Regional Impact
- Jurisdictional coverage and area versus corridor coverage; including corridor-by-corridor summaries
- Time frame of the assessment of areawide impact; as well as the frequency of the adequacy assessment

- When during the development process does adequacy get assessed and what linkages are there to other processes
- Use of public/private funding for transportation programs and projects
- Transit adequacy methods
- Increased monitoring of roadway travel times and speeds, as well as monitoringr transit travel times and speeds using an "operations orientation

The responses of the peer jurisdictions about their processes were reviewed and a summary of potential refinements that might be applicable to the TPAR were made. The following are generalizations made from the summary material:

- Using just Forecasts for areawide review, including a 6-year or 10 year time horizon, will give better travel patterns and more realistic transportation needs
- Follow more of an "operations orientation" by
- Have a "Coordination Overlap" element of TPAR that has both a regulatory focus as well as transportation improvement focus
- Refine TPAR so that all PM Peak Period transit routes are used in the measure of "Average Headway"
- Implement the proposed TPAR monitoring idea to use the actual performance of arterials; use the "slowness ratio" to compare to the modeled congestion measure
- Test using Automatic Vehicle Location data to monitor transit speeds,

Appendix A can be found at the back of this Report that is a copy of presentation material that was used to assess the results of benchmarking review of this sample of peer jurisdictions. More specifics of this benchmarking and of this above list of generalizations can be found there.

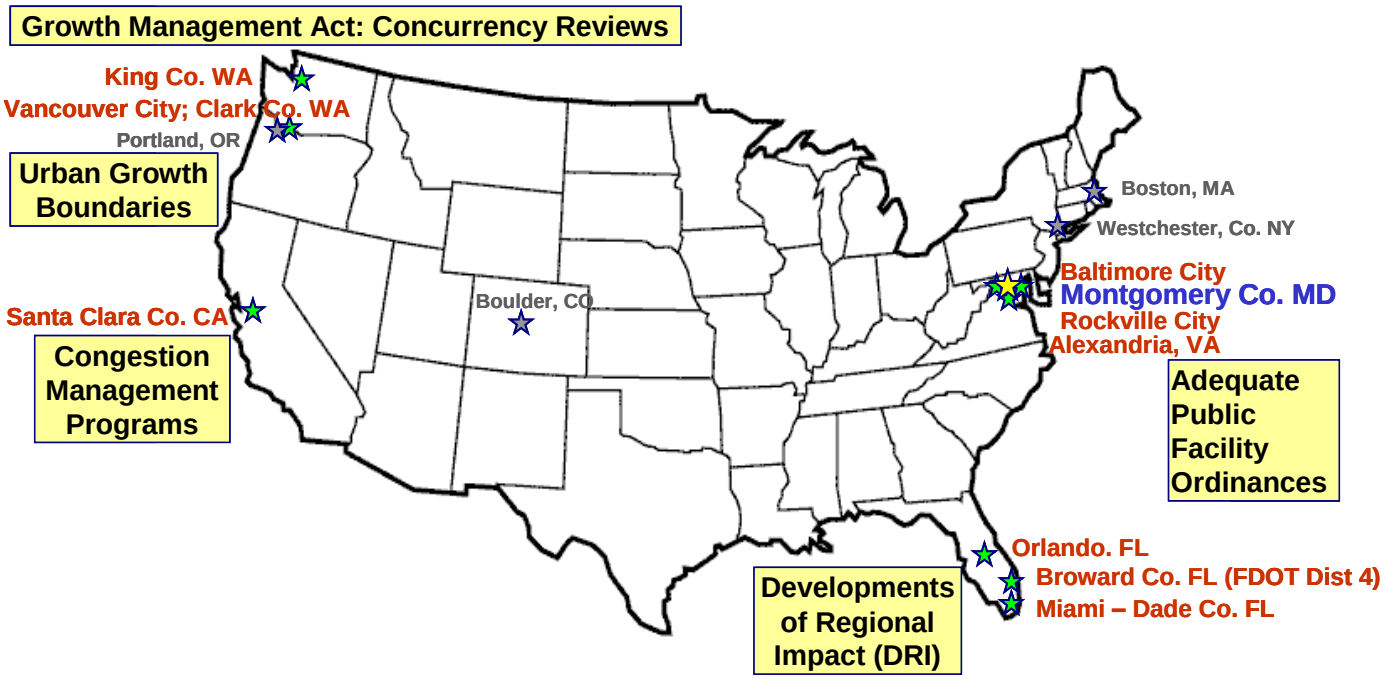



**Exhibit 2.2 Peer Jurisdictions Contacted about their Areawide Transportation Review Processes**

## 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 balance 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.

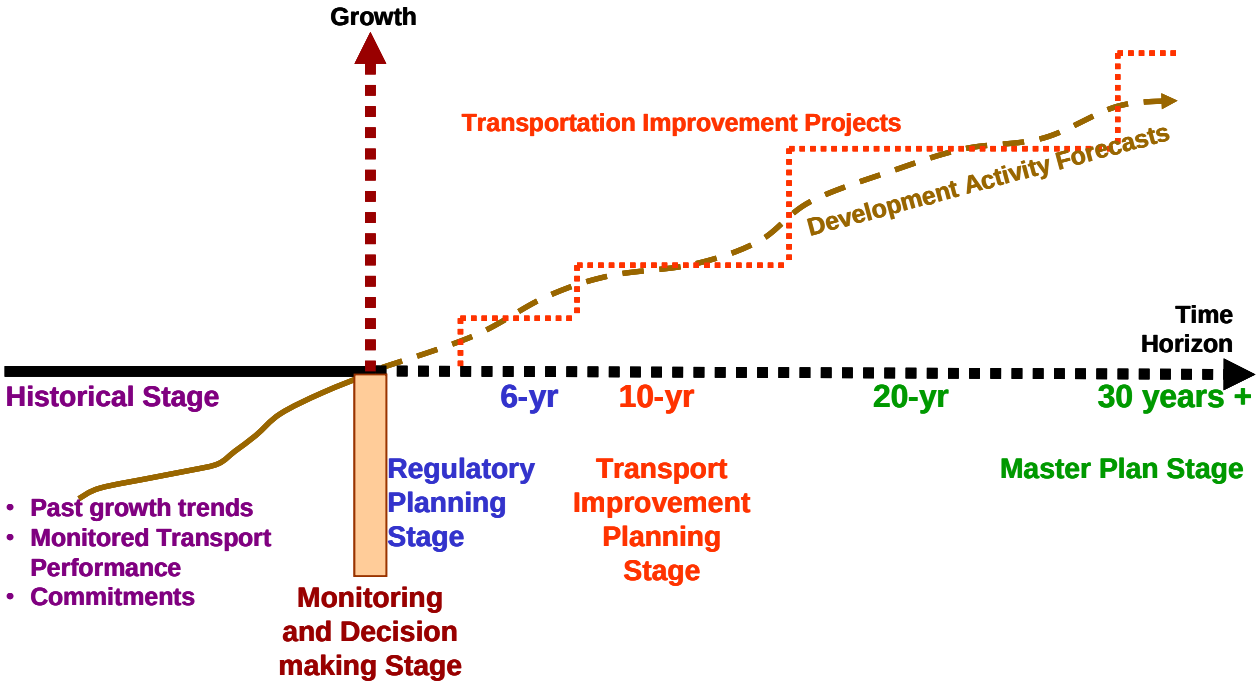



**Exhibit 3.1: TPAR Framework for Development Activity and Transportation Concurrency**

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 is about 7 to 8 years of growth; and the "job pipeline" is 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 roughly12 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.

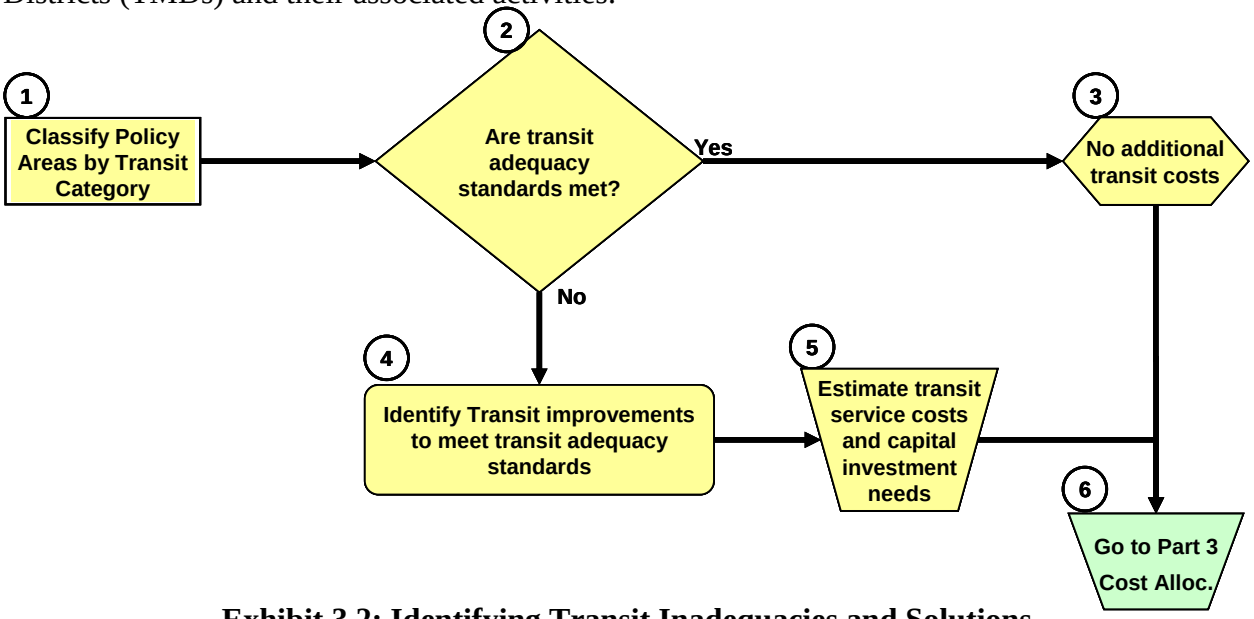



**Exhibit 3.2: Identifying Transit Inadequacies and Solutions**

TPAR takes into direct consideration the different forms of Transit Service provided or planned for in the County: Heavy Rail (Metrorail), future Light Rail Transit (LRT), Commuter Rail, Bus Service, and indirectly Transportation Demand Management (TDM) activities. Some of these forms of transit service are currently outside of the County's operational and financial control. Therefore, the TPAR Review is focused 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 Bus Rapid Transit (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 Transit Categories**: The first transit related step shown in Exhibit 3.2 is to classify Policy Areas in accordance with defined categories of transit service. TPAR defines three distinct categories for the County as a function of the type of transit service and development characteristics of each Policy Area. (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. Each Policy Area is classified as either: Urban, Suburban or Rural, as defined next:

**Urban Policy Areas** are those Policy Areas with higher population and employment densities, measured in terms of the number of people and employees per square mile. Urban areas have Metrorail Service, extensive and/or intensive bus service, and/or future Light Rail or BRT service. As the County continues to grow to higher densities, and mass transit service is expanded, more Policy Areas could be classified as Urban Areas.

**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.

**Suburban Policy Areas** are those Policy Areas not included in either the Urban or Rural categories. They 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 in and of them selves determine that a particular area is no longer a Suburban Policy Area and would transition to being an Urban Policy Area.

Exhibit 3.3 below shows the TPAR classification of the current Policy Areas by Transit Service Categories and provides details regarding the number of bus routes, the availability of rail transit, area size and population employment density, which are used to categorize each Policy Area. The sequencing of the rows is covered later in the discussion of Step 4.

**Policy Areas Categorized by Type of Transit and Population and Employment Density TPAR 2012** ***(3-26-12)***

| | Number of Buses | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **Total on all Routes** | **Peak Period Only** | **All-Day Routes** | **Metro Rail?** | **MARC Com-muter Rail?** | **Future Light Rail and/or BRT?** | **Area of the Policy Area** (sq. mi.) | **Pop. Density in 2010** (person per sq. mi.) | **Emp. Density in 2010** (emp. per sq. mi.) |
| **"Urban" Policy Areas served by Metrorail** | | | | | | | | | |
| Silver Spring/Takoma Park | 35 | *14* | *21* | Y | Y | Y | 10.49 | 8,622 | 4,376 |
| North Bethesda | 15 | *4* | *11* | Y | Y | *Y* | 9.25 | 5,216 | 7,430 |
| Kensington/Wheaton | 29 | *12* | *17* | Y | Y | | 19.26 | 4,853 | 1,230 |
| Bethesda/Chevy Chase | 17 | *6* | *11* | Y | | Y | 20.24 | 4,962 | 4,339 |
| Rockville City | 16 | 2 | 14 | Y | Y | Y | 13.64 | 4,314 | 5,794 |
| Derwood | 7 | *2* | *5* | Y | Y | | 8.22 | 2,274 | 2,556 |
| **"Suburban" Policy Areas** | | | | | | | | | |
| R&D Village | 5 | *2* | *3* | | | Y | 2.38 | 3,076 | 8,764 |
| Gaithersburg City | 10 | *1* | *9* | | Y | Y | 11.03 | 5,446 | 4,967 |
| Fairland/White Oak | 14 | *7* | *7* | | | | 20.66 | 3,700 | 1,495 |
| Germantown West | 9 | *2* | *7* | | Y | Y | 10.98 | 5,652 | 1,347 |
| Montgomery Village/Airpark | 9 | *3* | *6* | | | | 9.41 | 5,472 | 1,372 |
| Aspen Hill | 11 | *3* | *8* | | | | 13.05 | 4,644 | 478 |
| Germantown East | 5 | *2* | *3* | | | Y | 6.57 | 3,568 | 1,310 |
| Cloverly | 2 | *2* | *0* | | | | 9.83 | 1,621 | 137 |
| North Potomac | 7 | *3* | *4* | | | | 10.49 | 2,570 | 1,427 |
| Olney | 5 | *4* | *1* | | | | 17.36 | 1,887 | 317 |
| Potomac | 10 | *2* | *8* | | | Y | 28.07 | 1,696 | 431 |
| Clarksburg | 2 | *1* | *1* | | | Y | 14.91 | 934 | 255 |
| **"Rural" Policy Areas** | | | | | | | | | |
| Rural West | 1 | *1* | *0* | | Y | | 132.90 | 157 | 20 |
| Damascus | 1 | *0* | *1* | | | | 9.42 | 1,119 | 248 |
| Rural East | 1 | *0* | *1* | | | | 117.18 | 289 | 48 |

**Exhibit 3.3: Categorization of Policy Areas by Transit Related 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 three transit service performance factors are specified as the following:

- **Coverage of Service:** This is the percentage of a Policy Area located within a certain distance from Metrorail Station, Light Rail Station and Ride On and Metrobus service.

- **Peak Headways:** This is the weighted average of the frequency of service of the different bus routes operated by Metrobus and Ride On in the Policy Area – particularly how frequently, on average, the buses run during the weekday evening peak period. In areas where Metrorail, Light Rail or future BRT systems are provided, the averages are adjusted to reflect the presence (or future presence) of those systems.

- **Span of Service:** This 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 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.

Part of Step 2 is to specify or amend a set of standards of transit adequacy, particularly for bus transit services. Exhibit 3.4 below is that set of bus Transit Service Adequacy Standards, for each of the three factors of adequacy, for each of the three Transit Policy Area Categories.

**Exhibit 3.4: 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** | Greater than 80% | 20 minutes with Metrorail; or 14 minutes without | 17 Hours |
| **Suburban** | Greater than 30% | 20 minutes | 14 Hours |
| **Rural** | Greater than 5% | 30 minutes | 4 Hours |

*updated 3/26/2012*

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

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.

To improve understanding of how identifying solutions might typically work in practice, Exhibit 3.5 on the next page 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. Specifically, the service factors were applied to each of the Policy Areas in the County on the basis of bus service schedules for Ride On and Metro Bus 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 Area rows.

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**: Exhibit 3.6 indicates the specific definition used for the factor of Coverage – which is the percent of each Policy Area that is within 1 mile of a rail station or 1/3 of a mile of a bus stop. Such estimates for each Traffic Analysis Zone of each Policy Area have been previously made. The work on the TPAR Analysis selected these two parts of the definition of Coverage from a larger set of analytic variables used in the Travel Demand Modeling system being used for TPAR. 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 *(3-26-12)* | | | | |
|---|---|---|---|---|
| | **Number of Bus Routes** | **Coverage** (Percent of area within 1 mi. rail; 1/3 mi.of bus) | **Peak Headway** by Bus in PM Peak Hour (min.) | **Span**: Duration of Weekday Bus Service (hours) |
| **"Urban" Policy Areas served by Metrorail** | | | | |
| Silver Spring/Takoma Park | 35 | 96.0% | 18.2 | 18.9 |
| North Bethesda | 15 | 87.4% | **21.3** | 17.7 |
| Kensington/Wheaton | 29 | 82.0% | **20.7** | 18.5 |
| Bethesda/Chevy Chase | 17 | 81.2% | **20.4** | 17.4 |
| Rockville City | 16 | **79.9%** | **21.2** | 17.8 |
| Derwood | 7 | **70.0%** | **21.1** | 18.8 |
| **Inadequate versus the Standards shown** | **XX.X** | **more than 80.0%** | **less than 14.0 ##** | **more than 17.0** |
| | | **## = 20.0 with Metrorail** | | |
| **"Suburban" Policy Areas** | | | | |
| R&D Village | 5 | 75.5% | **25.8** | 15.8 |
| Gaithersburg City | 10 | 75.0% | 20.0 | 17.6 |
| Fairland/White Oak | 14 | 48.2% | 19.1 | 18.8 |
| Germantown West | 9 | 48.0% | **21.8** | 18.6 |
| Montgomery Village/Airpark | 9 | 47.1% | 19.4 | 18.0 |
| Aspen Hill | 11 | 43.7% | 19.9 | 19.3 |
| Germantown East | 5 | 39.3% | **21.4** | 17.8 |
| Cloverly | 2 | 30.0% | **26.5** | **8.0 *** |
| North Potomac | 7 | **29.2%** | **24.3** | 17.0 |
| Olney | 5 | **26.2%** | **25.0** | 22.3 |
| Potomac | 10 | **22.5%** | **21.1** | 16.4 |
| Clarksburg | 2 | **16.4%** | **30.0** | 14.1 |
| **Inadequate versus the Standards shown** | **XX.X** | **more than 30.0%** | **less than 20.0** | **more than 14.0** |
| **"Rural" Policy Areas** | | | | |
| Rural West | 1 | 8.4% | 30.0 | 6.3 * |
| Damascus | 1 | 7.4% | 20.0 | 15.7 |
| Rural East | 1 | 7.4% | 20.0 | 15.7 |
| **Inadequate versus the Standards shown** | **XX.X** | **more than 5.0%** | **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 transit analysis than roadway analysis. As such work for this report was focused on practical TPAR refinements to develop better methods for Transit Adequacy Analysis.

A judgment was made to focus on the Transit Service Factor of Peak Headway in conjunction with developing and applying a Transit sketch-planning approach. Cooperative coordination was carried out with the transit planning staff of MCDOT to first 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 that of which Policy Areas are served by each of the bus routes.

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) about 8 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 12 bus routes to directly serve those 8 or so areas, an allocation of buses to routes, and then a recalculation of the average Peak Headway. That recalculation did verify that if those buses would be added to the specified routes that 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 8 additional Policy Areas. In five of those Policy Areas the indirect affect would be to also 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.

**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.

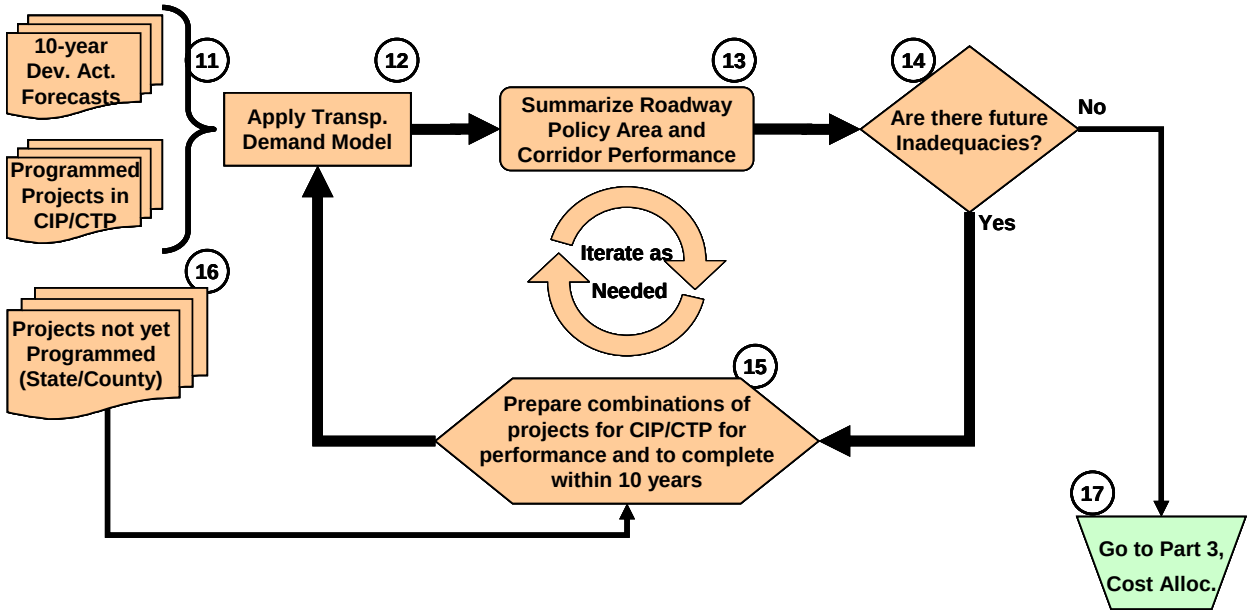



**Exhibit 3.7: Identifying Roadway Inadequacies and Solutions**

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 toad 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 (MWCOG) 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 MWCOG 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 the 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 in forecasting the amount of travel on each of the modeled roadway links. Those free slow speed values come from the regional modeling inputs prepared by MWCOG. As an example, if the 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 roadways 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 note 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 the combination 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 the 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 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 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 way to defining different Quality of Service levels for any arterial road, which 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, and sets level of service grades for ranges of those ratios or percents. The following are the ranges associated with each of the six 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 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, 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 Weighted Arterial Level of Service** |
| Urban | Average congestion of "D/E" borderline in the peak directions |
| Suburban | Average congestion of Mid-"D" or less in the peak directions |
| Rural | Average congestion of "C/D" borderline in the peak directions |

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) two conditional roadway projects, as well as (3) representation a conditional bus transit project to improve Peak Headways in about 8 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 in the left side of the chart
- Horizontal dotted orange lines are shown to depict the adequacy standards (LOS) for the Rural, Suburban and Urban 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 two for this combination of future development activity and transportation network improvements that two Policy Areas could have average road congestion in the peak traffic directions that are more congested (below the adequacy standards shown) by 2022. There is always a caveat in reviewing these types of summary charts – which is, "unless enough or appropriate other "conditional projects" are programmed in the intervening time and would be operational by 2022".

Section V and Section VI give the full Roadway Adequacy Assessment in conjunction with the Transit Adequacy Assessment.

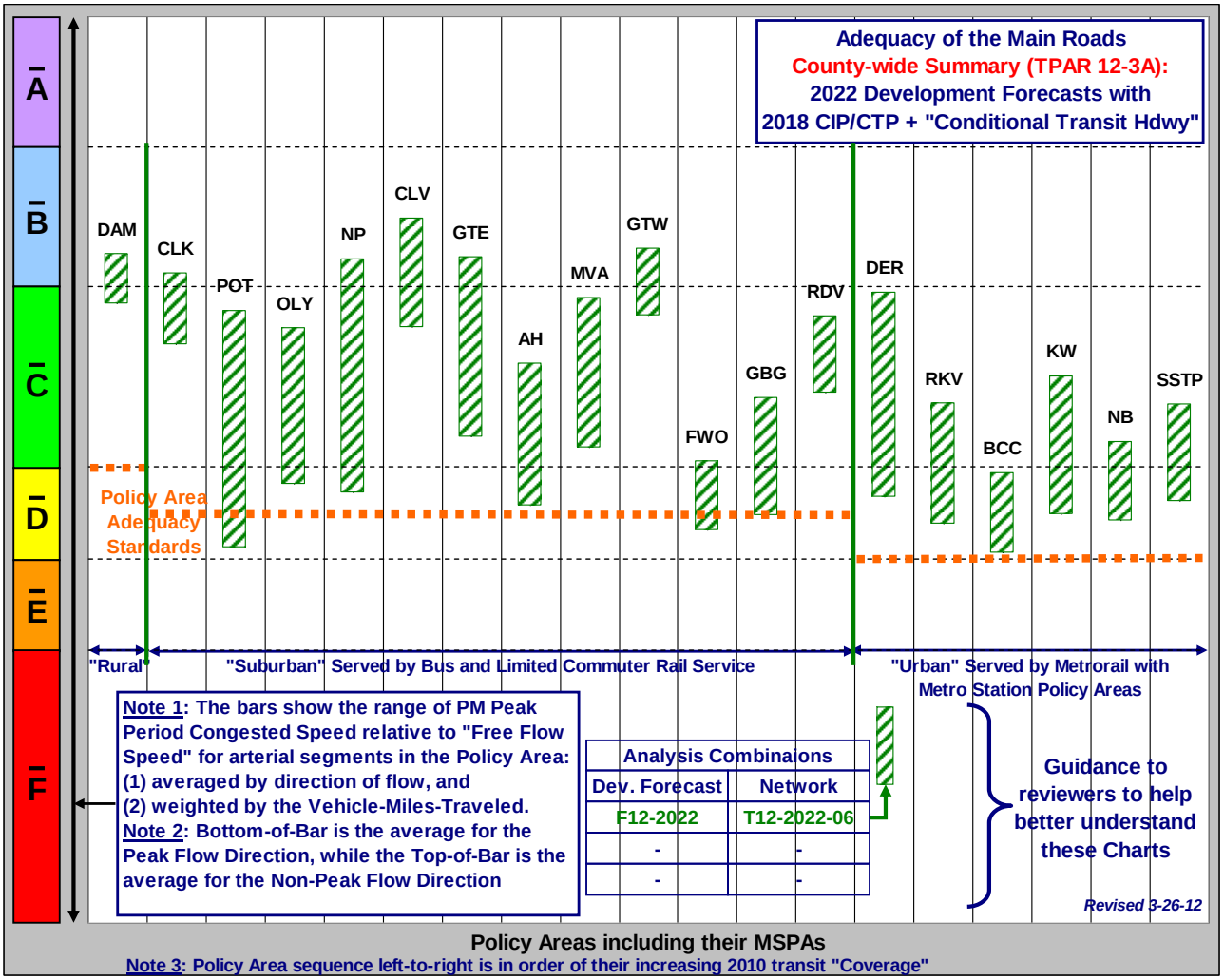



**Exhibit 3.10: Example of a Countywide Summary of Average Congestion Levels by Policy Area.**

**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 resource 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 D.

In addition, it has been 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.

**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 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 project.

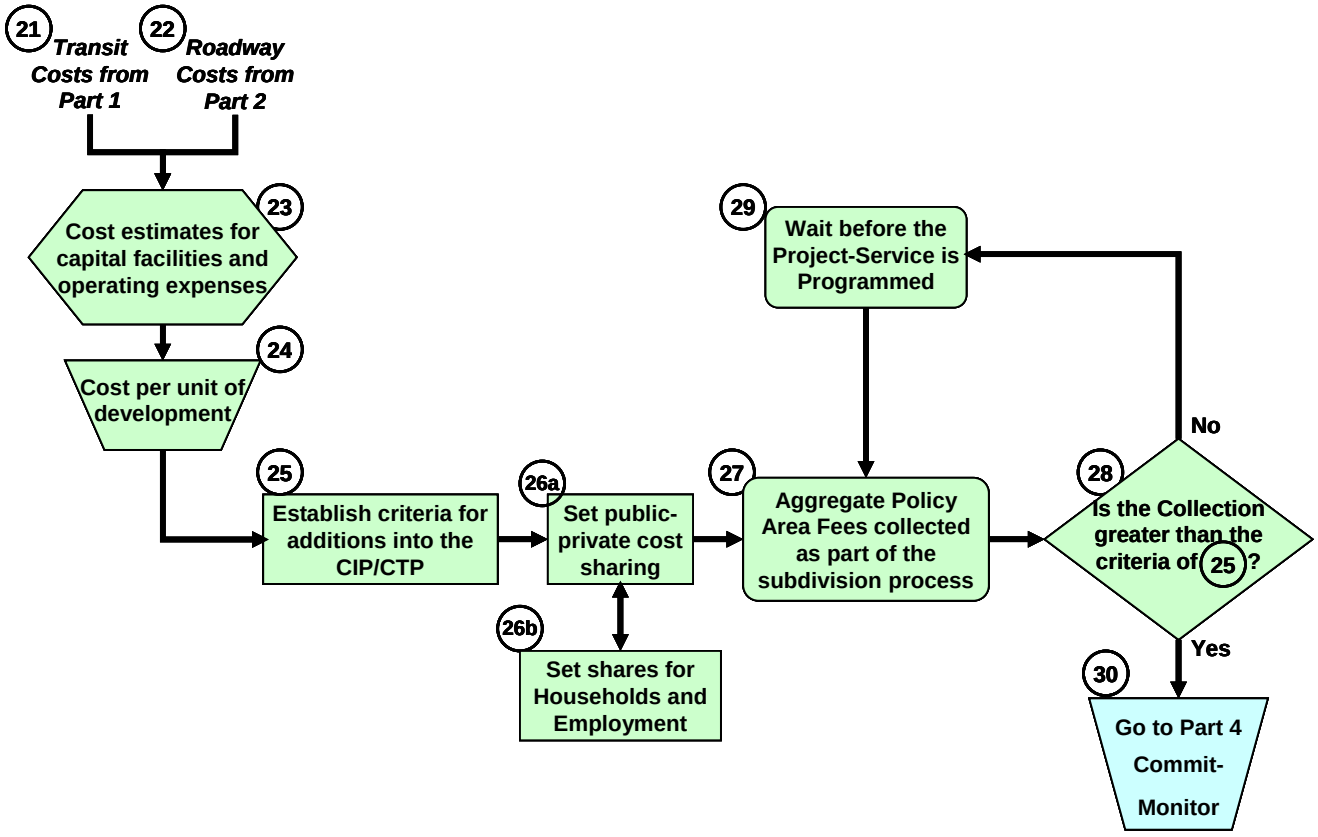



**Exhibit 3.11: Develop and Allocate Costs of the Needed Improvements**
(Source: Proposed TPAR Report, April 2010)

Under current procedures, a road project in the County starts with Facility Planning Phases 1 and 2. The project is programmed for:

- Final design;
- Right of way acquisition and;
- Construction only after completion of Phase 2 (about 35 percent engineering).

Depending on the complexity of the project, this process can span 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.

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, it would act as a deterrent for building in the near future, creating a possible barrier to the sustained economic development of the County, as most developers would wait for another project to go first and pay the private share.

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 (households and jobs) 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 proposed TPAR is an exception to 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 hour trips (by policy area) forecast to occur assuming a year 2040 time horizon.
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 needed to bring policy areas into transit adequacy, as may be defined by the Planning Board.

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.

The TPAR methodology gives elected officials the ability and responsibility to set a public/private cost sharing participation for each Policy Area. The level of public financing could be assessed in various ways, such as these four options:

(1) the same for all areas of the County;

(2) separately for each policy area;

(3) by geographic category (Urban, Suburban, and Rural); or

(4) by assigning priorities for development to each Policy Area.

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

Policy Areas where elected officials want to encourage development will be identified as high priority and so on. In any case, under TPAR development can proceed, with payment, in all policy areas. In low priority areas, the private sector will carry a higher burden. **It is the intent of TPAR that there will be no Policy Areas where development will be stopped outright due to inadequate area wide transportation.** TPAR requires that when development proceeds elected officials provide a high degree of certainty and commitment to ensure that the transportation solutions to accommodate such development be implemented in a timely manner.

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.

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

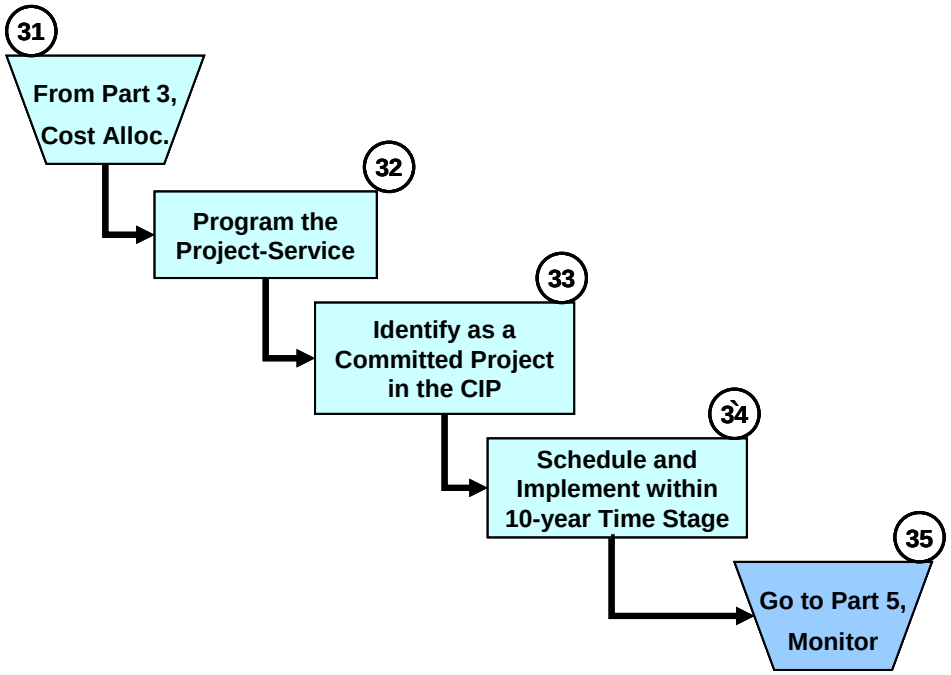



**Exhibit 3.12: Programming Public Commitments – Monitor and Report Progress**
(Source: adapted from the Proposed TPAR Report, April 2010)

As noted in the Part 3 discussion above, elected officials can use the TPAR to guide growth by **specifying the collection level** that triggers the programming of projects in each Policy Areas. That is shown in above in Exhibit 3.11 as Step 25, "establishing criteria for additions into the CIP/CTP."

TPAR recommends the initial level to trigger programming of a capital project to be ten percent of the estimated construction cost multiplied by the selected public-private cost sharing ratios identified as part of Step 26 in Exhibit 3.11, above in Part 3. This criteria seems reasonable given that for a typical roadway project, the engineering design cost varies between eight and twelve percent. With this recommendation, a project would be programmed when the expected

private participation for the project covers the portion of the design cost attributable to the private sector. MCDOT may need to program funding in advance of receiving private funds, especially for design and engineering of complex projects, or equipment that requires a long lead time. The County will request needed improvements to state roads as a priority in state budgets.

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

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.

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 3.13 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.

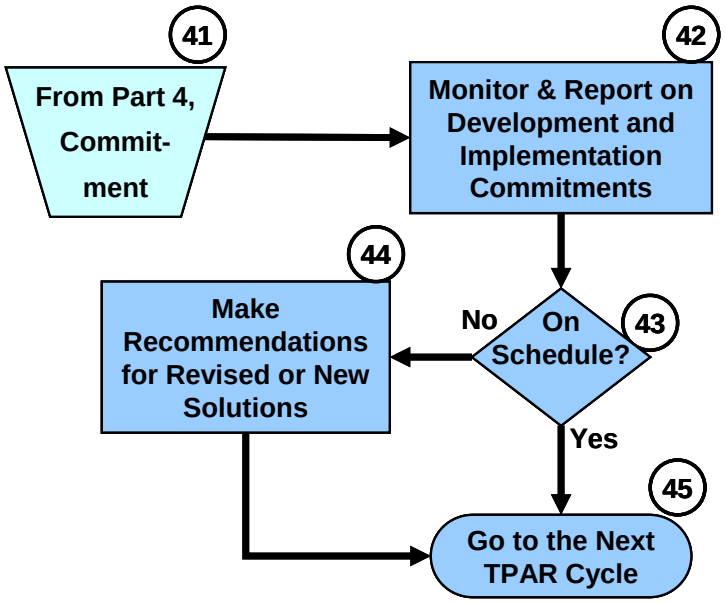



**Exhibit 3.13: Process to Annually Monitor and Report on TPAR Results**
(Source: adapted from the Proposed TPAR Report, April 2010)

**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 3.13 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 3.13 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 Towards 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 IV: Ways that TPAR Differs from the Current PAMR Methodology

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

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

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

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

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

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

6. Analyzes variable transportation scenarios to serve the forecast of development activity for the next 10 years. The current PAMR method analyzes variable amounts of development activity that could be supported by the set programmed transportation improvements of the CIP and CTP.

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

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

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

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

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

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

13. Gives elected officials the ability and responsibility to prioritize development in certain areas of the County, while permitting growth throughout the County.

## Section V: Application of 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**: As discussed above in Section 3, 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 buses and service during the peak periods to reduce the average time headway between buses serving those Policy Areas.

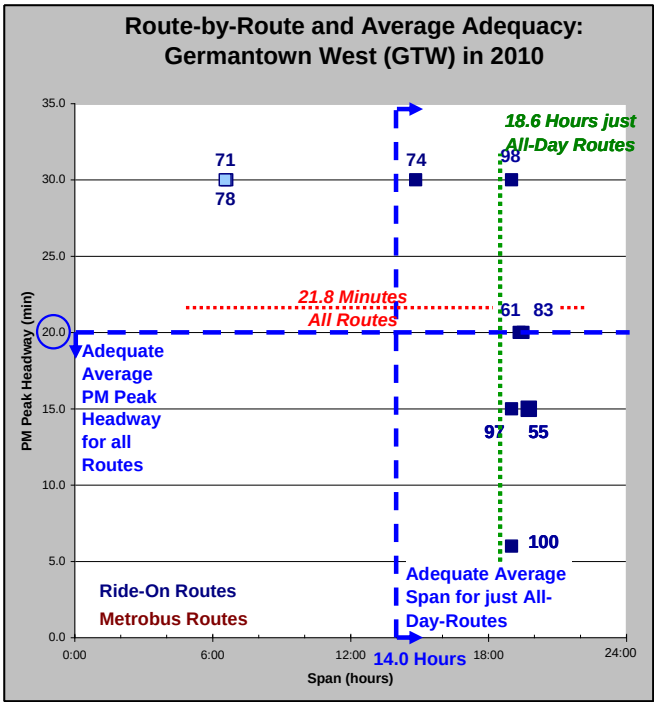



**Exhibit 5.1 Example of a Peak Headway Chart**

Cooperatively with MCDOT, a potential conditional project has been identified that could directly attain Peak Headway standards in eight 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 minutes while the average span for just the all-day routes is over 18 hours. The potential conditional solution could add buses on three of those routes.

**Exhibit 5.2 Coverage of a Potential Conditional Project to Increase Peak Headways**

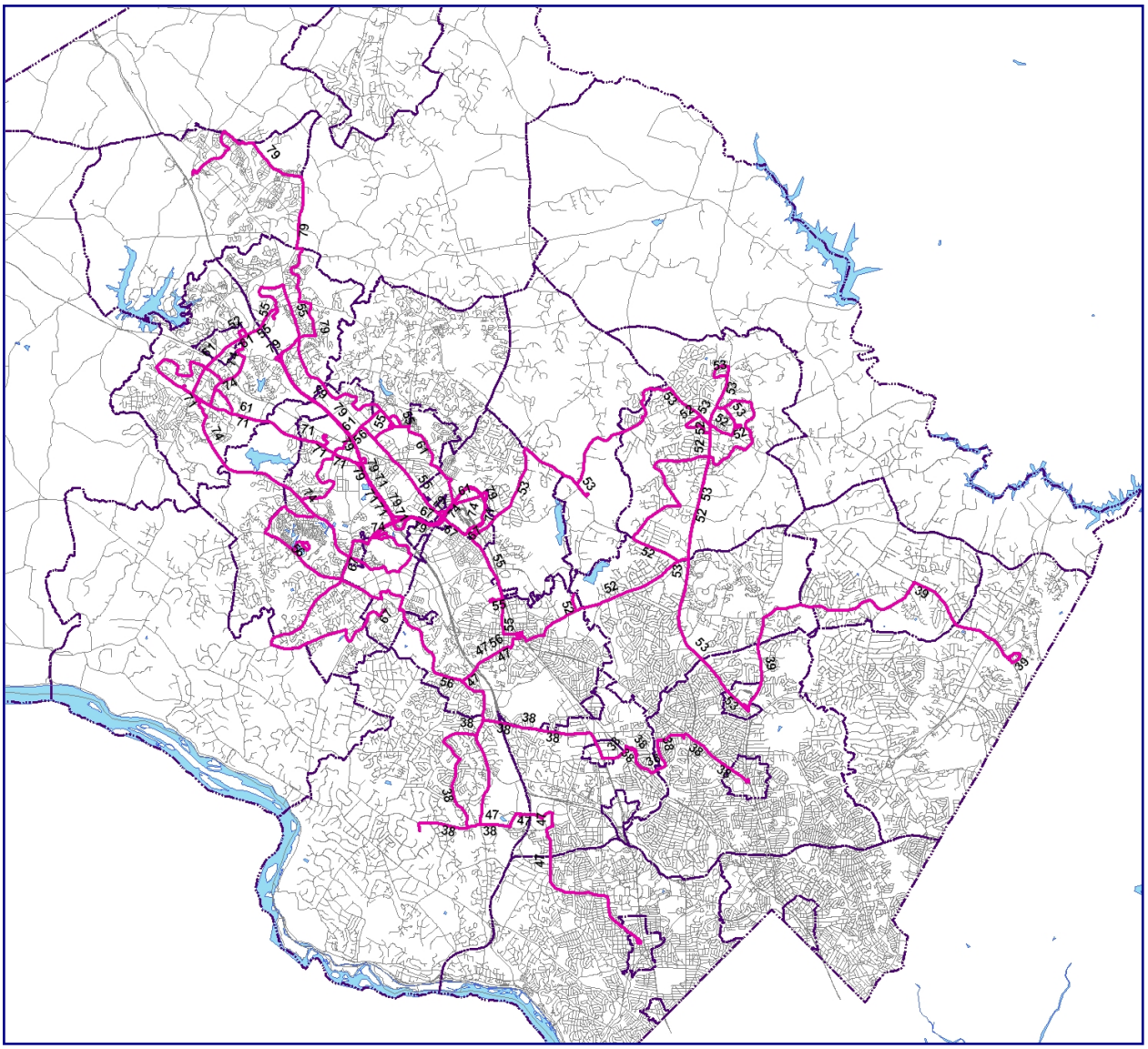


**Exhibit 5.2 Coverage of a Potential Conditional Bus Project to Increase Peak Headways**

MCDOT transit planning staff was able to use information organized in this manner to identify: (a) 8 Policy Areas that could benefit from improved Peak Headways, and (b) a target number of buses, in the range of 25 to 30 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 12 bus routes to directly serve those 8 areas, an allocation of buses to routes, and then a recalculation of the average Peak Headway.

Exhibit 5.2 above is a graphic that shows the coverage of those routes that would potentially have improved Peak Headways; the Route Numbers are labeled in the Exhibit. 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. 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.

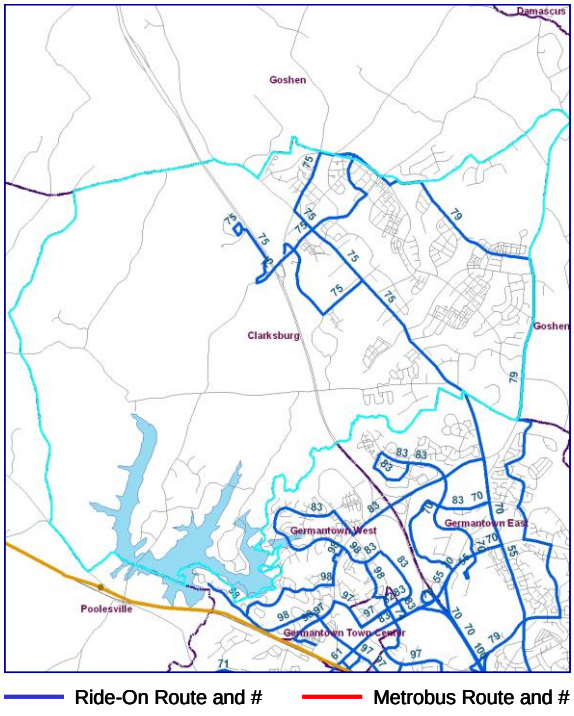
As a conclusion, this conditional project, which could be implemented over a few years, could:

- 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 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.

## Countywide Solutions for Roadway Adequacy

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: (1) Regulatory Planning Stage using the 2018 network with programmed CIP and CTP projects and 2018 development activity, (2) Transportation Planning Improvement Stage, using a 2022 network with the prior projects plus new conditional projects and 2022 development activity and (3) Transportation Master Plan—Costing Stage using the same network as the first but with 2040 development activity. Exhibit 5.4 includes the result of the first step 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 a few potential conditional projects which were used in the Transportation Planning Improvement Stage part of the analysis.

| Program Document | Staging of County CIP and State CTP Projects Used in TPAR 2012 *(updated to 3-26-12)* | | | | | |
|---|---|---|---|---|---|---|
| | **Project Name** | **Improvement Type and/or Limits** | **Policy Area** | Open by 2012 | Prog. by 2018 | Cond. Proj. by 2022 |
| CTP | Intercounty Connector (MD 200) | I-370 to I-95 (6 lane freeway) | Countywide | Y | Y | Y |
| CTP | Intercounty Connector (MD 200) | I-95 to US 1 (4 lane freeway) | Countywide | N | Y | Y |
| CTP | Intercounty Connector (MD 200) | Collector/Distributor Lanes along I-95, MD 200 to MD 198 | Countywide | N | Y | Y |
| CTP | Purple Line LRT | *Project Planning may be sufficient if conditional funding approved* | Countywide | N | N | Y |
| CIP | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | Countywide | N | Some | Y |
| CTP | Paul S. Sarbanes Transit Ctr | Silver Spring Metro/MARC/Ride-On | SSTP | N | Y | Y |
| CIP | Citadel Ave. Extended | Marinelli Rd to Nicholson Lane (2 lanes) | NB | Y | Y | Y |
| CIP | Montrose Parkway West | Montrose Rd to Hoya St. (4 lanes) | NB | Y | Y | Y |
| CIP | Nebel St. Extended | Chapman Ave. to Randolph Rd (4 lanes) | NB | Y | Y | Y |
| CIP | Chapman Ave Extended | Randolph Rd to Old Georgetown Rd (2 lanes) | NB | N | Y | Y |
| CIP | Montrose Parkway East | Parklawn Dr to Veirs Mill Road (MD 586) (4 lanes) | NB | N | Y | Y |
| CIP | Montrose Parkway East | MD 355/Montrose Parkway Interchange to Parklawn Dr (4 lanes) | NB | N | N | Y |
| CTP | Rockville Pike (MD 355) / | Includes connection on Montrose Parkway West from Hoya St to | NB | N | Y | Y |
| CTP | Georgia Ave (MD 97) | Interchange of Georgia Avenue (MD 97) with Randolph Rd | KW | N | Y | Y |
| CIP | Forest Glen Metro Underpass | Underpass of Georgia Ave (MD 97) for pedestrians and bicycles | KW | N | N | Y |
| CTP | Connecticut Ave. (MD 185) | I-495 to Jones Bridge Road (BRAC project) (add 4th SB Lane) | BCC | N | Y | Y |
| CTP | Connecticut Ave. (MD 185) | Manor Road to I-495 (BRAC project) (add 4th NB Lane) | BCC | N | Y | Y |
| CIP | Redland Rd | Crabbs Branch Way to Needwood Rd (4 lanes) | DER | Y | Y | Y |
| CIP | Redland Rd | Needwood Rd to Baederwood Lane (3 lanes) | DER | Y | Y | Y |
| CIP | Watkins Mill Rd Extended | MD 355 to MD 117; without a connection yet across I-270 (4 lanes) | GBG | Y | Y | Y |
| CTP | Watkins Mill Rd Bridge of I-270 | *(interchange would be a later project)* | GBG | N | N | Y |
| CIP | Fairland Rd Improvement | US 29 to Prince George's County line (3 lanes) | FWO | Y | Y | Y |
| CIP | Greencastle Road | Greencastle Ridge Terrace to Fairland Park Entrance ( 4 lanes) | FWO | Y | Y | Y |
| CIP | Father Hurley Blvd Extended | Wisteria Dr to Germantown Rd (MD 118) (4 lanes) | GTW | Y | Y | Y |
| CIP | Century Boulevard | Complete connecting loop road to Crystal Rock Drive (4 lanes) | GTW | N | Y | Y |
| CIP | Snouffer School Road | Sweet Autumn Drive to Centerway Road (5 lanes) | MVA | N | Y | Y |
| CIP | Snouffer School Road North | Centerway Rd to Ridge Heights Drive (4 lanes) (Webb Tract) | MVA | N | Y | Y |
| CTP | Woodfield Rd. (MD 124) | Airpark Road to Fieldcrest Road (6 lanes) | MVA | Y | Y | Y |
| CIP | Stringtown Road | I-270 to MD 355 and MD 355 to St. Clair Road (4 lanes) | CLK | Y | Y | Y |
| Private | Snowden Farm Parkway | MD 355 to MD 27 (4 lanes) | CLK | N | Y | Y |
| Private | Little Seneca Parkway | MD 27 to MD 355 ( 4 lanes) | CLK | N | Y | Y |
| CIP | Woodfield Rd Extended | North of Main St. (MD 108) to Ridge Rd (Md 27) (2 lanes) | DAM | Y | Y | Y |
| | Footnote 1: Existing plus FY12 CIP Amendment to the FY11 Approved CIP | | | | | |

**Exhibit 5.4: Road and Transit Projects Considered in the Road Adequacy Analysis**

**Regulatory Planning Stage**: Exhibit 5.5 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.

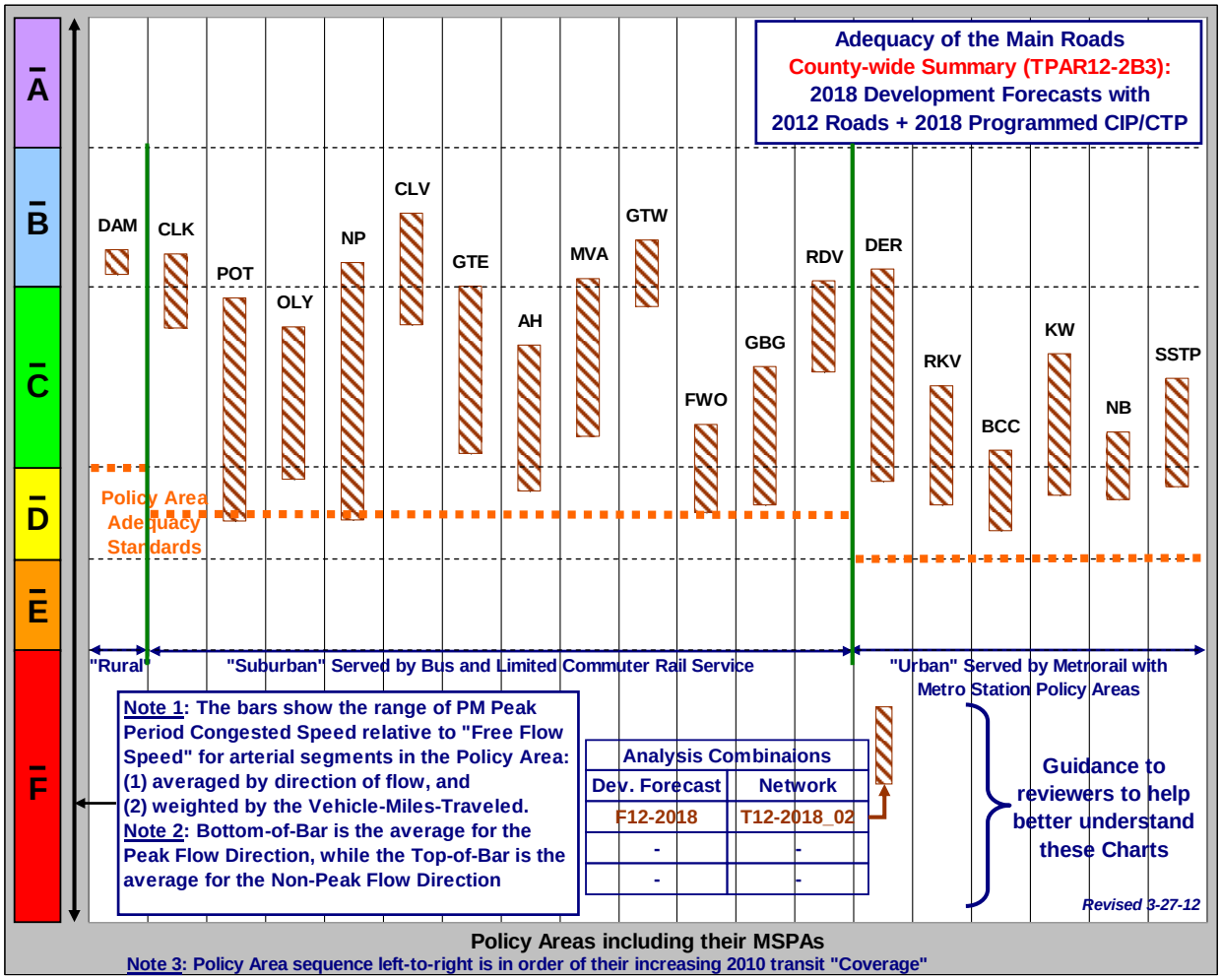



**Exhibit 5.5: Countywide Results for the Regulatory Planning Stage**

**Transportation Planning Improvement Stage**: Exhibit 5.6 presents the results of the Roadway Adequacy Analysis for the Transportation Planning Improvement Stage using the 2022 network with programmed CIP and CTP projects and the conditional projects shown above in Exhibit 5.4 and 2022 development activity. This comparison combination is a new feature of TPAR and is designed to give better guidance to MCDOT in the programming activities. As for 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.

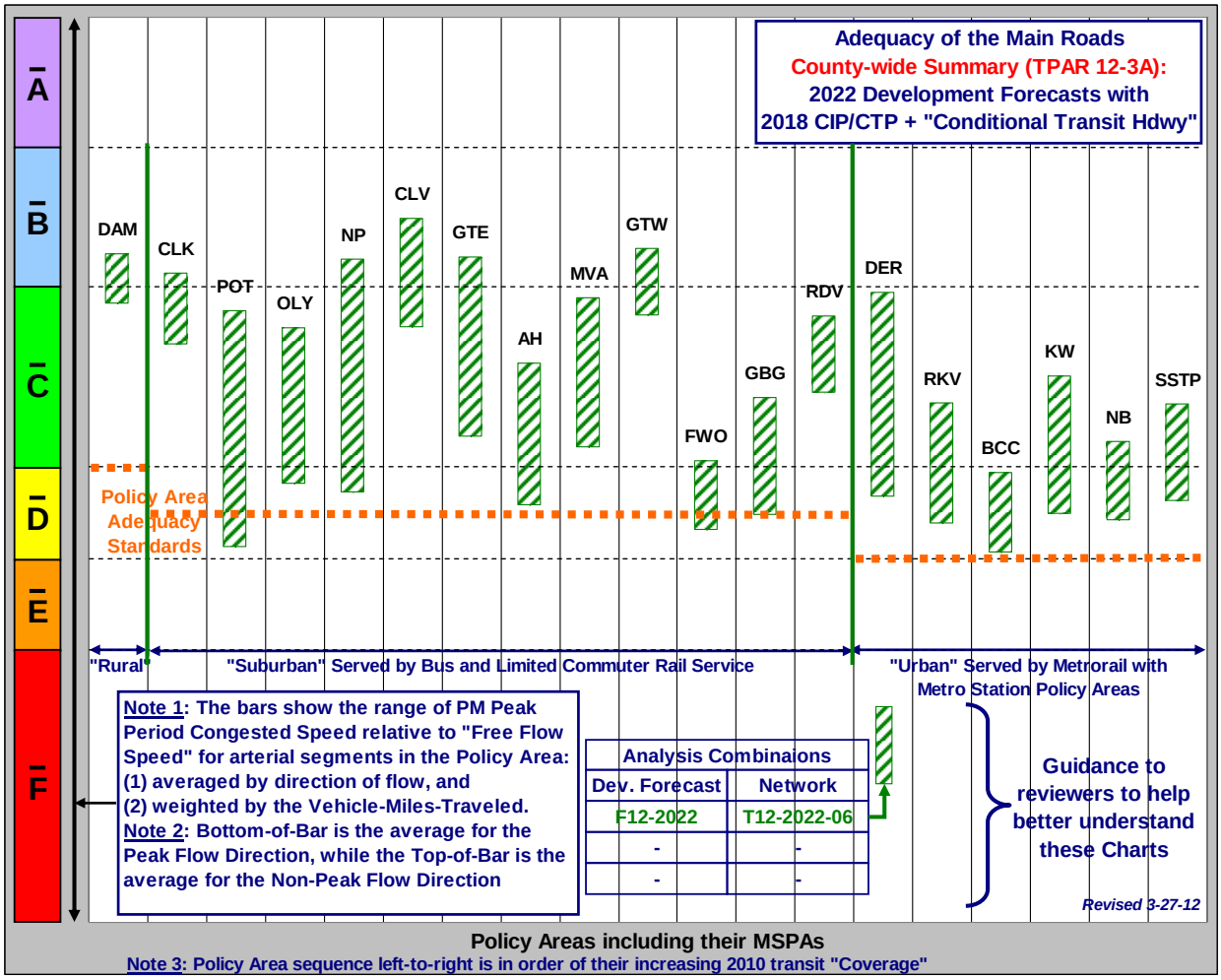



**Exhibit 5.6: Countywide Results for the Transportation Planning Improvement Stage**

**Transportation Master Plan—Costing Stage**: Exhibit 5.7 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 combination is also a good indicator of which roadways in each Policy Area would be most in need of improvement.

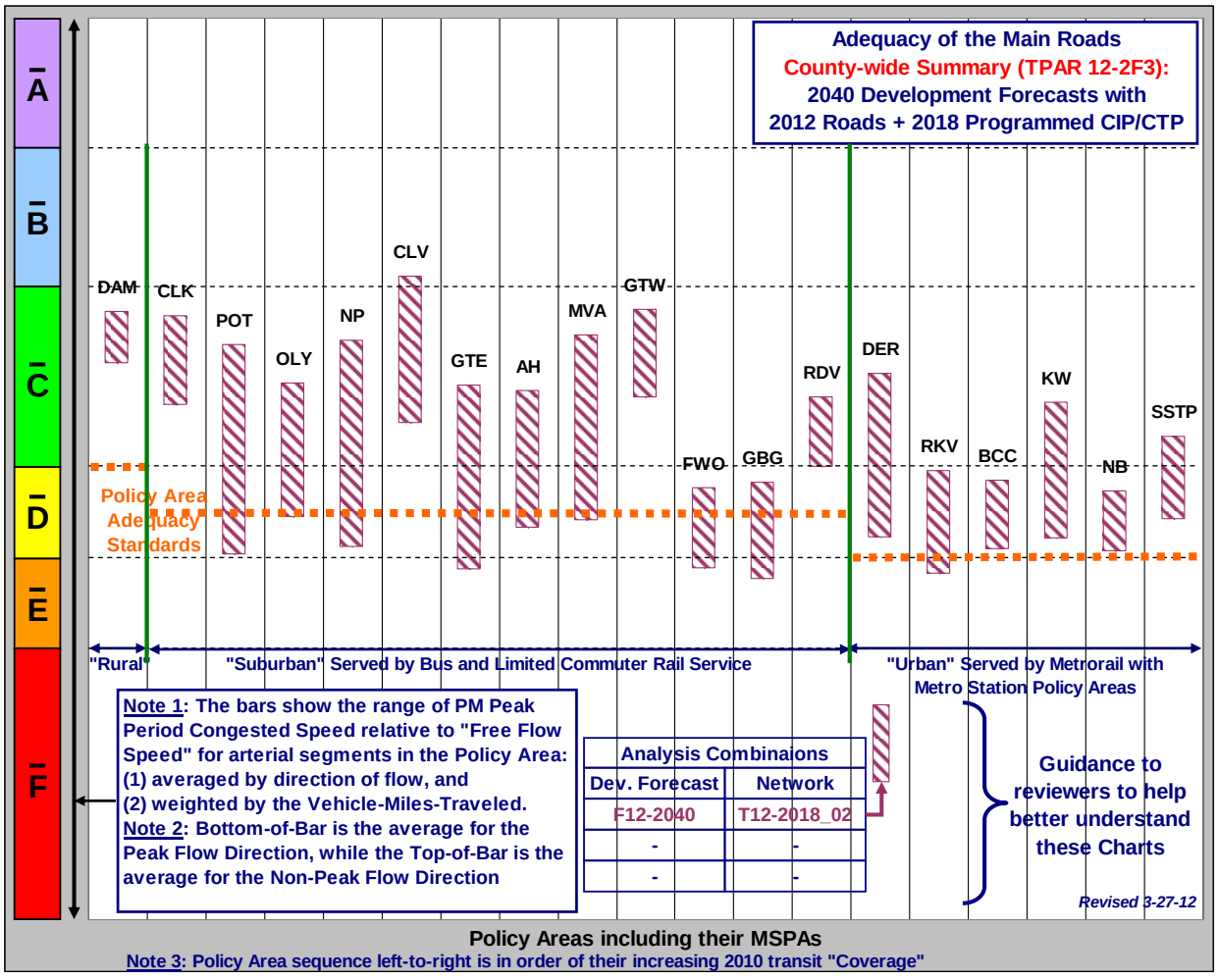



**Exhibit 5.7: Countywide Results for the Master Plan – Costing Stage**

**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.

## Section VI: Application of TPAR to Each Policy Area

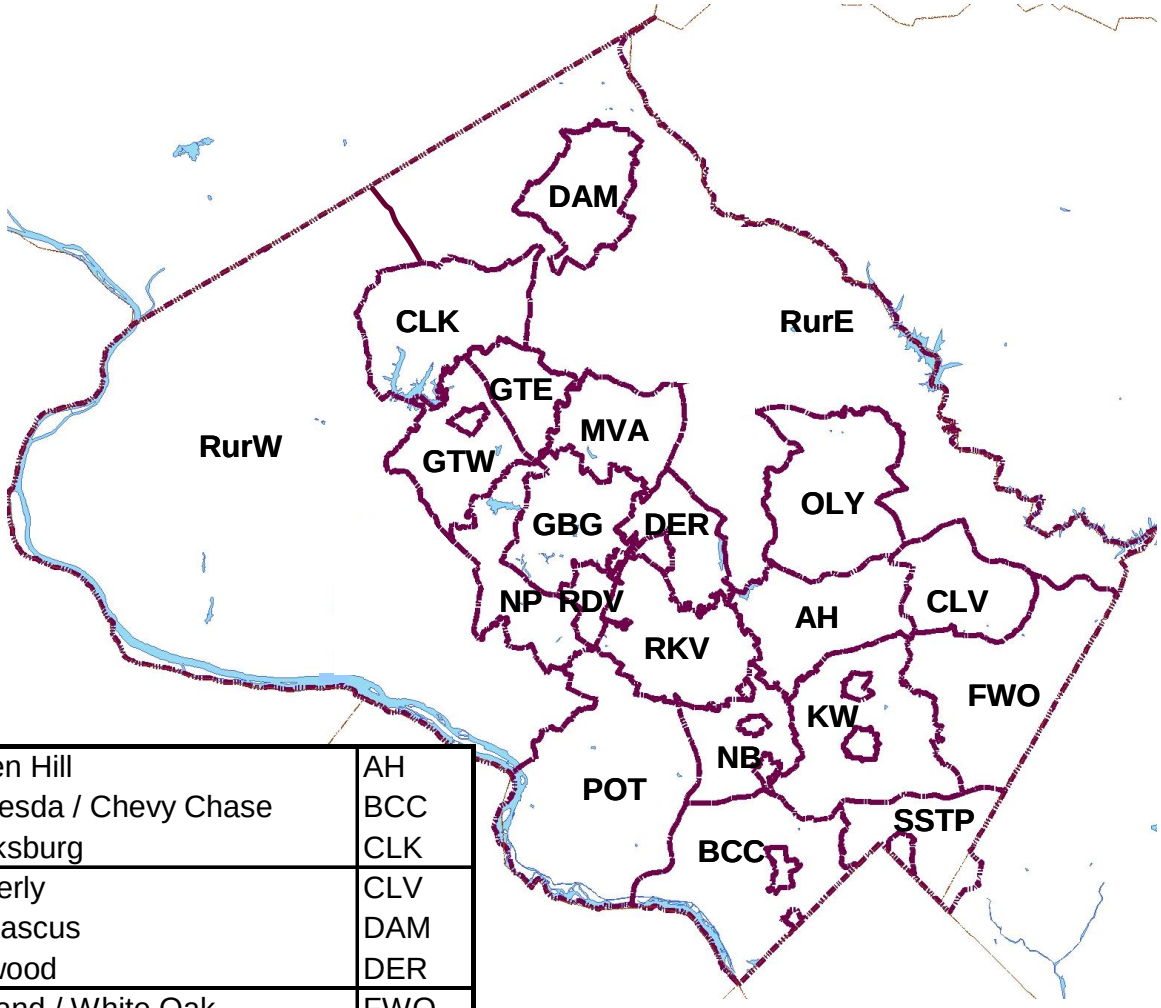
This Section provides a discussion of the application of the general TPAR approach to 19 of the Policy Areas of the County. The discussion summarizes the analysis one area at a time using localized graphics and brief text. Eight aspects are discussed and presented for each Policy Area:

- Overview including the classification of the Policy Area
- Development Activity Forecasts
- Programmed Transportation Improvements
- Transit Adequacy Analysis
- Roadway Adequacy Analysis
- Guidance for Local Area Transportation Reviews
- Guidance for Conditional Transportation Solutions
- Guidance for the Master plan Stage

This document sequences the discussion of policy areas in two ways: (1) according to the classification by type of Policy Area as categorized by type of transit service and population and employment densities – in particular those of Urban, Suburban, and Rural Policy Areas, and (2) by transit coverage percentage from most to least within each of the three respective categories. However, TPAR has not been applied to the Rural East or Rural West Policy Areas. As a result, the third category of Rural Policy Areas has only one summary, for the Damascus Policy Area.

The Following two list gives the sequence within the Urban and Suburban categories, respectively. It is anticipated that the reader will use this list as a Table of Contents to more quickly find the areas they are more interested in reviewing. As such, the page number within this section associated with the summary for each Policy Area is also given.

As a further aid to the reader the following map display of the Policy Areas is presented here. A three letter abbreviation is also used to make the map more readable. A separate alphabetized list of Policy Areas names and their corresponding abbreviations is also given as the abbreviations are often used in the ensuing tables and graphics of the report to conserve space.




| | |
|---|---|
| Aspen Hill | AH |
| Bethesda / Chevy Chase | BCC |
| Clarksburg | CLK |
| Cloverly | CLV |
| Damascus | DAM |
| Derwood | DER |
| Fairland / White Oak | FWO |
| Gaithersburg | GBG |
| Germantown East | GTE |
| Germantown West | GTW |
| Kensington Wheaton | KW |
| Montgomery Village / Airpark | MVA |
| North Bethesda | NB |
| North Potomac | NP |
| Olney | OLY |
| Potomac | POT |
| R&D Village | RDV |
| Rockville | RKV |
| Silver Spring / Takoma Park | SSTP |
| Rural East | RurE |
| Rural West | RurW |

## Silver Spring Takoma Park Policy Area

**A. <u>Overview of the Policy Area</u>**: Silver Spring Takoma Park (SSTP) is categorized as an Urban Policy Area, given the transit and development activity features of the area. This area is characterized by two Metrorail stations (Silver Spring and Takoma Park), a commuter rail station, high population and employment densities, and overall transit coverage of about 96% of its area. Significant redevelopment is continuing to take place. The Master Planned improvement of the Purple Line Light Rail Transit (LRT) line has reached a stage of project planning development where implementation of that major transit project may be able to be accomplished within 10 years by 2022 if overall transportation funding becomes firm.

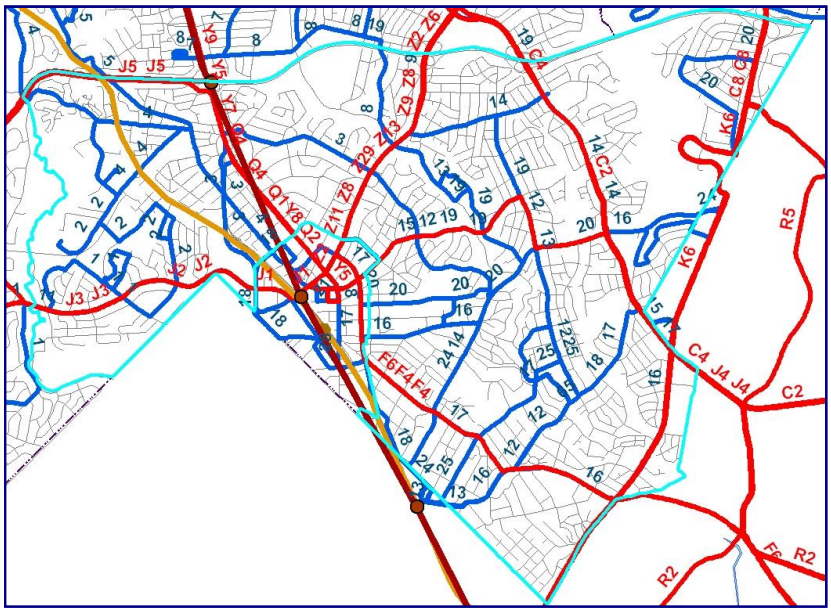
This Policy Area is also served by the Silver Spring Transportation Management District (TMD) that is an operational program of the Montgomery County Department of Transportation (MCDOT). The TMD works in conjunction with major employers in the Silver Spring Central Business District (CBD) to coordinate ridesharing and promote transit and non-motorized transportation. MCDOT also operates the Silver Spring Parking Lot District that consolidates and charges for off-street parking and manages the pricing and enforcement of the on-street parking meters.

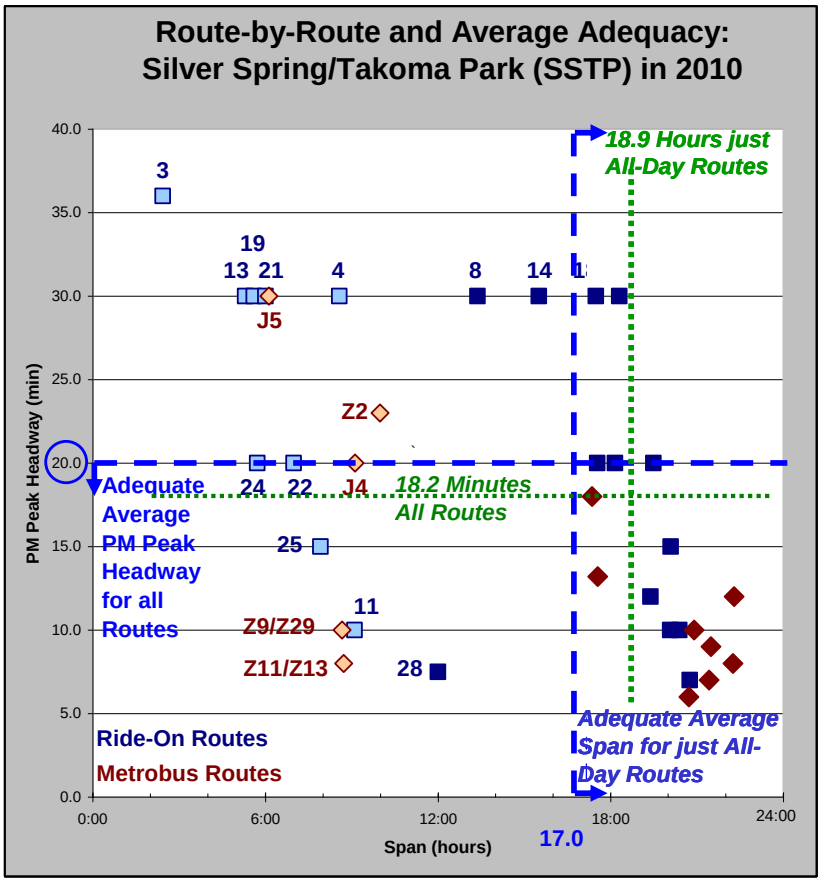
**B. <u>Forecast of Development Activity</u>**: The SSTP Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 4,142 households and 1,523 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 1,032 households and 1,889 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 3,235 households and 6,135 jobs. This growth is moderate-to-high and is on par with the share of the total growth in the County.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Silver Sp./ Takoma Park** | 35,746 | | 39,888 | | 40,920 | | 44,155 | 46,862 | | 48,385 | | 50,274 | | 56,409 |
| Growth in the Policy Area | | 4,142 | | 1,032 | | 3,235 | | | 1,523 | | 1,889 | | 6,135 | |
| Percent Growth of Area | | 11.6% | | 2.6% | | 7.9% | | | 3.2% | | 3.9% | | 12.2% | |
| Percent of County Growth | | 14.2% | | 6.5% | | 5.6% | | | 2.4% | | 4.9% | | 5.0% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There is a current major improvement project under construction, the Paul S. Sarbanes Transit Center that will consolidate the MARC and Amtrak commuter rail station at the bus terminal and staging area of the Silver Spring Metrorail Station. That project will increase pedestrian access for more transit users to the heart of the CBD and facilitate transfers among transit services, including Commuter and Intercity buses services. The countywide project of the Purple line Purple Line LRT has reached a stage of project planning development where implementation of that major transit project may be able to be accomplished within 10 years by 2022 if overall transportation funding becomes firm.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-19-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CTP | Paul S. Sarbanes Transit Ctr | Silver Spring Metro/MARC/Ride-On | SSTP | N | Y | Y |
| CTP | Purple Line LRT | *Project Planning may be sufficient if conditional funding approved* | Countywide | N | N | Y |




**D. <u>Transit Adequacy Analysis</u>:** The SSTP Policy Area includes two Metrorail Stations: Silver Spring and Takoma Park and a third (Forest Glen) is within walking distance of portions of the policy area. The area also will have future stations on the Purple Line, as well the new Transit Center that will also tie into the Purple Line.

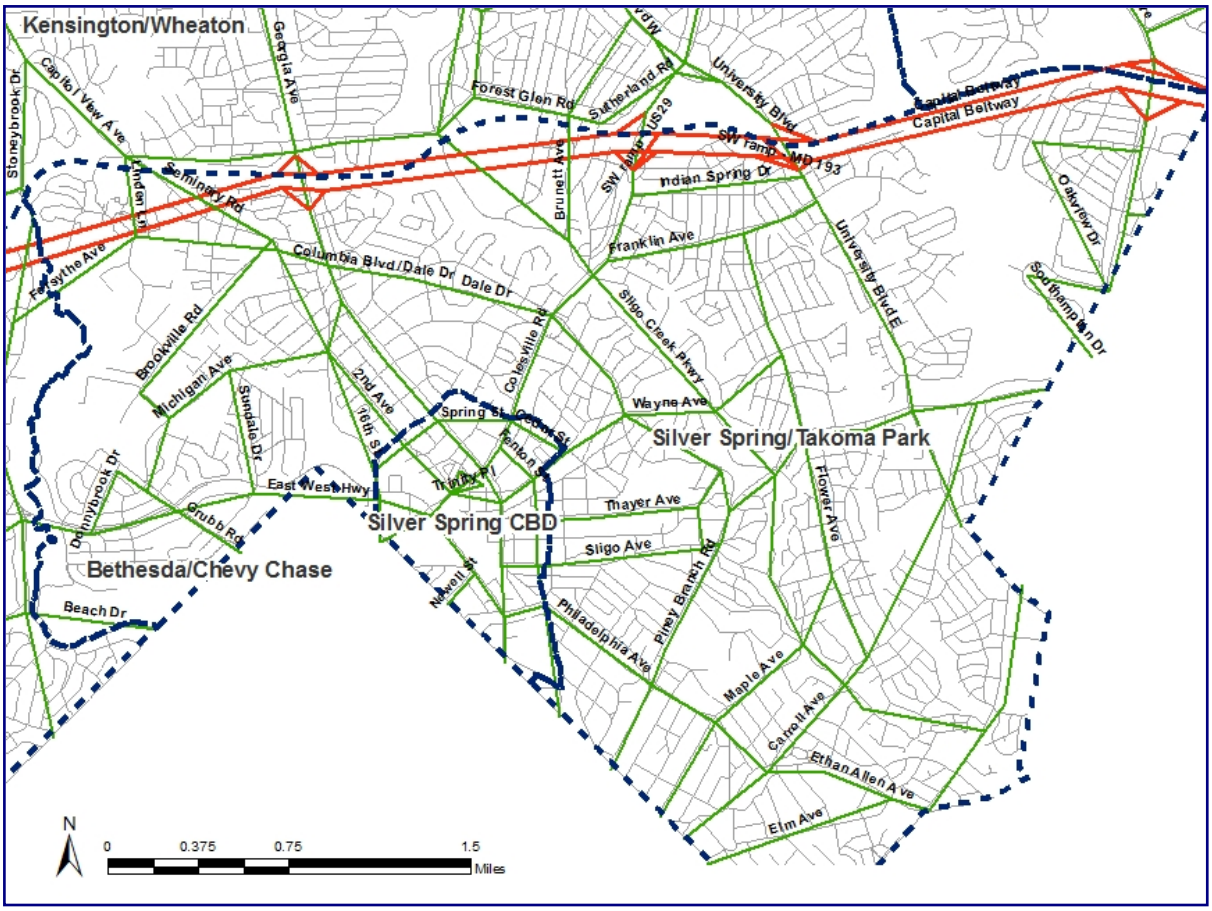
**Coverage of Service:** About 96% of the SSTP Policy Area is located within 1 mile of a Metrorail station or 1/3 of a mile of one of the 35 bus routes currently serving the area as well as several Commuter Bus routes from the Baltimore area. The graphic to the left shows where in particular bus service coverage is provided in the SSTP area. The standard for Coverage for an Urban Policy Area is 80%. Therefore transit coverage in the SSTP Policy Area is adequate.

**Peak Headways:** All buses on average provide 18.2 minutes between buses during the weekday evening peak period in the SSTP Policy Area. Some provide very frequent service such as the J1-J3 or Q2 Metrobuses. In areas like SSTP where Metrorail or future LRT are provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the SSTP area is adequate.

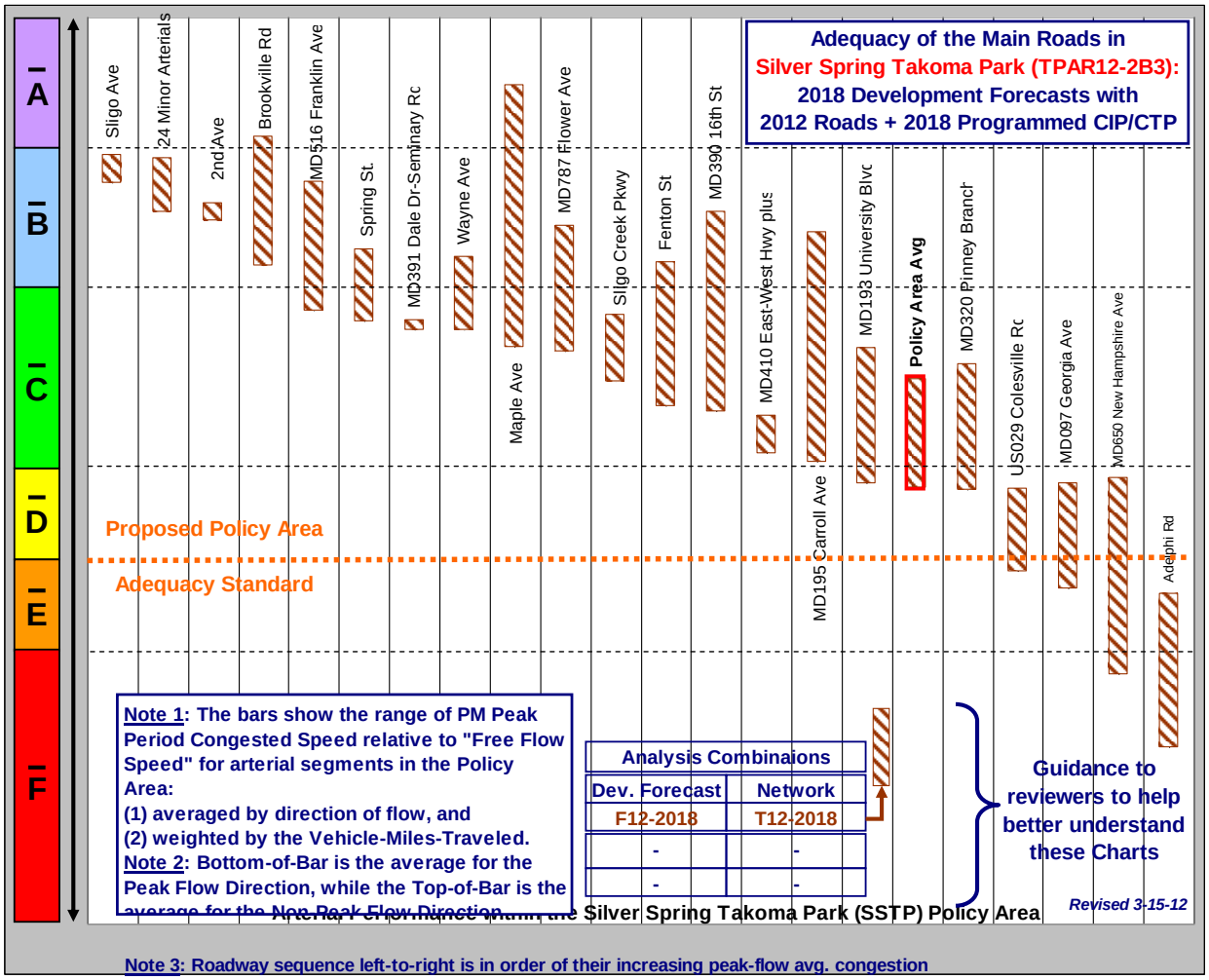
**Span of Service**: The average value of span is 18.9 hours per day for routes that operate all-day. The urban standard is 17.0 hours per day on average for all-day routes. Therefore transit span in the SSTP Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the SSTP Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for SSTP roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the SSTP Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the SSTP that were shown in the prior graphic. Towards the left, one of the bars is itself an average, in this case of 24 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

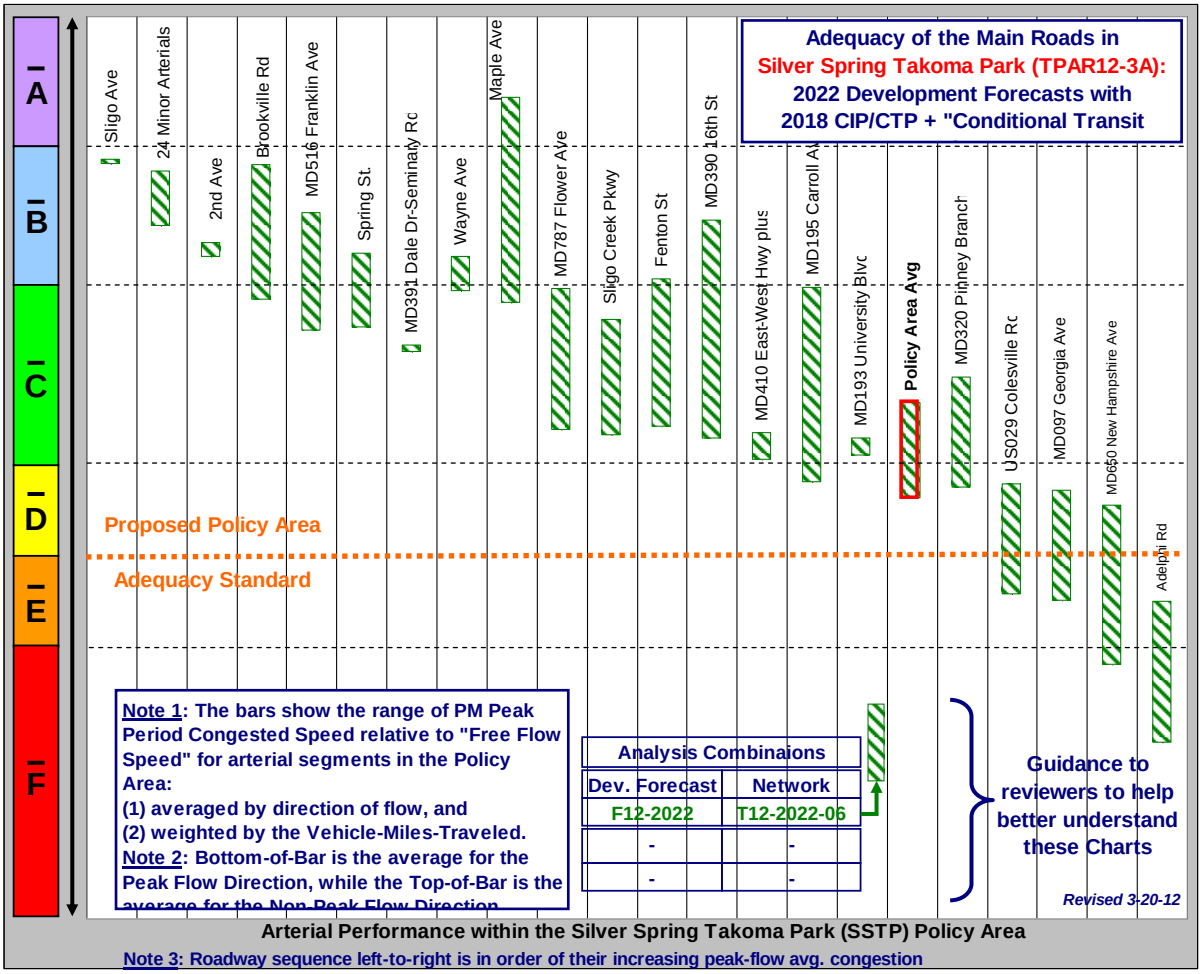
**Assessment of Areawide Roadway Adequacy for the SSTP Policy Area**: The overall weighted average for the SSTP Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the SSTP area. Therefore, the SSTP Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the SSTP Policy Area**: The prior graphic shows that 16 of the depicted left-most arterial roads (and the 24 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Urban Policy Area, often considerably less. Yet the graphic also shows that there are 4 other roadway link-segments in the

SSTP Policy Area that are more congested than the Standard for an Urban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) Adelphi Rd., (b) MD 650 New Hampshire Ave., (c) MD 97 Georgia Ave., and (d) US 29, Colesville Rd. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

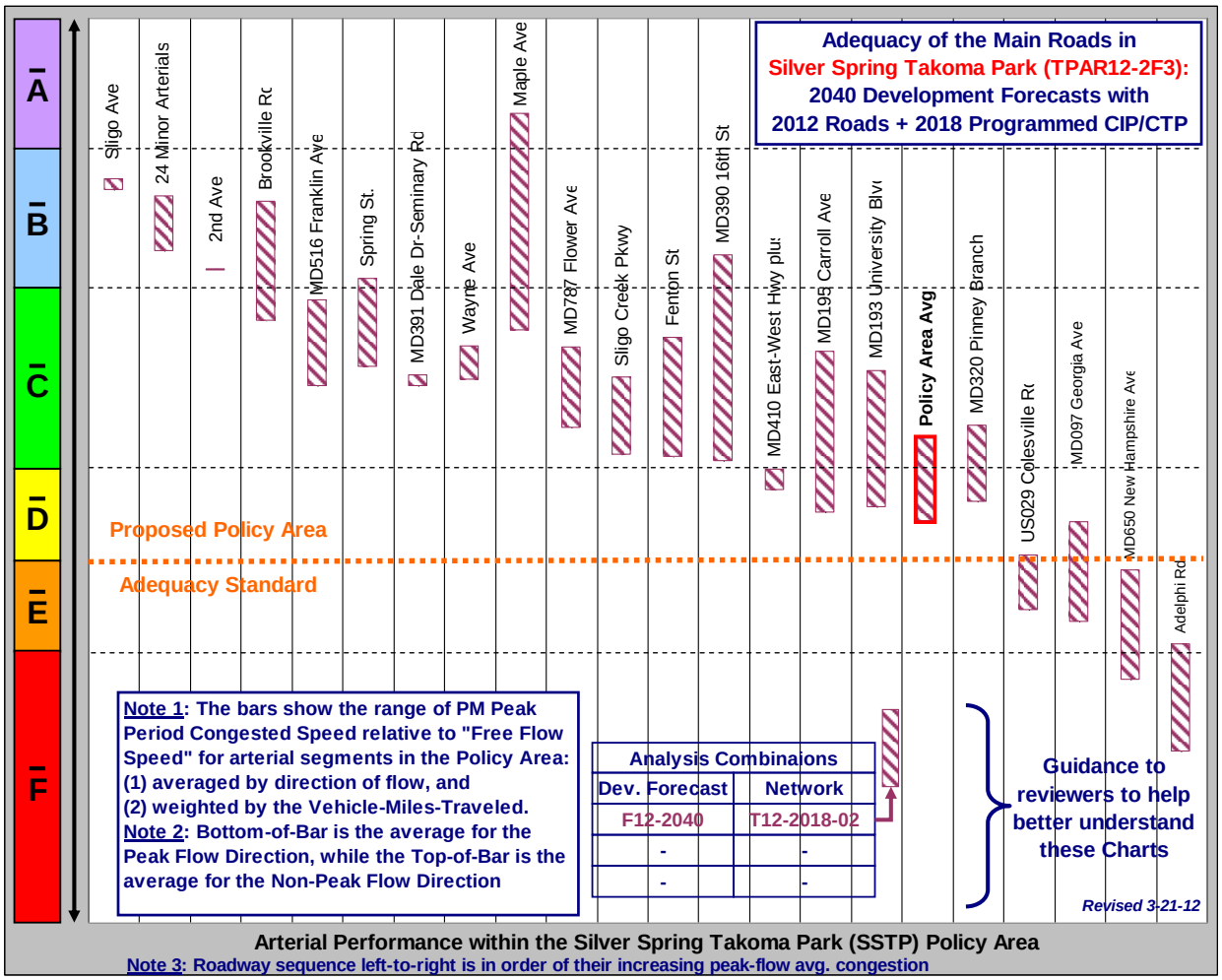
In addition, given the overall high volumes of traffic throughout many parts of the SSTP Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the SSTP area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. The Purple Line LRT is assumed to be available by 2022 in this scenario. Green-hatched bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022 are estimated not to cause the SSTP Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized. However, localized congestion would be somewhat more during this 10-year transportation improvement time period than that during the regulatory staging time period.



While other options to improve the roadway network over the next 10 years in the SSTP Policy Area do not exist or are impractical, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area, which is also used by the bus route system. The prior graphic can be used as a guide to focuson which roadways, singularly or in combination, should receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the SSTP area would maintain its overall roadway adequacy into the long term. The traffic patterns would remain similar with the roads already having more peak congestion possibly becoming more congested than the standard for an Urban Policy Area. Thus increases emphasis on improved Traffic Management and Operations as well as more intense Transportation Demand Management should continue.



## North Bethesda Policy Area

**A. Overview of the Policy Area**: North Bethesda (NB) is categorized as an Urban Policy Area, given the transit and development activity features of the area. This area is characterized by three Metrorail stations (Grosvenor, White Flint, and Twinbrook), high population and employment densities, and overall transit coverage of more than 80% of its area. Notable growth associated with major development proposal in the White Flint Sector Plan Area is occurring in conjunction with improved circulation roadways and improvements to east-west travel related to recent implementation of Montrose Parkway from and to the west, an interchange at MD 355 Rockville Pike, and still to be programmed sections of Montrose Parkway from and to the east.

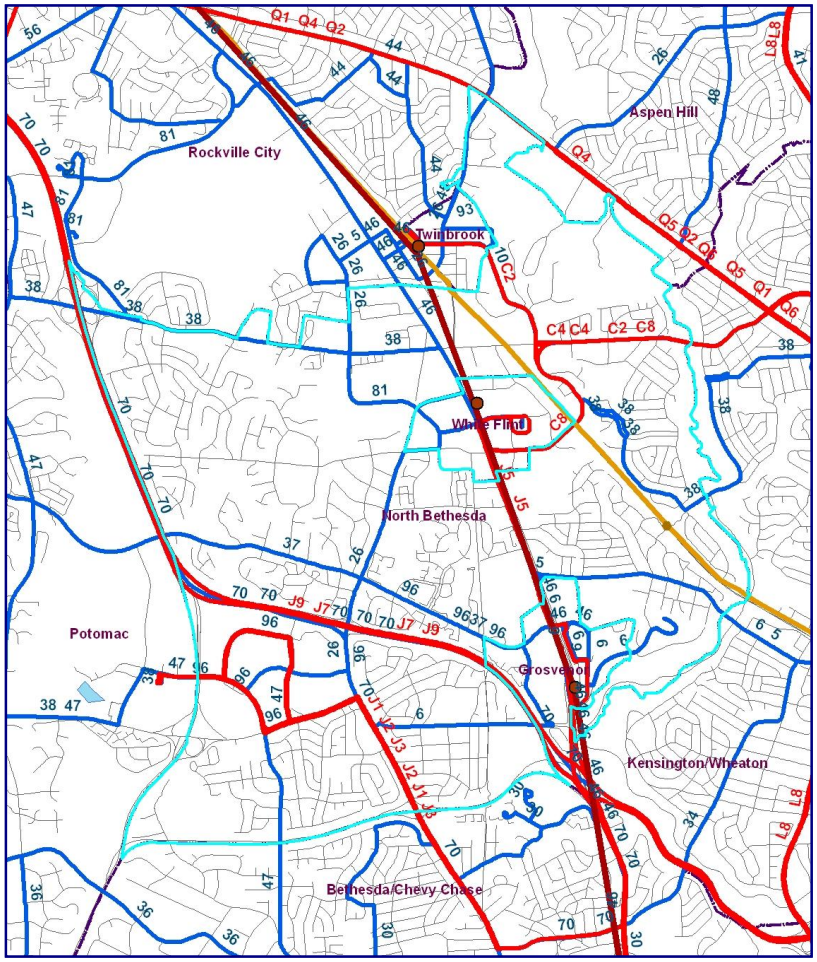
This Policy Area is also served by the North Bethesda Transportation Management District (TMD) that is an operational program of the Montgomery County Department of Transportation (MCDOT). The TMD works in conjunction with major employers primarily in the White Flint area to coordinate ridesharing and promote transit and non-motorized transportation. MCDOT also operates a program that manages the pricing and enforcement of on-street parking meters, which are in the vicinity of the Grosvenor and White Flint Metrorail stations. Considerable Park and Ride spaces are provided at the three stations. The MARC commuter rail system also has a station at Garret Park and one is being planned nearer to the White Flint business area.

**B. Forecast of Development Activity**: The North Bethesda Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 4,5788 households and 9,410 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 1,548 households and 3,863 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 9,564 households and 16,595 jobs. This growth is high and an increasing share of total County growth.

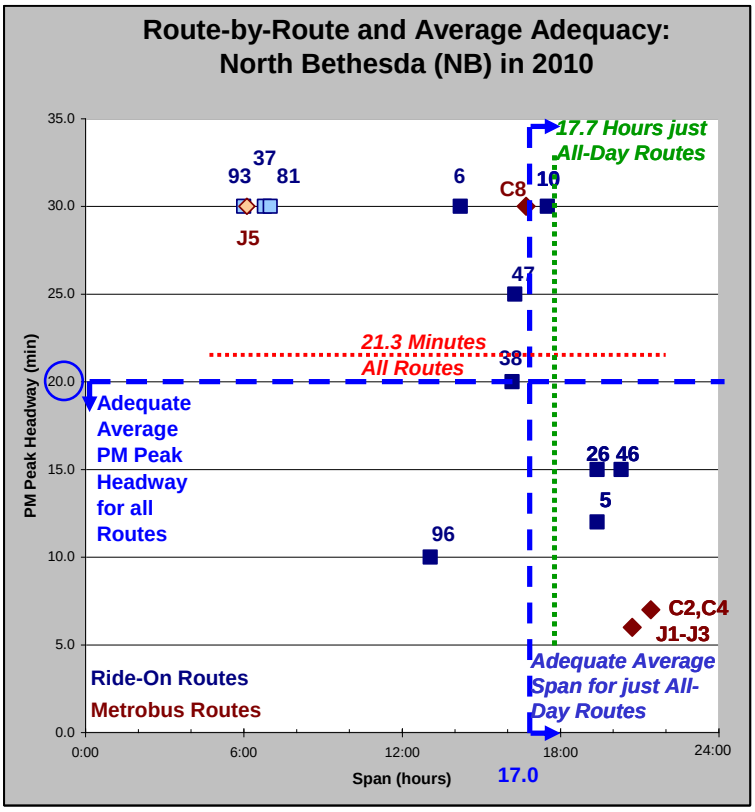
| *Source of the Forecasts*: *Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **North Bethesda** | 20,615 | | 25,193 | | 26,741 | | 36,305 | 68,402 | | 77,812 | | 81,675 | | 98,270 |
| Growth in the Policy Area | | 4,578 | | 1,548 | | 9,564 | | | 9,410 | | 3,863 | | 16,595 | |
| Percent Growth of Area | | 22.2% | | 6.1% | | 35.8% | | | 13.8% | | 5.0% | | 20.3% | |
| Percent of County Growth | | 15.7% | | 9.7% | | 16.7% | | | 15.1% | | 10.1% | | 13.4% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. Programmed Transportation Improvements**: The North Bethesda area has the largest number of programmed projects of any of the Policy Areas. These are staged improvements to the Montrose Parkway project being jointly done by MCDOT and MDOT/SHA. Three of the projects are more localized circulation improvements that will provide easier travel in the area.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-19-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Citadel Ave. Extended | Marinelli Rd to Nicholson Lane (2 lanes) | NB | Y | Y | Y |
| CIP | Montrose Parkway West | Montrose Rd to Hoya St. (4 lanes) | NB | Y | Y | Y |
| CIP | Nebel St. Extended | Chapman Ave. to Randolph Rd (4 lanes) | NB | Y | Y | Y |
| CIP | Chapman Ave Extended | Randolph Rd to Old Georgetown Rd (2 lanes) | NB | N | Y | Y |
| CIP | Montrose Parkway East | Parklawn Dr to Veirs Mill Road (MD 586) (4 lanes) | NB | N | 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 |
| CIP | Montrose Parkway East | MD 355/Montrose Parkway Interchange to Parklawn Dr (4 lanes) | NB | N | N | Y |




Ride-On Route and # Metrobus Route and #




**D. <u>Transit Adequacy Analysis</u>:** The NB Policy Area includes three Metrorail Stations: Grosvenor, White Flint, and Twinbrook. The area also includes one MARC station at Garret Park as well as one being planned nearer the White Flint business area.

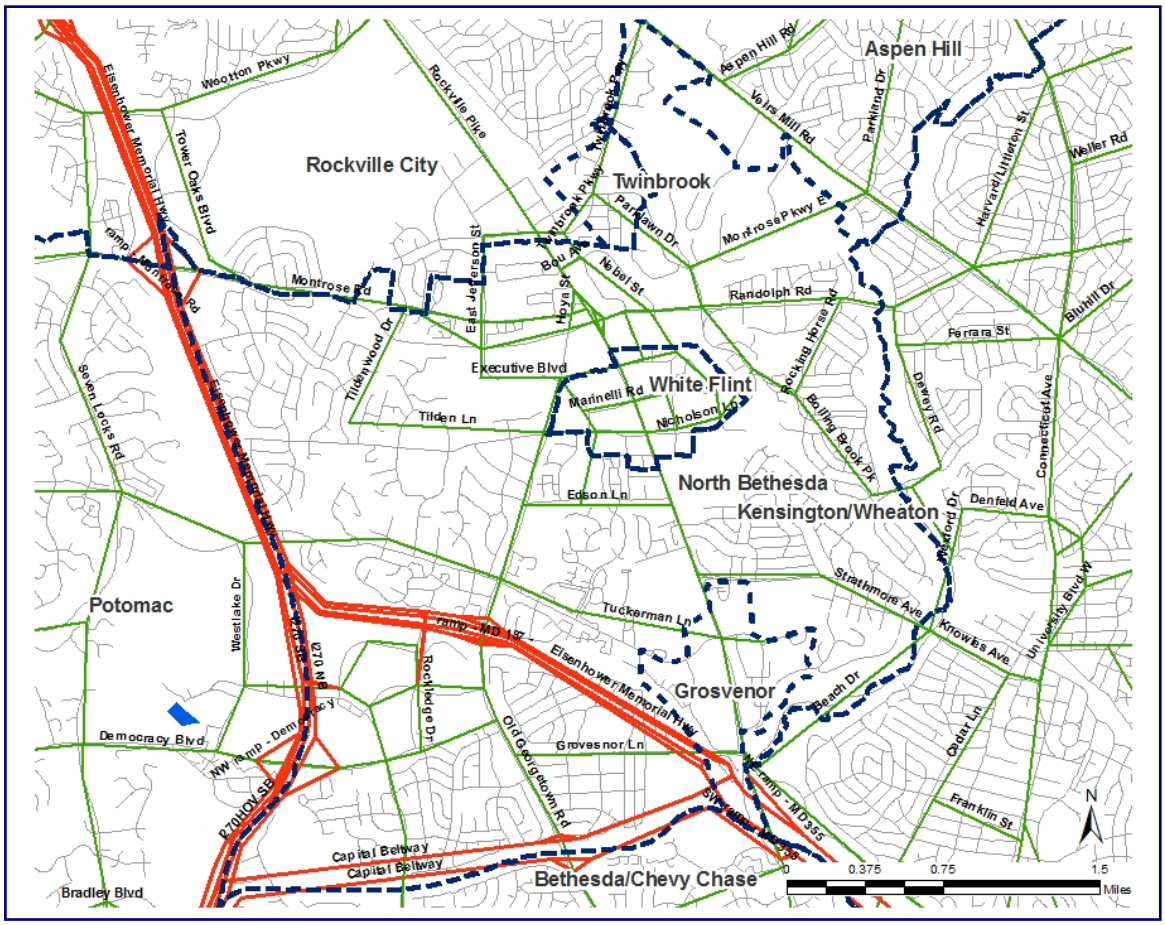
**Coverage of Service:** About 87% of the NB Policy Area is located within 1 mile of a Metrorail station or 1/3 of a mile of one of the 15 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the NB area. The standard for Coverage for an Urban Policy Area is 80%. Therefore transit coverage in the NB Policy Area is adequate.

**Peak Headways:** All buses on average provide 21.3 minutes between buses during the weekday evening peak period in the NB Policy Area. Some provide very frequent service such as the C2 or J1-J3 Metrobuses. In areas like NB where Metrorail and Commuter Rail are provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the NB area is not yet adequate. The transit Adequacy Analysis has shown that a "conditional project" to improve peak headways in other areas has routes that also serve the NB area, and as a result the NB area could attain peak headway adequacy within the next 10 years.

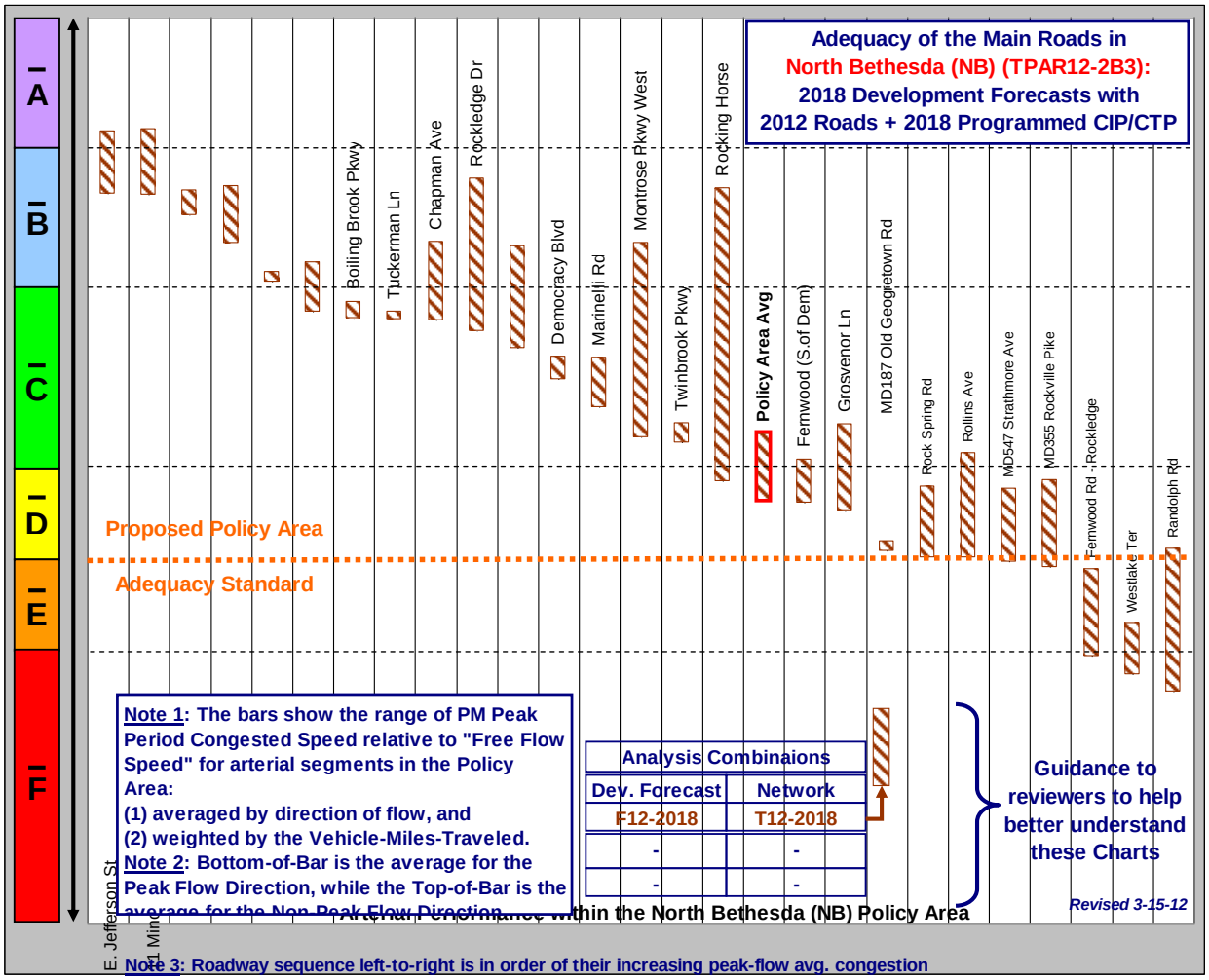
**Span of Service**: The average value of span is 17.7 hours per day for routes that operate all-day. The urban standard is 17.0 hours per day on average for all-day routes. Therefore transit span in the NB Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the NB Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for NB roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the NB Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.



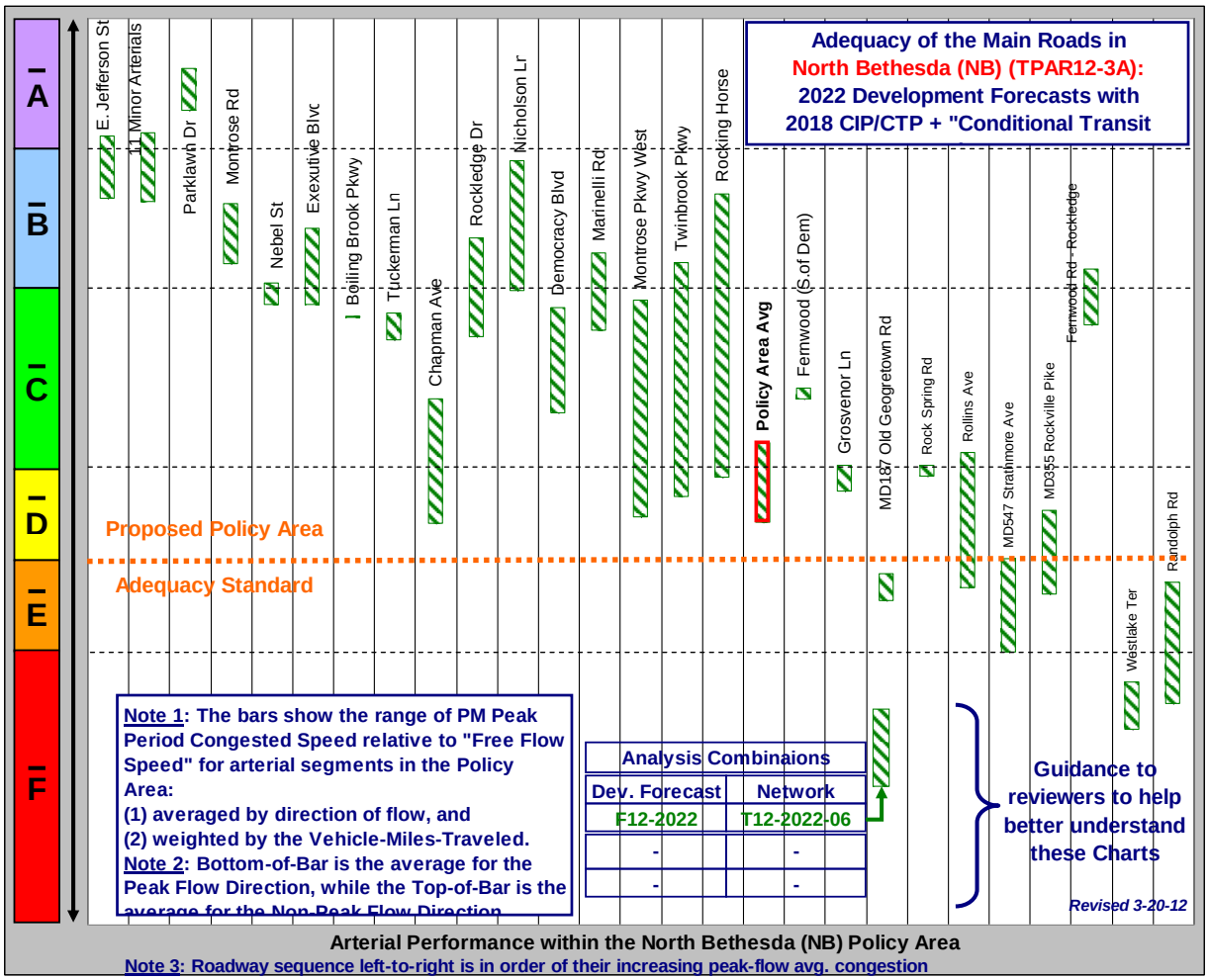

This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the NB that were shown in the prior graphic. Almost at the left side, one of the bars is itself an average, in this case of 11 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

**Assessment of Areawide Roadway Adequacy for the NB Policy Area**: The overall weighted average for the NB Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is <u>above</u> the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the NB area. Therefore, the NB Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. <u>Guidance to Local Area Transportation Review (LATR) in the NB Policy Area</u>**: The prior graphic shows that 21 of the depicted left-most arterial roads (and the 11 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is <u>less</u> congested that the Standard for an Urban Policy Area, often considerably less. Yet the graphic also shows that there are some 4 other roadway link-segments

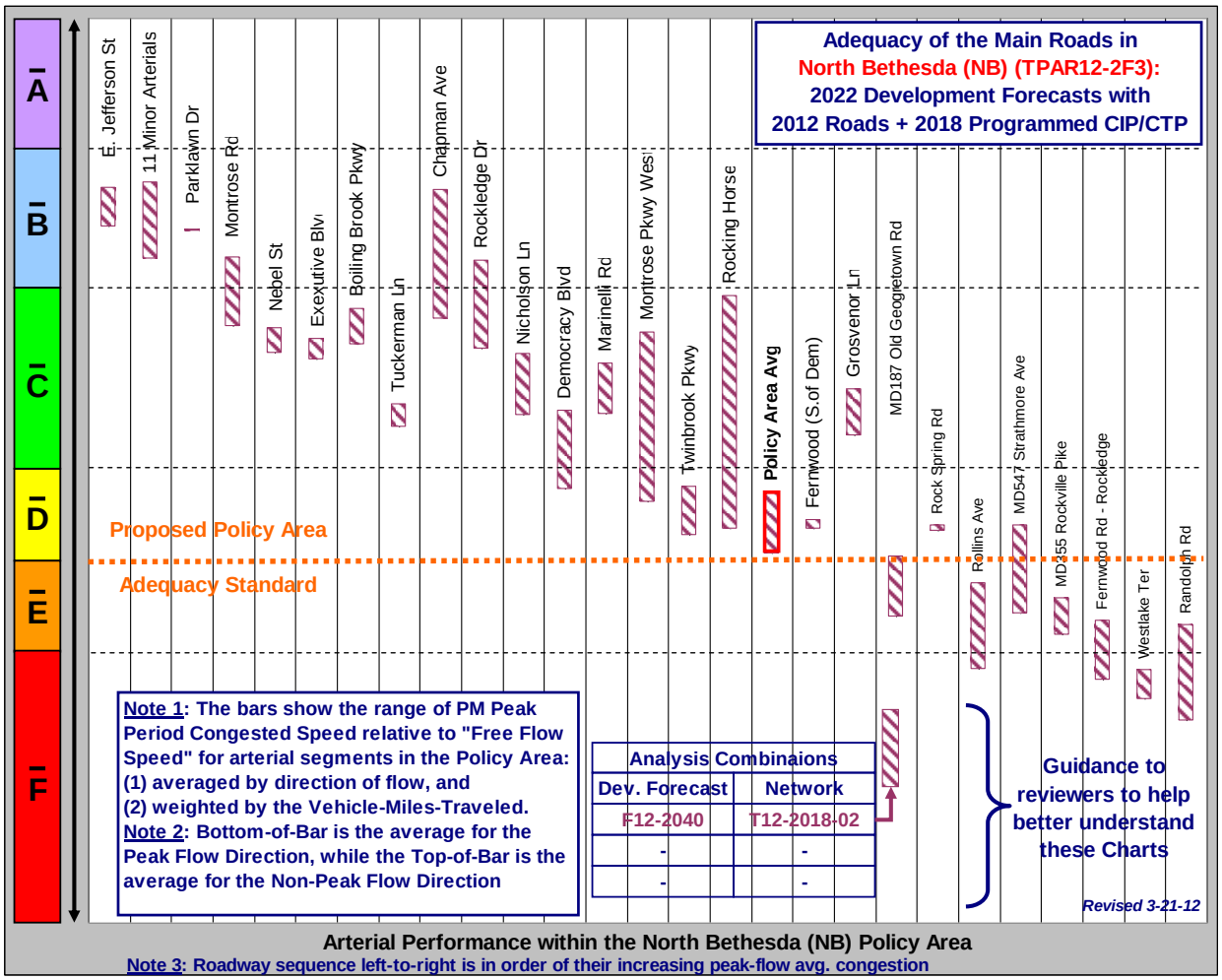
in the NB Policy Area that are more congested than the Standard for an Urban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) Randolph Rd (b) Westlake Terrace, (c) Fernwood Rd and Rockledge Roads, and (d) MD 355 Rockville Pike. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site. In addition, given the overall moderate to high volumes of traffic throughout other parts of the NB Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the NB area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. One of those is the extension of Montrose Parkway to the east to MD 586 Veirs Mill Road in the Kensington Wheaton Policy Area. In the prior graphic, Green-hatched bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the NB Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage. However, the high growth rates in development activity point to the need to continue to identify additional conditional transportation solutions for the NB Area.



Other options to improve the roadway network over the next 10 years in the NB Policy Area are potentially feasible. However, attention should also be given to transit improvements and enhancements as well proactive traffic signal improvements that could be undertaken to increase the functioning of the roadway and transit networks in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the NB Policy Area would maintain its overall roadway adequacy into the long term. The traffic patterns would remain similar and a few additional roads already having more peak congestion would possibly become more congested than the standard for an Urban Policy Area. Thus emphasis should be increase on improved Traffic Management and Operations as well as more intense Transportation Demand Management.



## Kensington Wheaton Policy Area

**A. <u>Overview of the Policy Area</u>**: Kensington Wheaton (KW) is categorized as an Urban Policy Area, given the transit and development activity features of the area. This area is characterized by three Metrorail stations (Forest Glen, Wheaton, and Glenmont), high population and moderate employment densities, and overall transit coverage of more than 80% of its area. The KW Policy Area is also served by the Commuter Rail MARC system and Amtrak trains stopping at the Kensington Station. Development activity has been and is forecast to be steady and with redevelopment near the two of the Metrorail Stations is keeping on par with overall growth in Montgomery County.

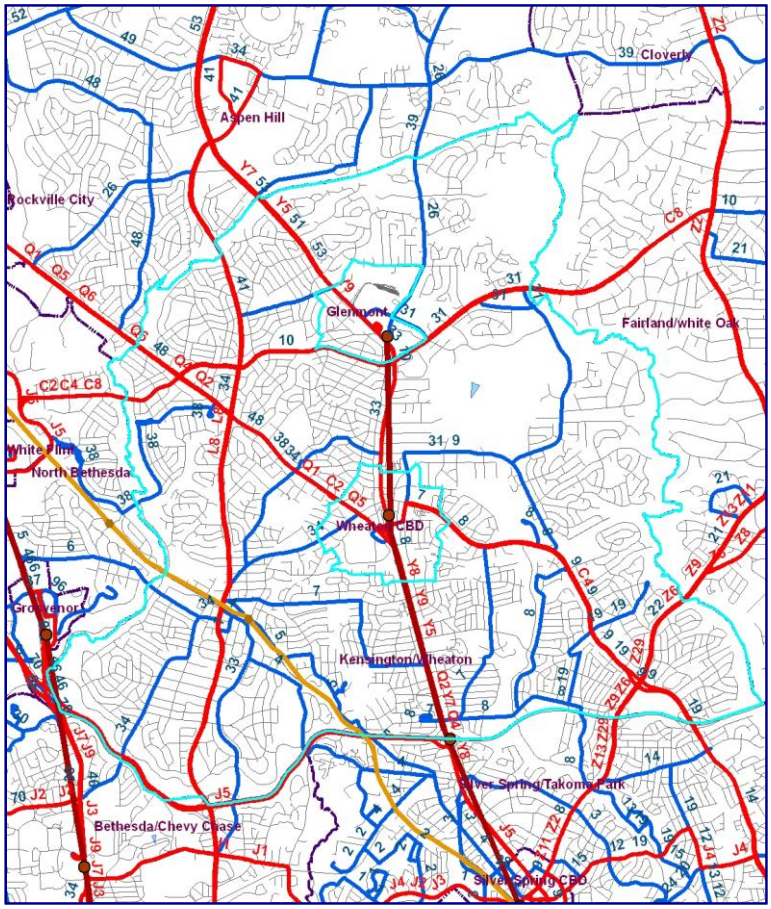
This Policy Area is also served by the Wheaton Parking Lot District that is operated by the Montgomery County Department of Transportation (MCDOT). The Parking Lot District is managed to consolidate and charge for off-street parking and as well as the pricing and enforcement of the on-street parking meters.

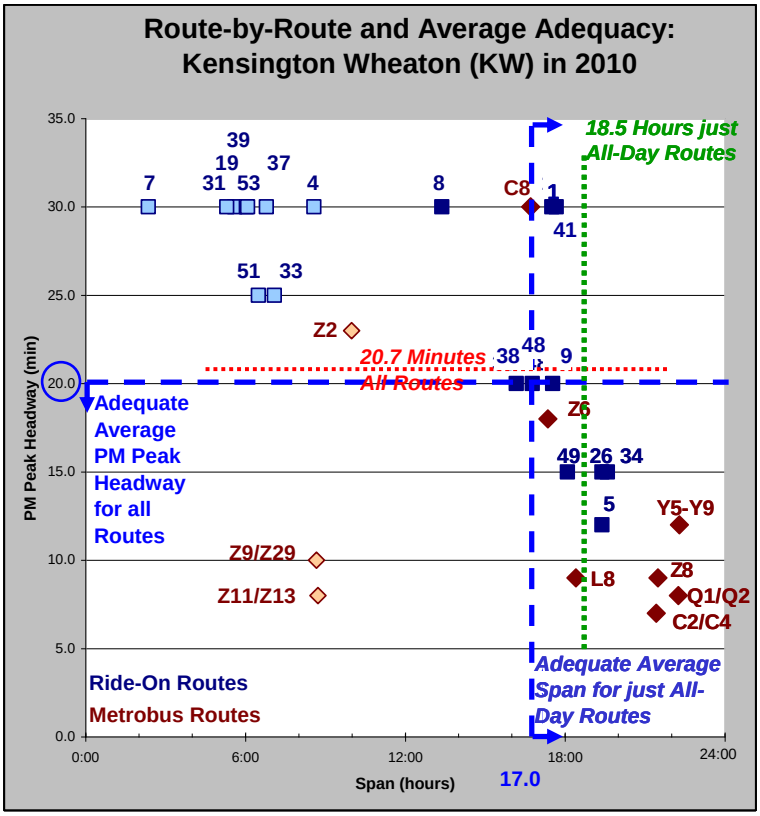
**B. <u>Forecast of Development Activity</u>**: The KW Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 2,014 households and 465 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 1,182 households and 341 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 3,542 households and 1,394 jobs. This pace of growth is moderate and it is a fairly steady share of the total growth in the County.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Kensington/Wheaton** | 36,836 | | 38,850 | | 40,032 | | 43,574 | 25,769 | | 26,234 | | 26,575 | | 27,969 |
| Growth in the Policy Area | | 2,014 | | 1,182 | | 3,542 | | | 465 | | 341 | | 1,394 | |
| Percent Growth of Area | | 5.5% | | 3.0% | | 8.8% | | | 1.8% | | 1.3% | | 5.2% | |
| Percent of County Growth | | 6.9% | | 7.4% | | 6.2% | | | 0.7% | | 0.9% | | 1.1% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are two programmed projects to improve roadway capacity in the KW area to address impacts of growth and traffic that passes through the area. The first of these is an interchange of MD 97 Georgia Avenue and Randolph Road south of the Glenmont Metrorail Station. An announcement was recently made of a special grant from the United States Department of Transportation that will provide an underpass of MD 97 Georgia Avenue in the vicinity of Forest Glen Road. The underpass will facilitate pedestrian and bicycling travel between the Forest Glen Station entrance on the west side of Georgia Avenue to the Holy Cross Hospital and medical offices located east of Georgia Avenue.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CTP | Georgia Ave (MD 97) | Interchange of Georgia Avenue (MD 97) with Randolph Rd | KW | N | Y | Y |
| CIP | Forest Glen Metro Underpass | Underpass of Georgia Ave (MD 97) for pedestrians and bicycles | KW | N | N | Y |




**D. <u>Transit Adequacy Analysis</u>**: The KW Policy Area includes three Metrorail Stations: Forest Glen, Wheaton, and Glenmont. The area also is served by the MARC Commuter Rail and Amtrak train service at the Kensington Station.

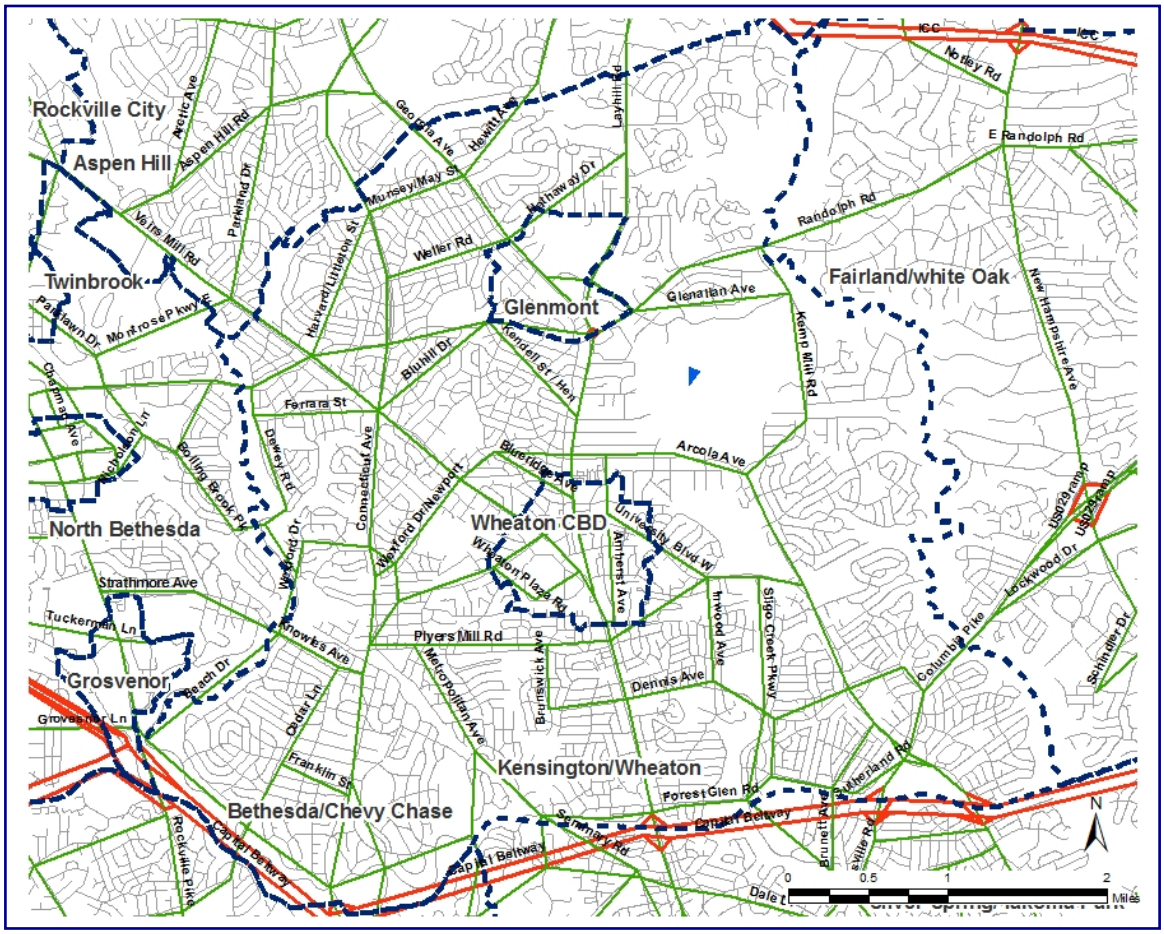
**Coverage of Service:** About 82% of the KW Policy Area is located within 1 mile of a Metrorail station or 1/3 of a mile of one of the 29 bus routes that crisscross serving the area. The graphic to the left shows where in particular bus service coverage is provided in the KW area. The standard for Coverage for an Urban Policy Area is 80%. Therefore, transit coverage in the KW Policy Area is adequate.

**Peak Headways:** All buses on average provide 20.7 minutes between buses during the weekday evening peak period in the KW Policy Area. Some provide very frequent service such as the Metrobus routes of L8, Y5-Y9, Q1/Q2, and the C2/C4. In areas like KW where Metrorail is provided the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the KW area is not yet adequate. The transit Adequacy Analysis has shown that a "conditional project" to improve peak headways in other areas has routes that also serve the KW area, and as a result the KW area could attain peak headway adequacy within the next 10 years.

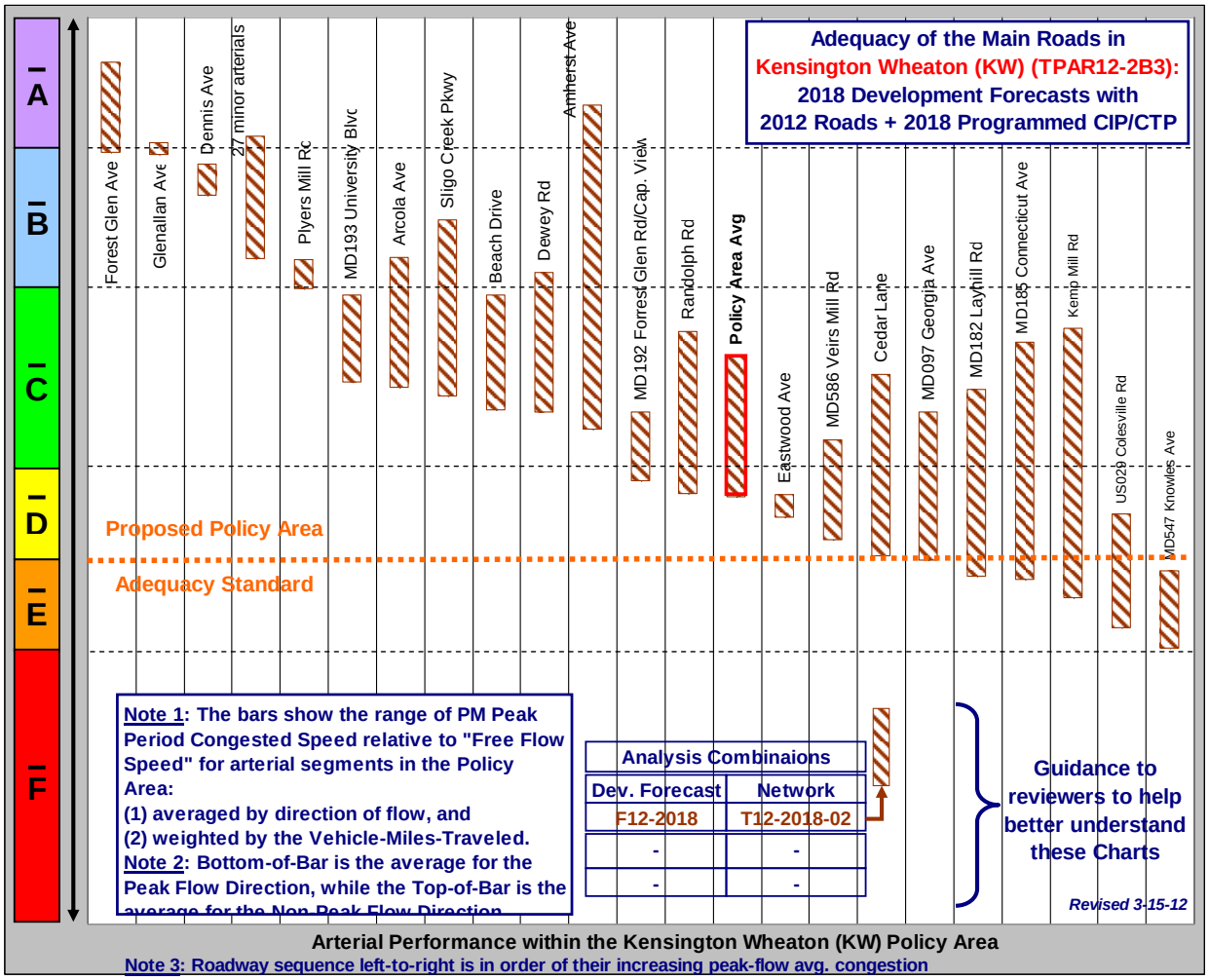
**Span of Service**: The average value of span is 18.5 hours per day for routes that operate all-day. The urban standard is 17.0 hours per day on average for all-day routes. Therefore transit span in the KW Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the KW Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for KW roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the KW Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the KW that were shown in the prior graphic. Towards the left side of the graphic, one of the bars is itself an average, in this case of 27 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

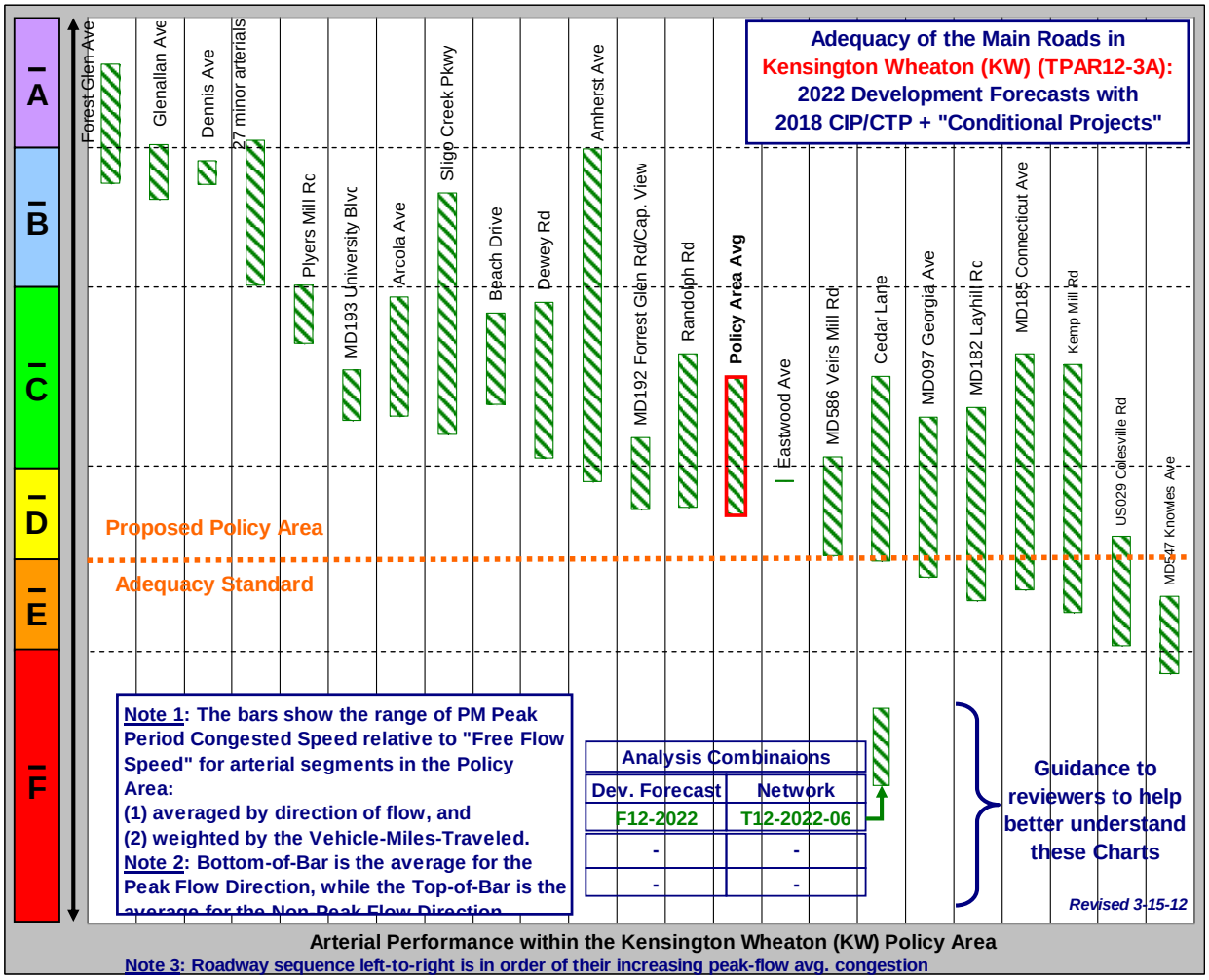
**Assessment of Areawide Roadway Adequacy for the KW Policy Area**: The overall weighted average for the KW Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is <u>above</u> the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the KW area. Therefore, the KW Policy Area overall has adequate future areawide roadway traffic conditions for the regulatory planning stage combination, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. <u>Guidance to Local Area Transportation Review (LATR) in the KW Policy Area</u>**: The prior graphic shows that 16 of the depicted left-most arterial roads (and the 27 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is <u>less</u> congested that the Standard for an Urban Policy Area, often considerably less. Yet the graphic also shows that there are some 5 other roadway link-segments in the KW Policy Area that are <u>more</u> congested than the Standard for an Urban Policy Area.

Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) MD 547 Knowles Ave., (b) US 29 Colesville Rd, (c) Kemp Mill Rd, (d) MD 185 Connecticut Ave, and (e) MD 182 Layhill Rd. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

In addition, given the overall high volumes of traffic throughout many parts of the KW Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the KW area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

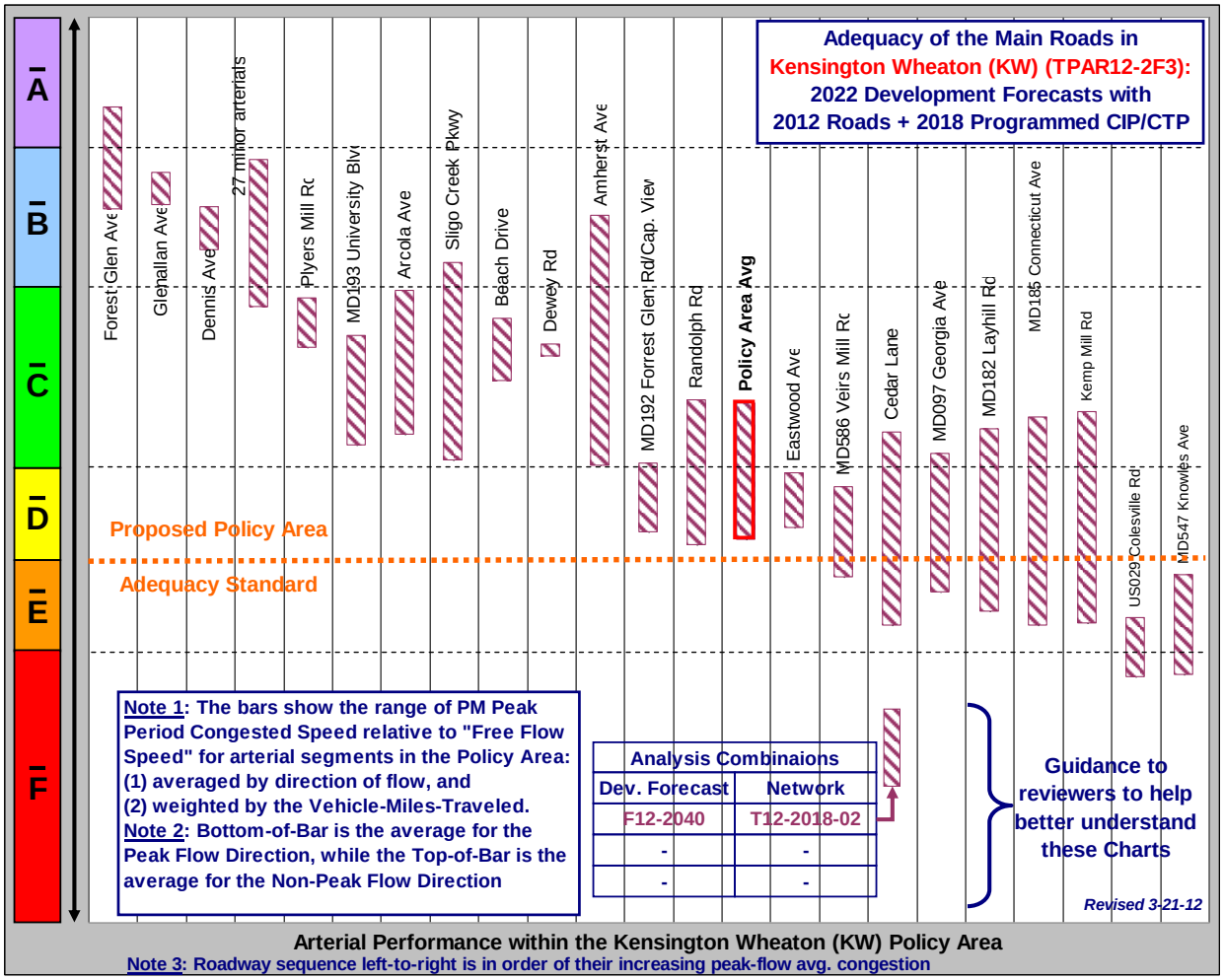
**G. <u>Guidance for Conditional Transportation Solutions</u>:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the KW Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized.



It can be noted in comparing the prior graphic to the previous one that in the period of the transportation improvement stage between 2018 and 2022 that one more of the roadways on average, MD 97 Georgia Avenue would more likely have peak flow congestion conditions that would be more congested than the Policy Area standard for the Urban Policy Areas. Consideration should be given to monitoring actual congestion trends and identifying further potential conditional solutions.

While other options to improve the roadway network over the next 10 years in the KW Policy Area potentially feasible, transit improvements and enhancements as well proactive traffic signal improvements should be undertaken to increase the functioning of the roadway and transit networks in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the KW Policy Area would maintain its overall roadway adequacy into the long term. The traffic patterns would remain similar and a few additional roads already having more peak congestion possibly becoming more congested than the standard for an Urban Policy Area. Thus emphasis increase emphasis on improved Traffic Management and Operations as well as more intense Transportation Demand Management should continue.



## Bethesda Chevy Chase Policy Area

**A. <u>Overview of the Policy Area</u>**: Bethesda Chevy Chase (BCC) is categorized as an Urban Policy Area as it has 3 Metrorail stations (Friendship Heights, Bethesda, and Medical Center), high population and employment densities, and overall transit coverage of more than 80% of its area. Notable growth is occurring associated with the Base Realignment and Closure (BRAC) process at the Naval Medical Center, which includes programmed transportation improvements. The Master Planned improvement of the Purple Line Light Rail Transit line has reached a stage of project planning development where implementation of that major transit project may be able to be accomplished within 10 years by 2022 if overall transportation funding becomes firm.

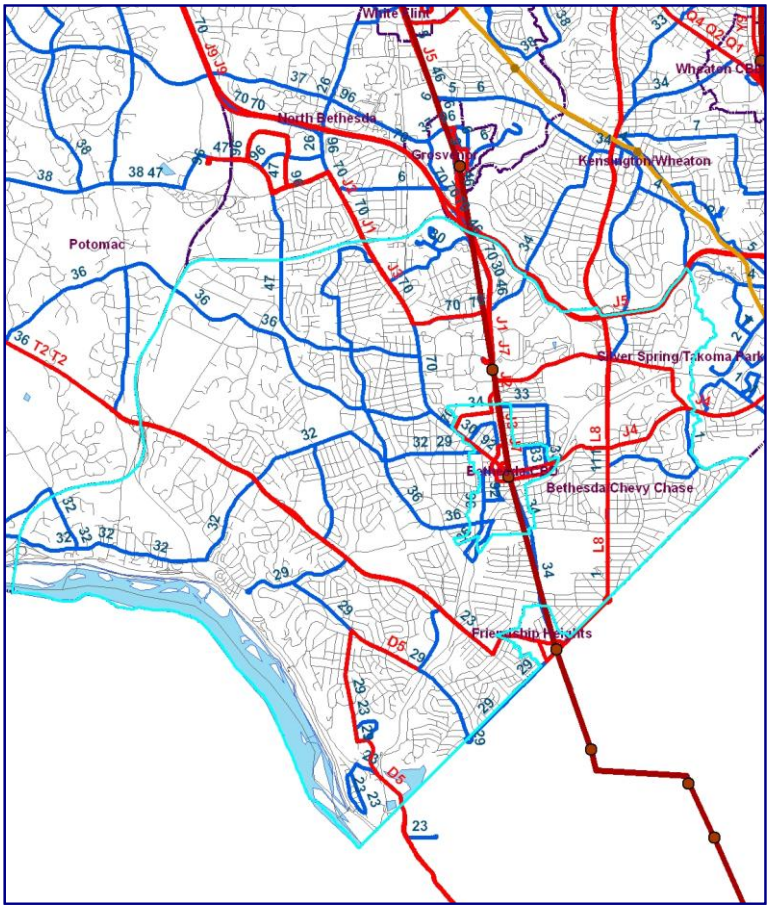
This Policy Area is also served by the Bethesda Transportation Management District (TMD) that is an operational program of MCDOT. The TMD works in conjunction with major employers in the Bethesda CBD and NIH and Naval Medical Center campuses to coordinate ridesharing and promote transit and non-motorized transportation for travel to and from the area. MCDOT also operates the Bethesda Parking Lot District that consolidates and charges for off-street parking as well as manages the pricing and enforcement of the on-street parking meters. The National Crescent Trail provides significant recreational bicycling opportunities as well as with other bike lanes and routes provides connectivity between the residential and employment areas.

**B. <u>Forecast of Development Activity</u>**: The Bethesda Chevy Chase Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 3,719 households and 7,189 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 1,106 households and 3,288 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 3,242 households and 4,792 jobs. Growth is significant but a declining share of the County growth.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Bethesda / Chevy Chase** | 39,621 | | 43,340 | | 44,446 | | 47,688 | 87,464 | | 94,653 | | 97,941 | | 102,733 |
| Growth in the Policy Area | | 3,719 | | 1,106 | | 3,242 | | | 7,189 | | 3,288 | | 4,792 | |
| Percent Growth of Area | | 9.4% | | 2.6% | | 7.3% | | | 8.2% | | 3.5% | | 4.9% | |
| Percent of County Growth | | 12.8% | | 6.9% | | 5.6% | | | 11.5% | | 8.6% | | 3.9% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

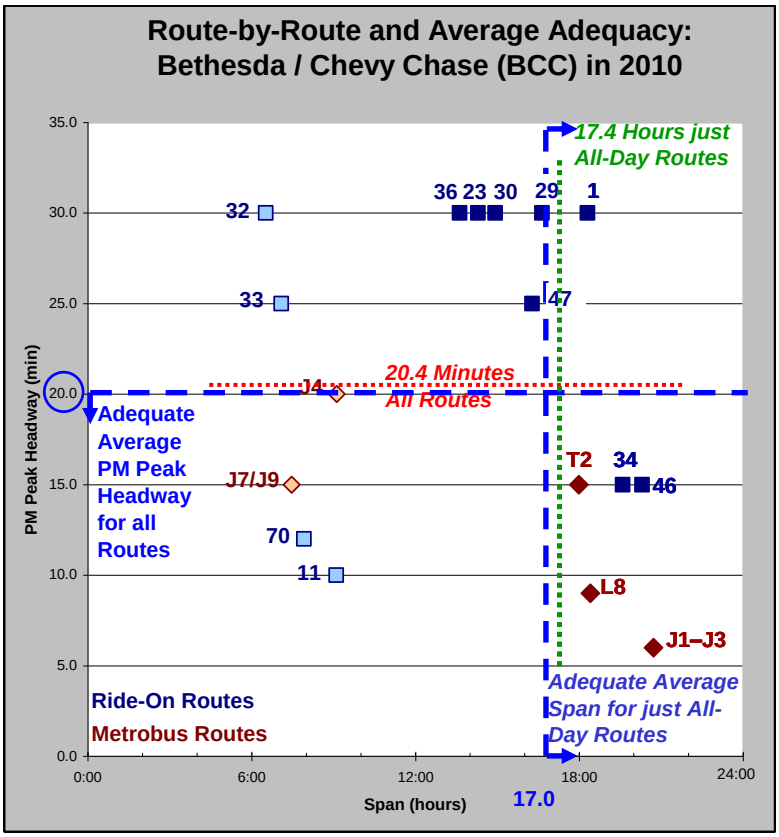
**C. <u>Programmed Transportation Improvements</u>**: There are two programmed projects that would provide improved roadway capacity in the BCC Policy Area that are being implemented to address impacts of the BRAC development activity of the Federal Government. These are improvements to parts of MD 185, Connecticut Avenue. Other BRAC related improvements will be done that will address bicycling and pedestrian circulation concerns. The countywide conditional project of the Purple line Purple Line LRT has reached a stage of project planning development where implementation of that major transit project may be able to be accomplished within 10 years by 2022 if overall transportation funding becomes firm.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-19-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CTP | Connecticut Ave. (MD 185) | I-495 to Jones Bridge Road (BRAC project) (add 4th SB Lane) | BCC | N | Y | Y |
| CTP | Connecticut Ave. (MD 185) | Manor Road to I-495 (BRAC project) (add 4th NB Lane) | BCC | N | Y | Y |
| CTP | Purple Line Light Rail Transit | *Project Planning may be sufficient if conditional funding approved* | Countywide | N | N | Y |




**D. <u>Transit Adequacy Analysis</u>**: The BCC Policy Area includes three Metrorail Stations: Bethesda, Friendship Heights, and Medical Center, The area also includes two future stations on the Purple Line, one near Connecticut Avenue, Chevy Chase Lake Drive and Newdale Road, and another located at Elm Street and Woodmont Avenue.

**Coverage of Service:** 81.2% of the BCC Policy Area is located within 1 mile of a Metrorail station or 1/3 of a mile of one of the 17 bus routes servicing the area. The graphic to the left shows where in particular bus service coverage is provided in the BCC area. The standard for Coverage for an urban area is 80.0%. Therefore transit coverage in the BCC Policy Area is adequate.

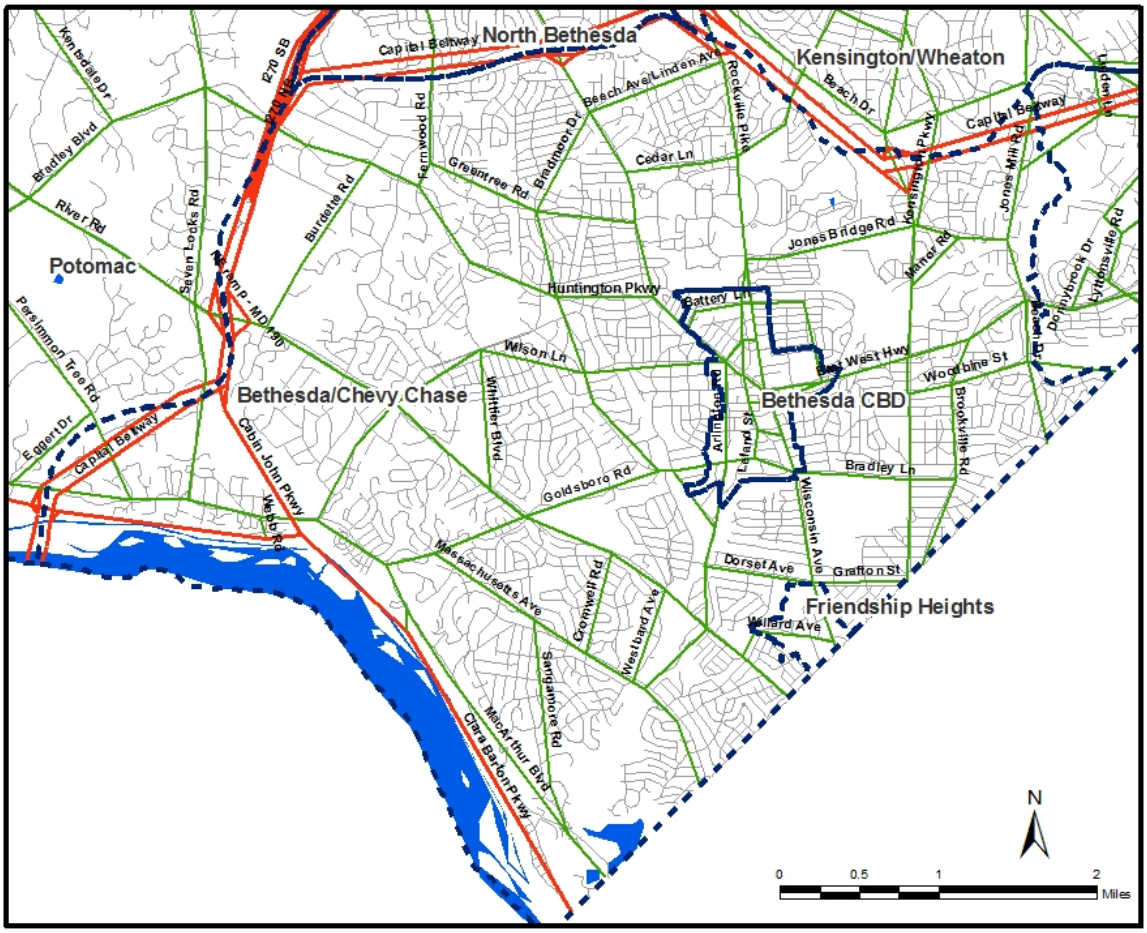



**Peak Headways:** All buses on average operate every 20.4. minutes during the weekday evening peak period in the BCC Policy Area. Some provide very frequent service such as the L8 or J1-J3 Metrobuses. In areas like BCC where Metrorail, Light Rail Transit or future BRT systems are provided, the standard for average Peak Headway is 20 minutes or less. Thus the average peak headway for the BCC area is not yet adequate. A conditional countywide project to improve peak headways in other areas could also attain adequacy in the BCC area too.

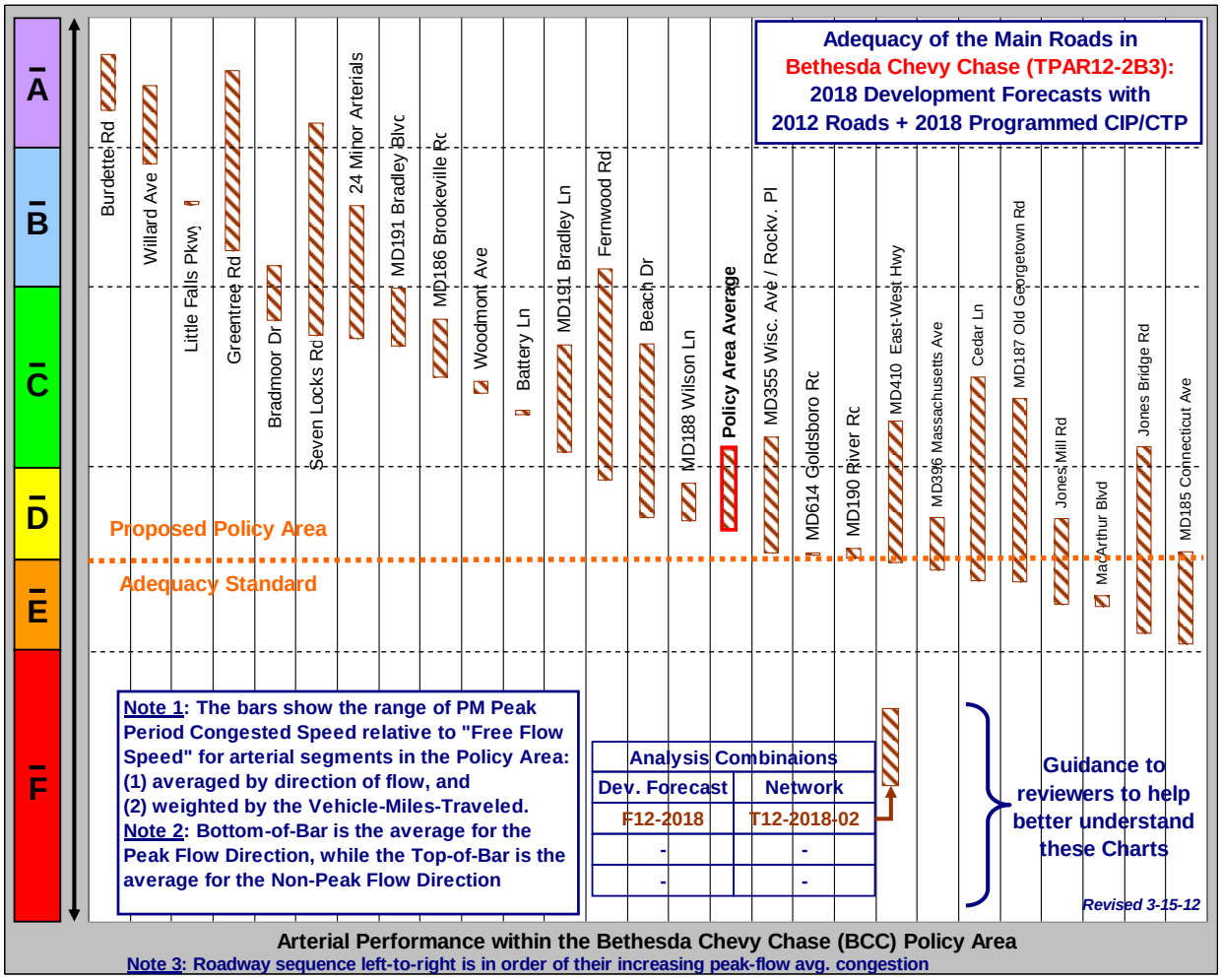
**Span of Service**: The average value of span is 17.4 hours per day for routes that operate all-day. The urban standard is 17.0 hours per day on average for all-day routes.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the BCC Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic schematically shows those major and minor arterials that were used and summarized. The freeway system of the region was also accounted for in the analysis but their performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as such very local streets and roads have low volumes of traffic. It is beyond the state-of-the-practice to model the use of them. The pattern of such local streets is nevertheless depicted in the background in the roadway graphic for purpose of understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for BCC roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the BCC Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage that uses the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to read the chart, yet some elaboration can also be help. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the BCC that were shown in the prior graphic. Towards the left, one of the bars is itself an average, in this case of 24 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

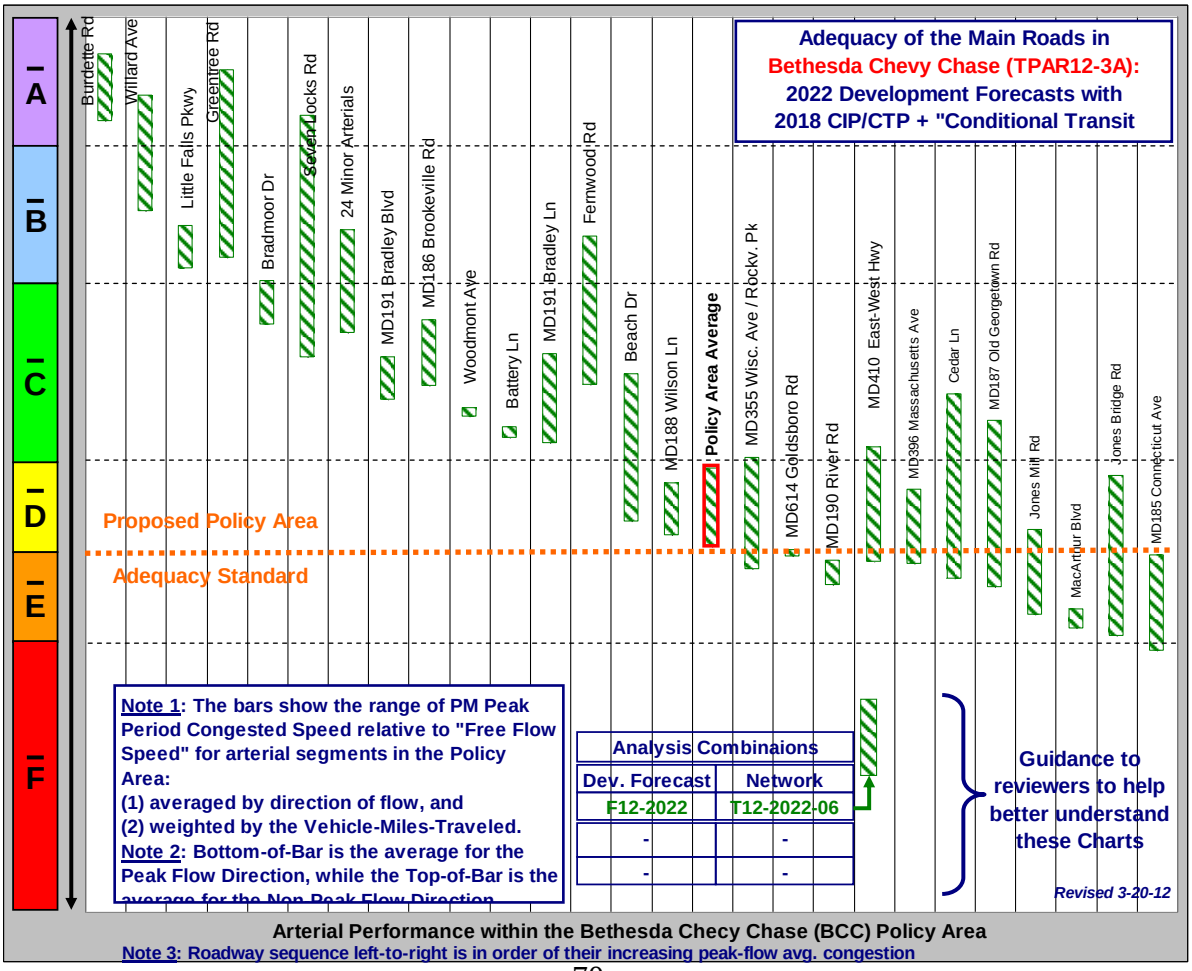
**Assessment of Areawide Roadway Adequacy for the BCC Policy Area**: The overall weighted average for the BCC Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the BCC area. Therefore, the BCC Policy Area has adequate future roadway conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP, results in overall areawide adequate roadways in the BCC Policy Area.

**F. Guidance to Local Area Transportation Review (LATR) in the BCC Policy Area**: The prior graphic shows that 18 of the depicted left-most arterial roads (and 24 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Urban Policy Area, often considerably less. Yet the graphic also shows that there are some 8 other roadway link-segments

in the BCC Policy Area that are more congested than the Standard for an Urban Policy Area. Reading from right to the left in prior graphic locally inadequate congested conditions would be more likely found on parts of: (a) MD 185, Connecticut Ave. (b) Jones Bridge Rd, (c) McArthur Blvd, (d) Jones Mill Rd, (e) MD 187 Old Georgetown Rd, (f) Cedar Lane, (g) MD 396 Massachusetts Ave, and (h) MD 410 East West Hwy. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

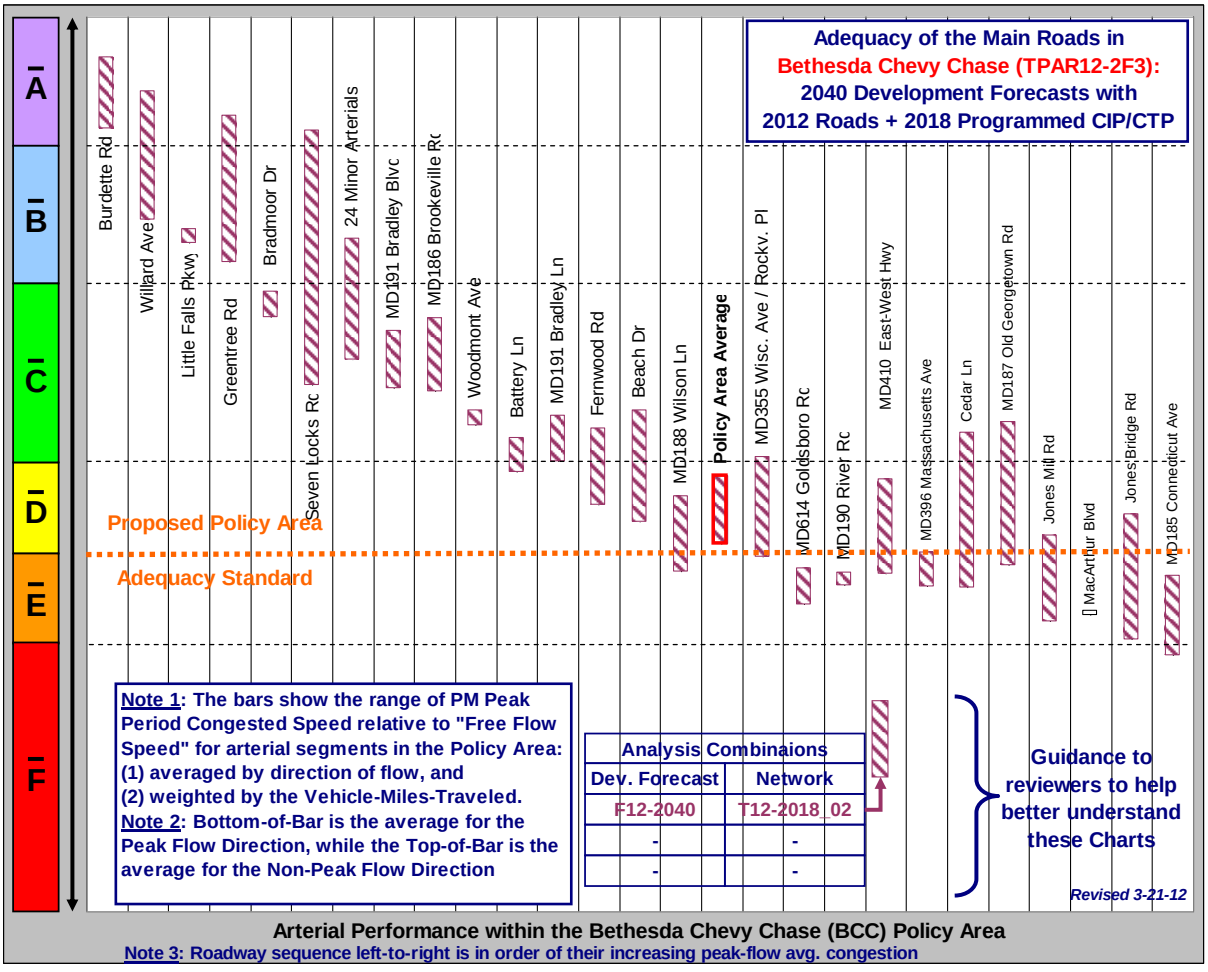
In addition, given the overall high volumes of traffic throughout many parts of the BCC Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the BCC area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. The Purple Line LRT is assumed to be available by 2022 in this scenario. Green-hatched bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the BCC Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage. However, it would be very close to doing so and effort and solutions should be sought during the intervening time period.



During the transportation improvements stage time period the Roadway Adequacy Analysis in the prior graphic suggests that three additional roadways would likely be frequently experiencing locally inadequate congestion conditions, those of: (1) MD 190 River Road, (2) MD 614 Goldsboro Rd, and (3) MD 355 Wisconsin Ave. Traffic operations and localized improvements may be workable for some locations along those roadway segments. More attentive monitoring of congestion trends along those roadway segments should also be undertaken. It is noted that the BRAC improvements for the Naval Hospital Expansion, include a MD 355 Pedestrian Crossing, as well as intersection and pedestrian improvements. While the BRAC improvements will help to maximize the efficiency of the existing network in the BCC area, directly accounting for the effects of such localized improvements is beyond the current state-of-the-practice in the regional-based modeling of the type used in the TPAR analysis. While options to improve the roadway network over the next 10 years in the BCC Policy Area do not exist or are impractical, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this policy area, which is also used by the bus route system. The prior graphic can be used as a guide in focusing on which roadways should receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** . The following graphic shows that the BCC area would maintain its overall roadway adequacy into the long term but that some additional roads would have peak congestion more congested than the standard for an Urban Policy Area. Thus emphasis on Traffic Management and Operations and Transportation Demand Management should continue.



## Rockville Policy Area

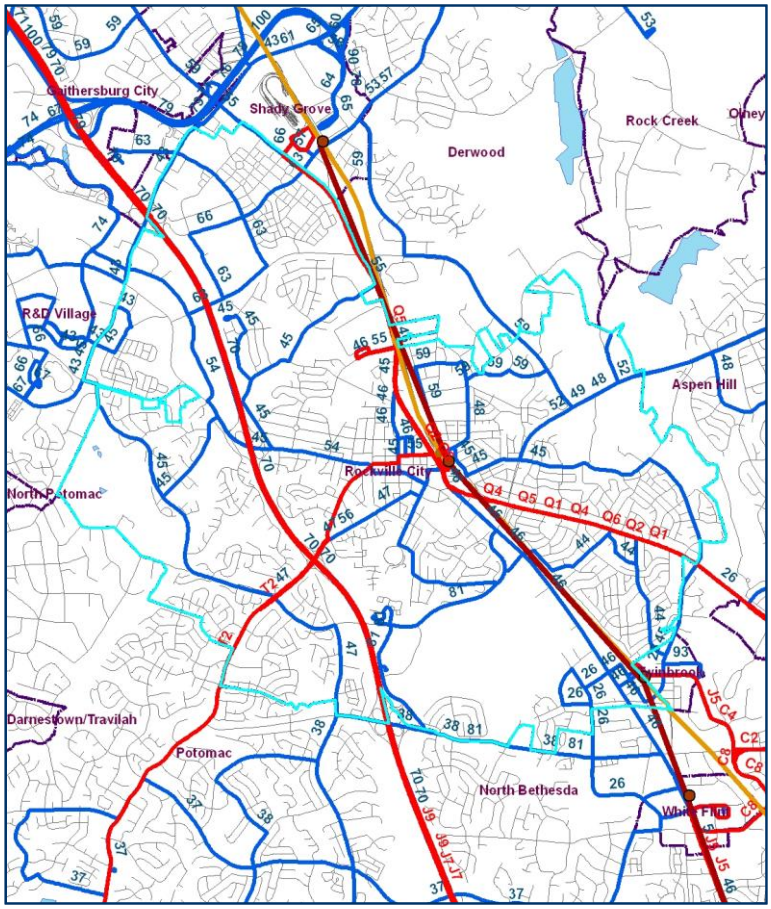
**A. <u>Overview of the Policy Area</u>**: Rockville (RKV) is categorized as an Urban Policy Area, given the transit and development activity features of the area. This area is characterized by one Metrorail stations (Rockville) and one adjacent station (Twinbrook), high population and employment densities, and overall transit coverage of more than 80% of its area. Notable growth is occurring associated with the Rockville Town Center. The City of Rockville has their own Adequate Public Facilities Ordinance.

**B. <u>Forecast of Development Activity</u>**: The RKV Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 3,215 households and 12,230 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 1,738 households and 6,822 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 5,225 households and 11,873 jobs. That amount of growth is high and will result in the RKV area having an increasing share of the total growth in the County particularly over the next 10 years.

| *Source of the Forecasts:* *Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Rockville City** | 24,226 | | 27,441 | | 29,179 | | 34,404 | 74,800 | | 87,030 | | 93,852 | | 105,725 |
| Growth in the Policy Area | | 3,215 | | 1,738 | | 5,225 | | | 12,230 | | 6,822 | | 11,873 | |
| Percent Growth of Area | | 13.3% | | 6.3% | | 17.9% | | | 16.4% | | 7.8% | | 12.7% | |
| Percent of County Growth | | 11.0% | | 10.9% | | 9.1% | | | 19.6% | | 17.8% | | 9.6% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

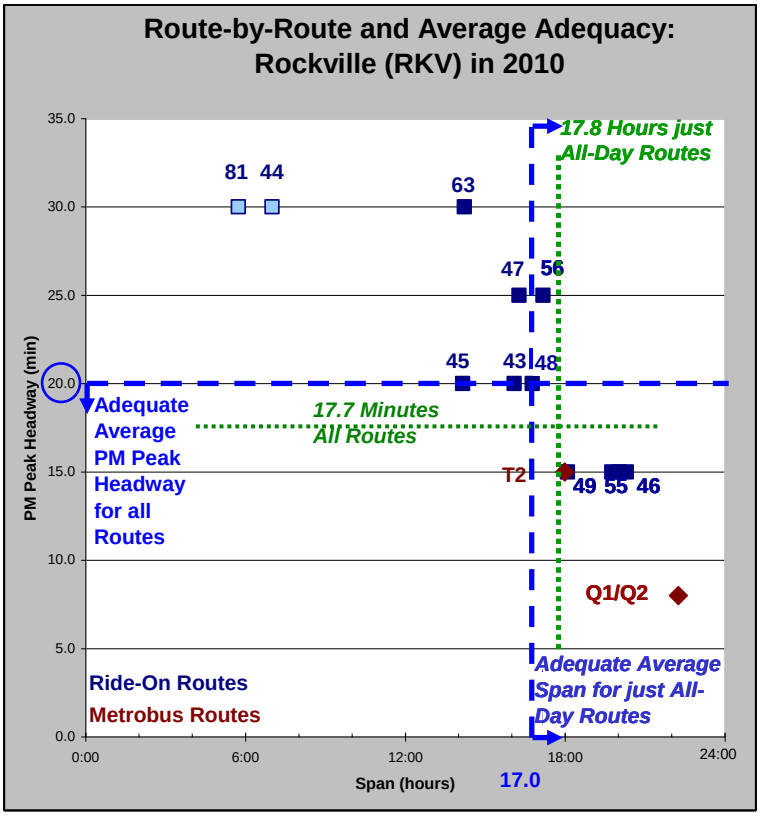
**C. <u>Programmed Transportation Improvements</u>**: There are no programmed projects to improve roadway capacity in the RKV area to address impacts of development in the CIP or CTP. The City of Rockville does have its own CIP and one road project for Southlawn Lane while it would improve safety and access will not add capacity to the over roadway network.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| | | | RKV | | | |




**D. <u>Transit Adequacy Analysis</u>**: The RKV Policy Area includes the Rockville Metrorail Station and parts are within walking distance of two others: Twinbrook and Shady Grove. MARC Commuter Rail and Amtrak service is at the Rockville Station.

**Coverage of Service:** About 80% of the RKV Policy Area is located within 1 mile of a Metrorail station or 1/3 of a mile of one of the 15 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the RKV area. The standard for Coverage for an Urban Policy Area is 80%. Therefore, transit coverage in the RKV Policy Area is adequate.

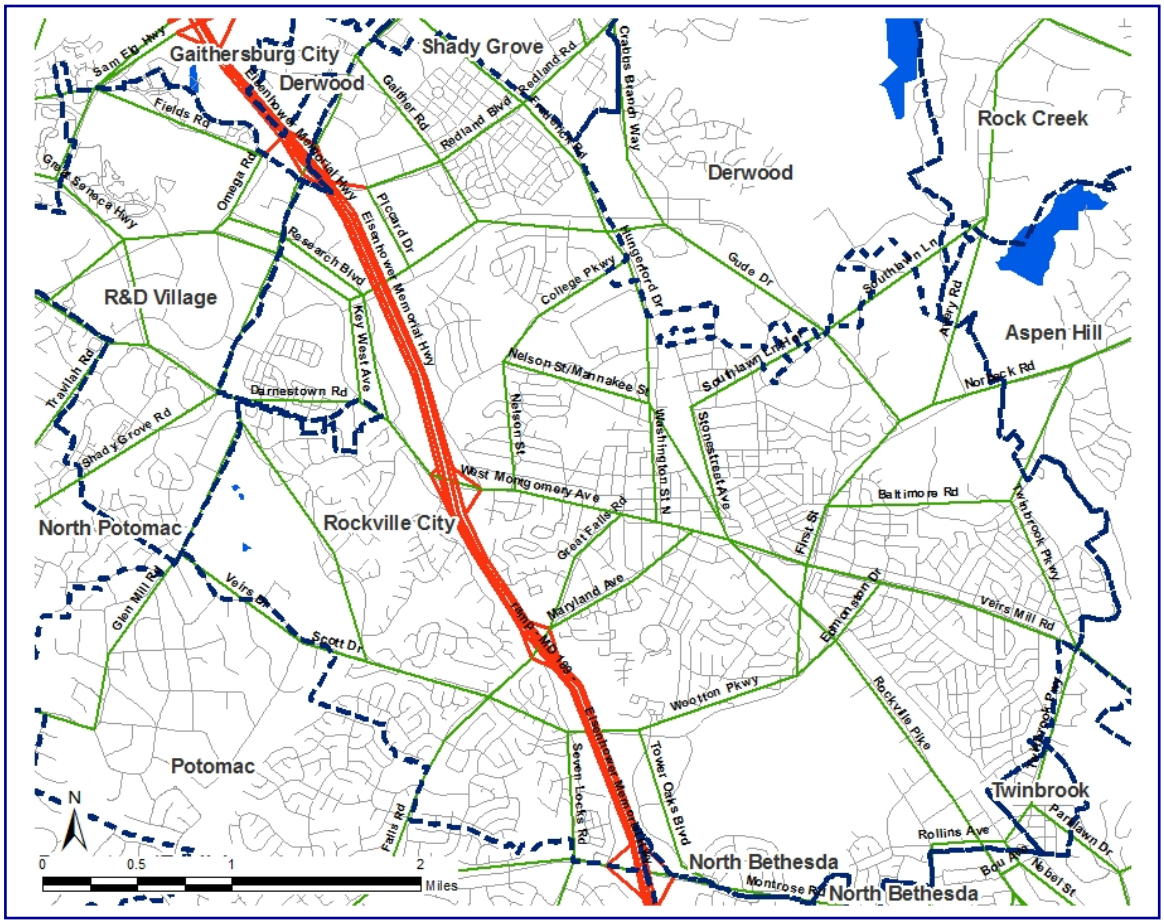



**Peak Headways:** All buses on average provide 21.2 minutes between buses during the weekday evening peak period in the RKV Policy Area. Some provide very frequent service such as the Q1/Q2 Metrobuses. In areas like RKV where Metrorail the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the RKV area is not yet adequate. A conditional countywide project to improve peak headways in other areas could further improve adequacy in the RKV area too.

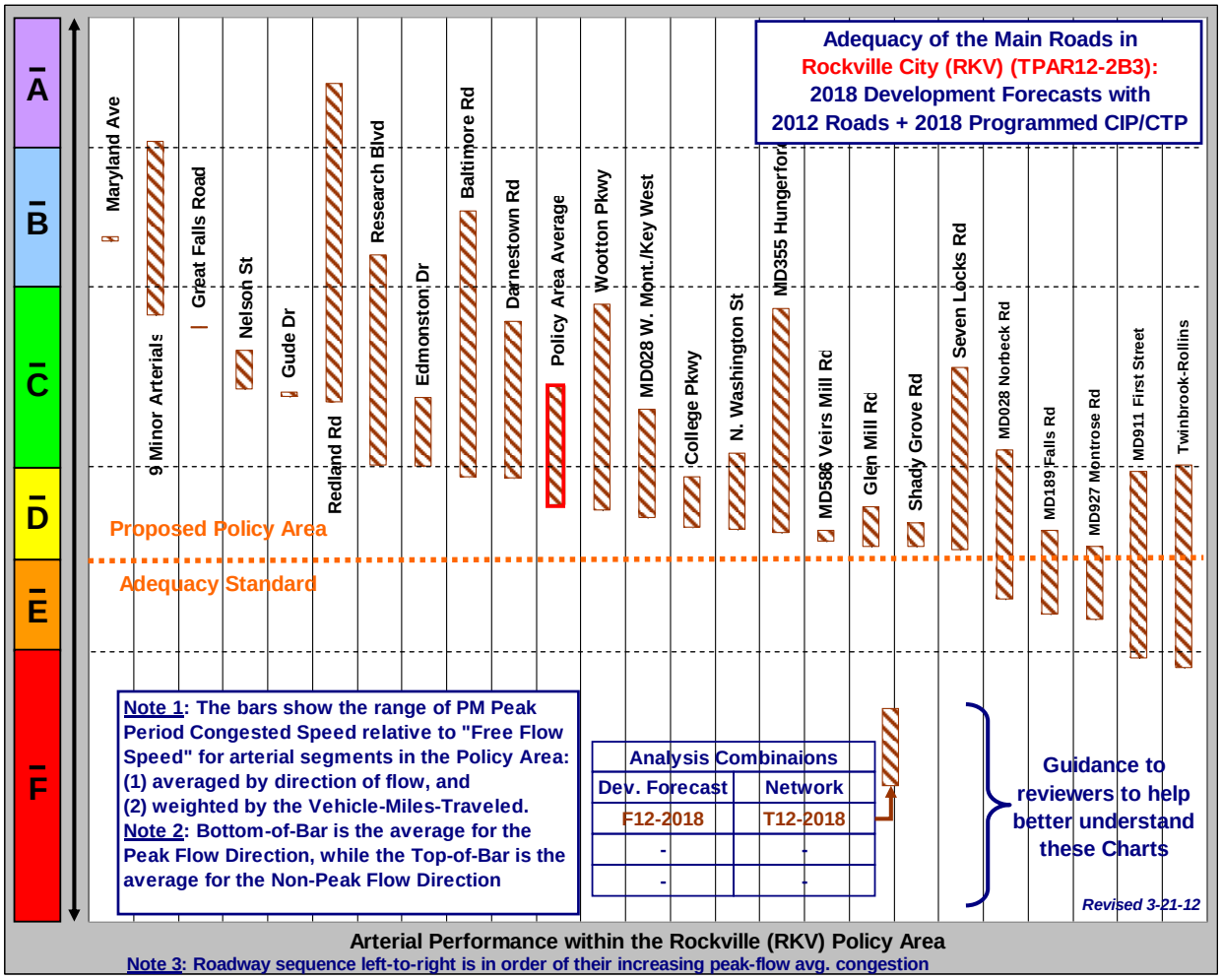
**Span of Service**: The average value of span is 17.8 hours per day for routes that operate all-day. The urban standard is 17.0 hours per day on average for all-day routes. Therefore, transit span in the RKV Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the RKV Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for RKV roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the RKV Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the RKV that were shown in the prior graphic. Towards the left, one of the bars is itself an average, in this case of 9 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

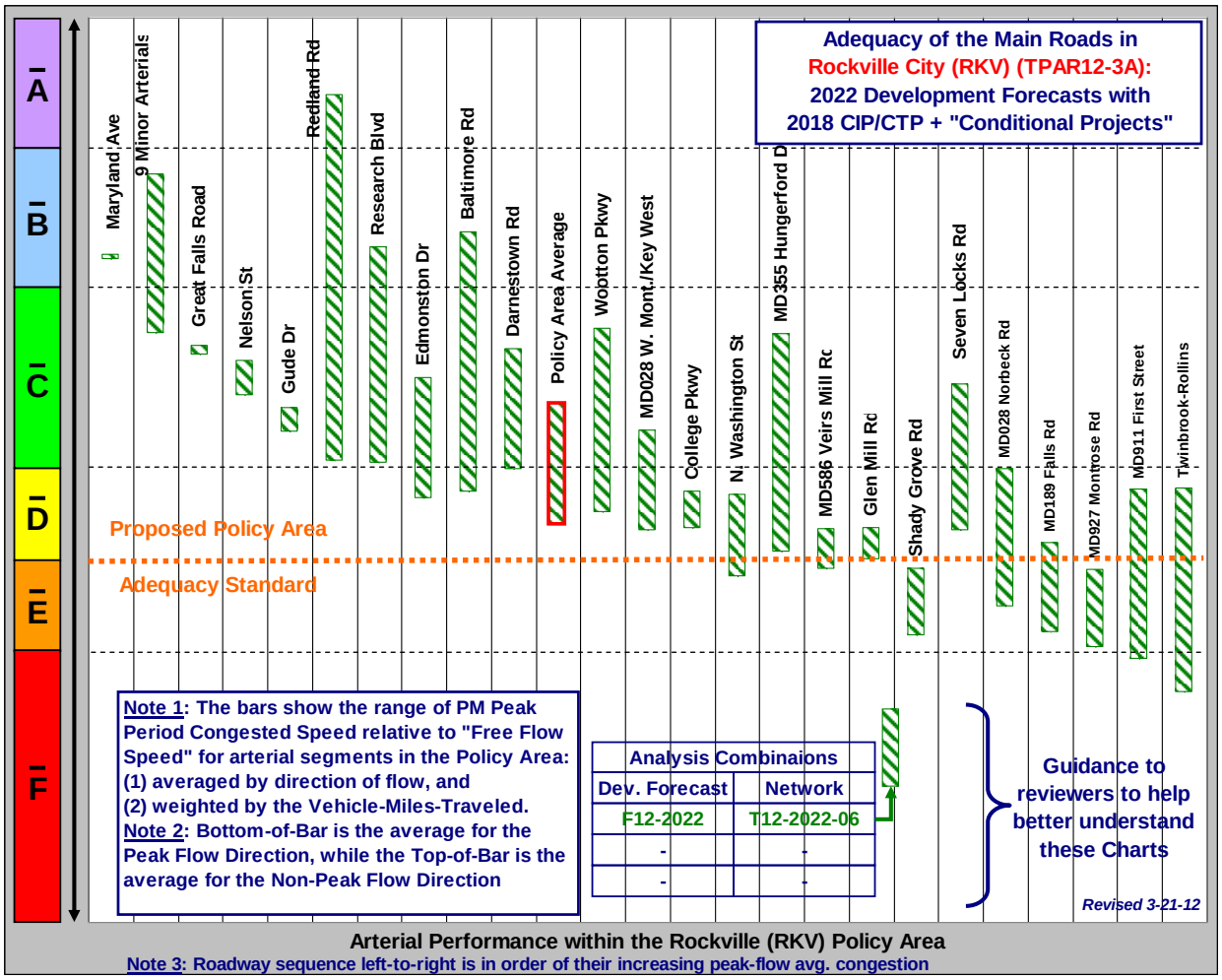
**Assessment of Areawide Roadway Adequacy for the RKV Policy Area**: The overall weighted average for the RKV Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the RKV area. Therefore, the RKV Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the RKV Policy Area**: The prior graphic shows that 18 of the depicted left-most arterial roads (and the 9 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Urban Policy Area, often considerably less. Yet the graphic also shows that there are some 8 other roadway link-segments

in the RKV Policy Area that are more congested than the Standard for an Urban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) Twinbrook Pkwy/Rollons Ave, (b) MD 911 First Street, (c) MD 927 Montrose Rd, (d) MD 189 Falls Rd, and (e) MD 28 Norbeck Rd. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

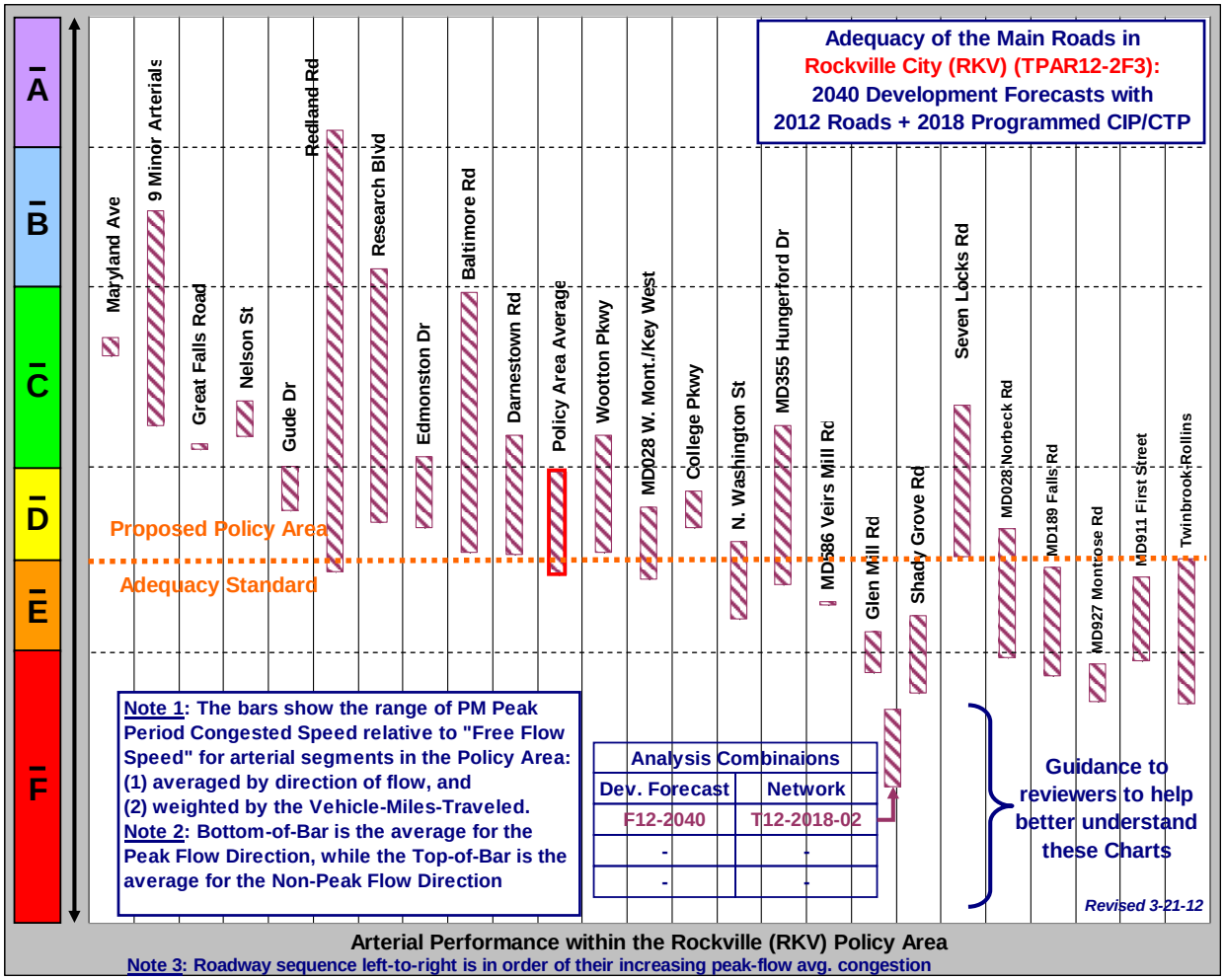
In addition, given the overall high volumes of traffic throughout many parts of the RKV Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the RKV area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements, including turn-lanes at nearby intersections, access or local circulation needs, bus stops, and sidewalks.

**G. <u>Guidance for Conditional Transportation Solutions</u>:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. Green-hatched bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the RKV Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized



While other options to improve the roadway network over the next 10 years in the RKV Policy Area are not being proposed at this time, transit improvements and enhancements as well proactive traffic signal improvements must be undertaken to increase the functioning of the network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways, singularly or in combination should receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the RKV Policy Area would not maintain its overall roadway adequacy into the long term. Further, it can also be seen that many additional roadways would be more congested in the peak direction than the standard for an Urban Policy Area, which implies either that many long-term transportation improvements will be needed or that the forecasts of development activity are too high. The pattern suggests that most roadways in Rockville would be so congested during peak periods in the long-term. In the nearer term emphasis could be given to developing a Rockville-specific Traffic Management and Operations program as well as more a Transportation Demand Management program.



## Derwood Policy Area

**A. <u>Overview of the Policy Area</u>**: Derwood (DER) is categorized as an Urban Policy Area, given the transit and development activity features of the area. This area is characterized by having the Shady Grove Metrorail Station, the terminal of the Red Line with a large number of Park and Ride spaces and a special access roadway from I-370 and MD 200. There is a MARC Commuter Rail and Amtrak Rail station at Washington Grove, which is within the Policy Area. The recently opened MD 200 (Intercounty County Connector) passes through the middle part of the Derwood area and access and egress is provided by an interchange at Shady Grove Road.

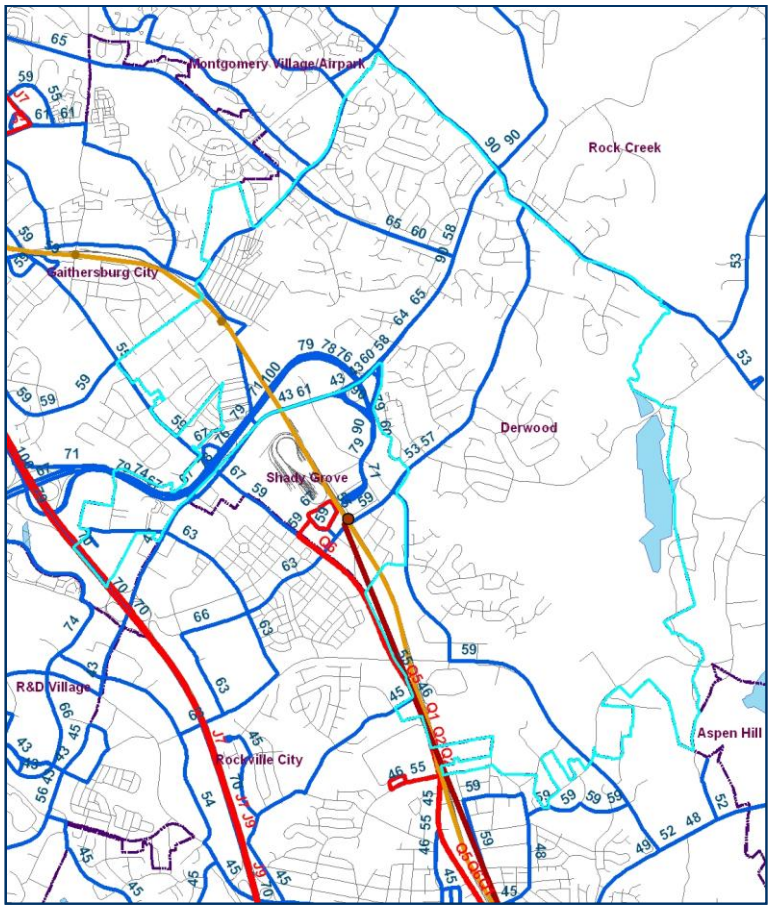
The development in the area is however at present only moderate in terms of population and employment densities. The overall transit coverage is presently less than the standard for an Urban Policy Area, which is having more than 80% of the area with transit service. Notable growth has been occurring in the adjacent Rockville Policy Area associated with the King Farm.

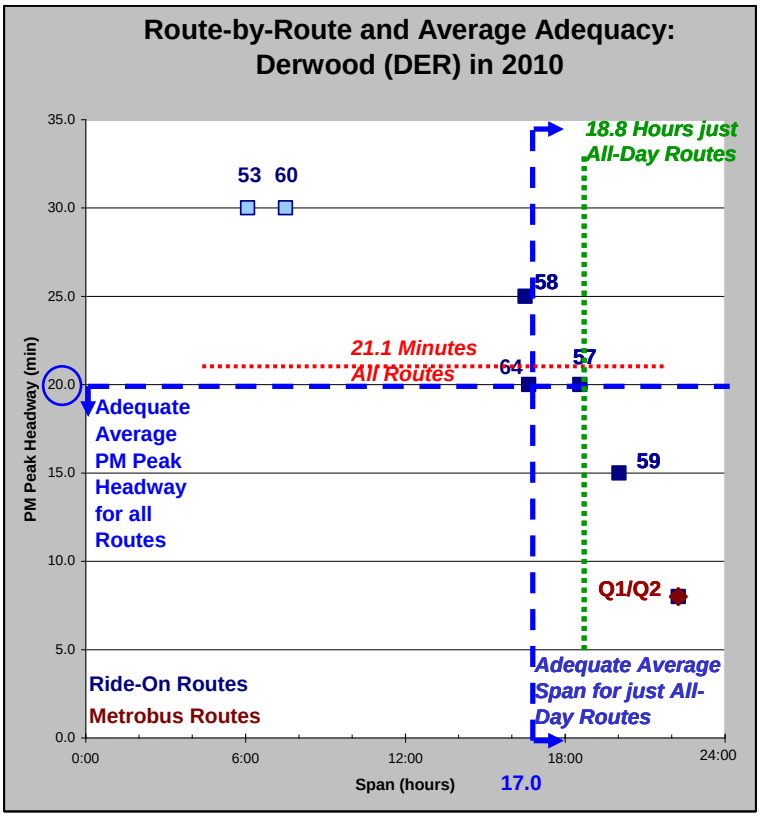
**B. <u>Forecast of Development Activity</u>**: The DER Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 930 households and 58 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 1,578 households and 4,566 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 4,263 households and 6,909 jobs. This growth is high as a percent of current development for the area, but it is on par or slightly increasing relative to the total forecast of growth in the County.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Derwood** | 6,157 | | 7,087 | | 8,665 | | 12,928 | 20,937 | | 20,995 | | 25,561 | | 32,470 |
| Growth in the Policy Area | | 930 | | 1,578 | | 4,263 | | | 58 | | 4,566 | | 6,909 | |
| Percent Growth of Area | | 15.1% | | 22.3% | | 49.2% | | | 0.3% | | 21.7% | | 27.0% | |
| Percent of County Growth | | 3.2% | | 9.9% | | 7.4% | | | 0.1% | | 11.9% | | 5.6% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are two programmed projects that will be improving roadway capacity in the DER area, each associated with parts of Redland Road as noted in the graphic below.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Redland Rd | Crabbs Branch Way to Needwood Rd (4 lanes) | DER | Y | Y | Y |
| CIP | Redland Rd | Needwood Rd to Baederwood Lane (3 lanes) | DER | Y | Y | Y |




**D. <u>Transit Adequacy Analysis</u>**: The DER Policy Area includes the Shady Grove Metrorail Station as well as the nearby Washington Grove Station that is serviced by MARC Commuter Rail and Amtrak.

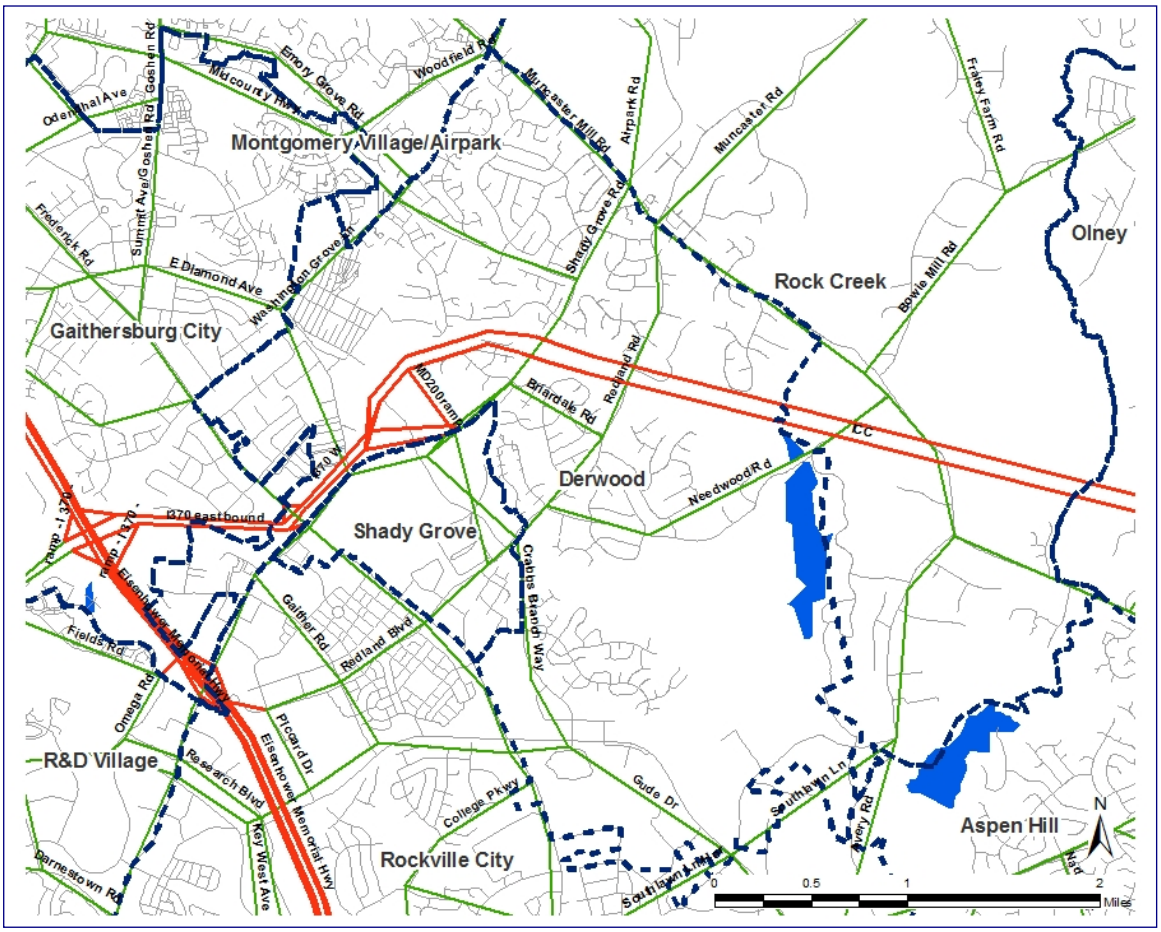
**Coverage of Service:** About 70% of the DER Policy Area is located within 1 mile of a Metrorail station or 1/3 of a mile of one of the 7 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the DER area. The standard for Coverage for an Urban Policy Area is 80%. Therefore transit coverage in the DER Policy Area is nominally not adequate.

**Peak Headways:** All buses on average provide 21.1 minutes between buses during the weekday evening peak period in the DER Policy Area. Some provide very frequent service such as the Q1/Q2 Metrobuses. In areas like DER where Metrorail is provided the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the DER area is not yet adequate. A conditional countywide project to improve peak headways to serve other adjacent and nearby Policy Areas could result within the next 10 years that the DER area could attain Peak Headway adequacy.

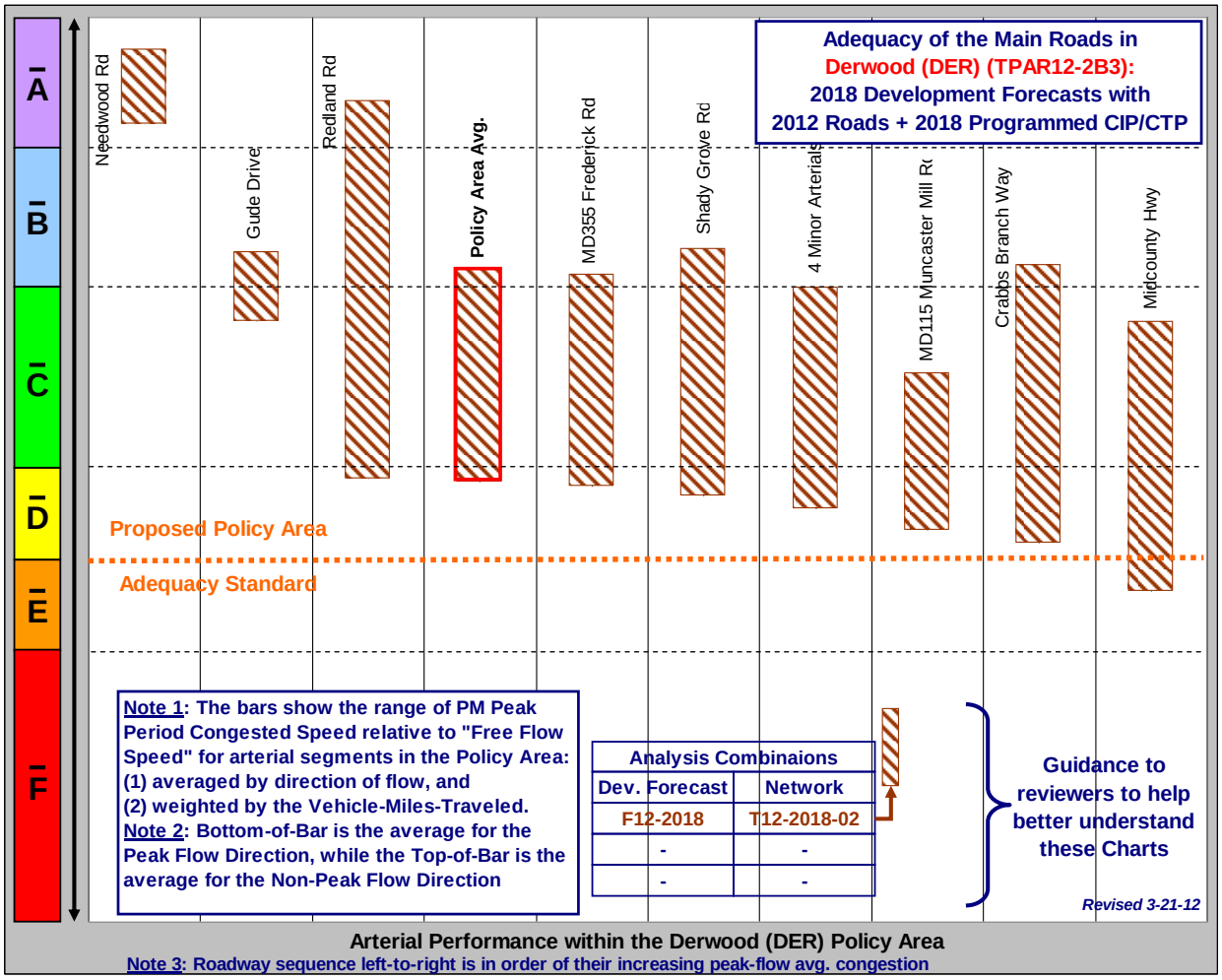
**Span of Service**: The average value of span is 18.8 hours per day for routes that operate all-day. The Urban standard is 17.0 hours per day on average for all-day routes. Therefore, transit span in the DER Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the DER Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for DER roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the DER Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.



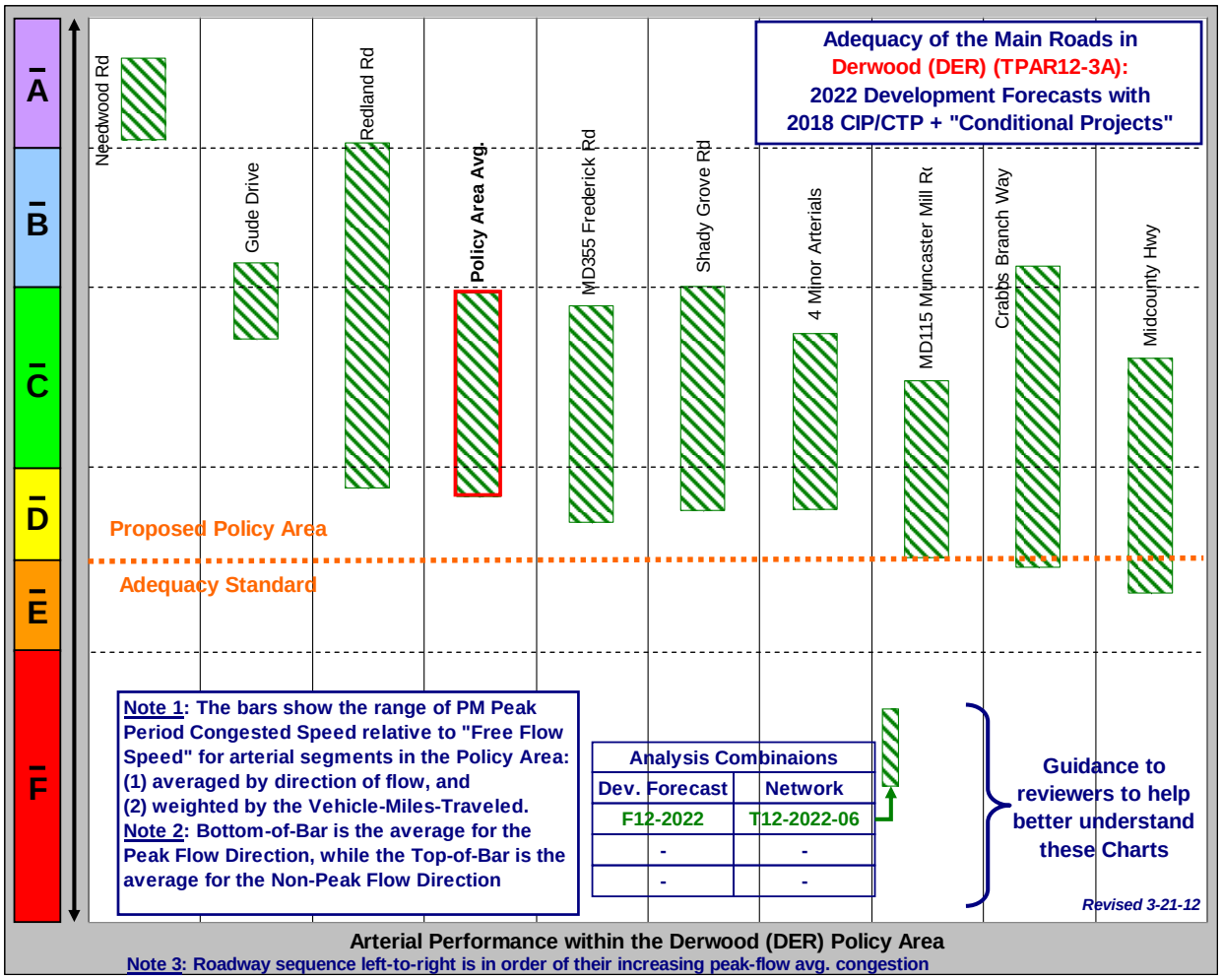

This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the DER that were shown in the prior graphic. One of the bars is itself an average, in this case of 4 minor arterials roads, which is the fourth bar from the right. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

**Assessment of Areawide Roadway Adequacy for the DER Policy Area**: The overall weighted average for the DER Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the DER area. Therefore, the DER Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the DER Policy Area**: The prior graphic shows that all but one of the depicted left-most arterial roads (and the 4 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Urban Policy Area. The graphic also shows that there is only one roadway link-segment in the DER Policy

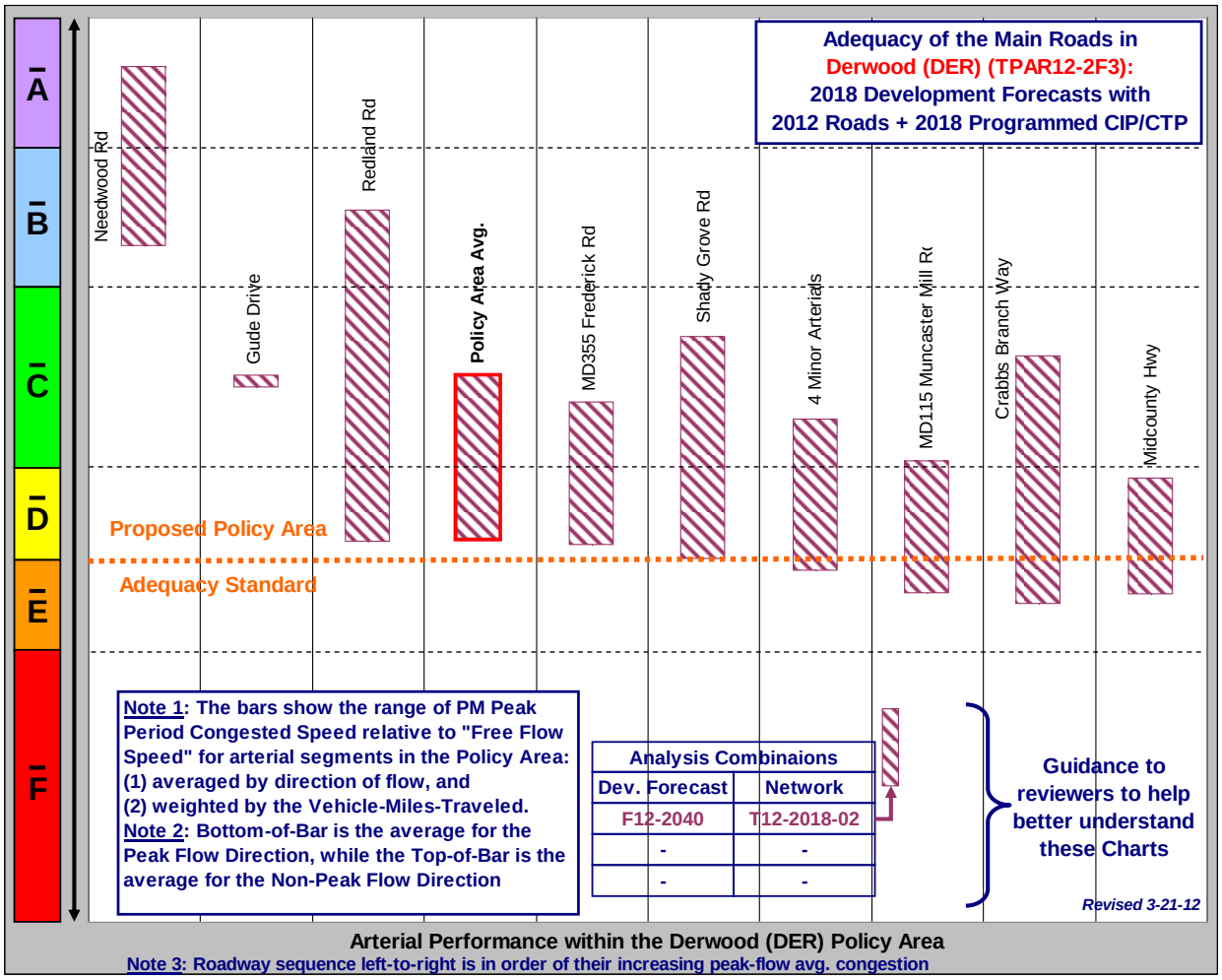
Area that are more congested than the Standard for an Urban Policy Area – which is that of Mid County Highway. Thus locally inadequate congested conditions would be more likely found on in the vicinity of that roadway. Particular attention should be given to the LATRs for proposed subdivisions that would use that arterial road for access to their proposed site. Further, It can be seen that most of the roadways throughout many parts of the DER Policy Area during peak periods would have fairly busy but acceptable traffic flow conditions. Thus, proposed subdivisions that would rely on other arterial roads serving the DER area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. Green-hatched bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the DER Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage. The prior analyses done for the Proposed TPAR in 2010 did consider the extension of Midcounty Highway to become direct access ramps to and from the new Intercounty Connector (MD 200) . While not considered in this Roadway Adequacy Analysis for TPAR12, it could become a future conditional project.



While other options to improve the roadway network over the next 10 years in the DER Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the Derwood Policy Area would maintain its overall roadway adequacy into the long term, it can also be seen that most roadways would be about as congested in the peak direction as the standard for an Urban Policy Area. In the nearer term and mid-term emphasis could be given to developing a Derwood-specific Traffic Management and Operations program as well as a Transportation Demand Management program.



## R&D Village Policy Area

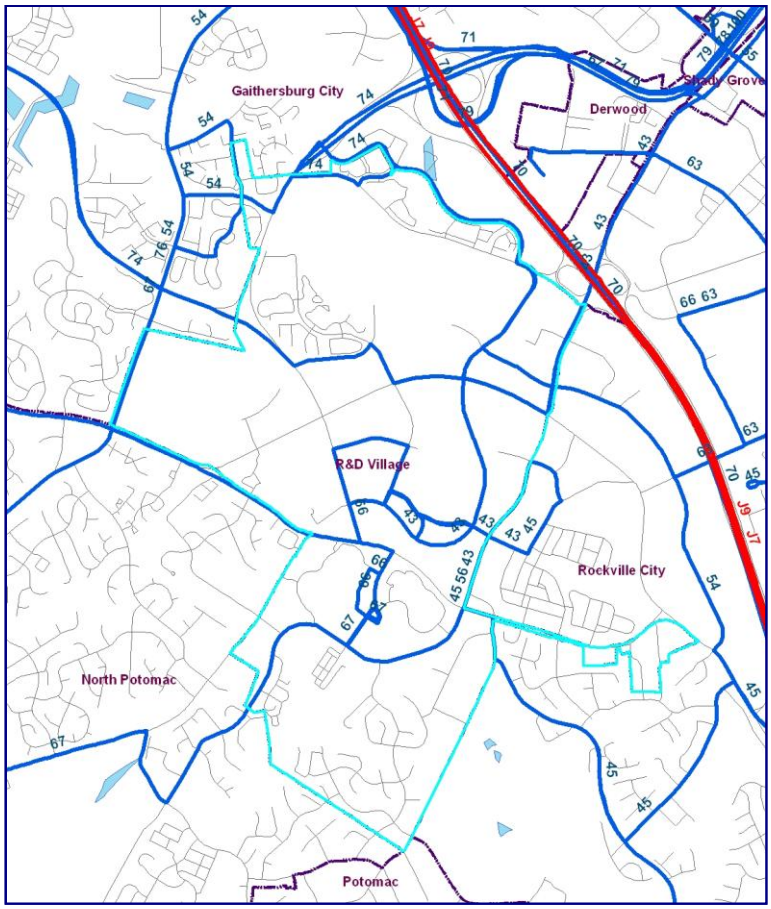
**A. <u>Overview of the Policy Area</u>**: R&D Village (RDV) is categorized as an Suburban Policy Area, given the transit and development activity features of the area. This area has high population and employment densities, and overall transit coverage of more than 30% of its area. Notable growth is occurring associated with the implementation of development projects located in the Life Science Center (LSC). The staging of master-planned development in the LSC is linked to the realization of major transportation-related improvements including: (1) the implementation of phases of the Corridor Cities Transitway (CCT) between the Shady Grove Metro and Clarksburg (2) the achievement of non-auto driver mode share goals and; (3) the implementation of selected arterial roadway improvements.

**B. <u>Forecast of Development Activity</u>**: The RDV Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 1,795 households and 3,604jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 1,442 households and 3,507 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 5,963 households and 14,806 jobs. While the household and job growth is high relative to the current development activity, it is only a moderate but increasing share of the total growth in the County.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **R&D Village** | 2,364 | | 4,159 | | 5,600 | | 9,777 | 20,052 | | 23,656 | | 27,163 | | 41,969 |
| Growth in the Policy Area | | 1,795 | | 1,442 | | 5,963 | | | 3,604 | | 3,507 | | 14,806 | |
| Percent Growth of Area | | 75.9% | | 34.7% | | 106.5% | | | 18.0% | | 14.8% | | 54.5% | |
| Percent of County Growth | | 6.2% | | 9.0% | | 10.4% | | | 5.8% | | 9.1% | | 12.0% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

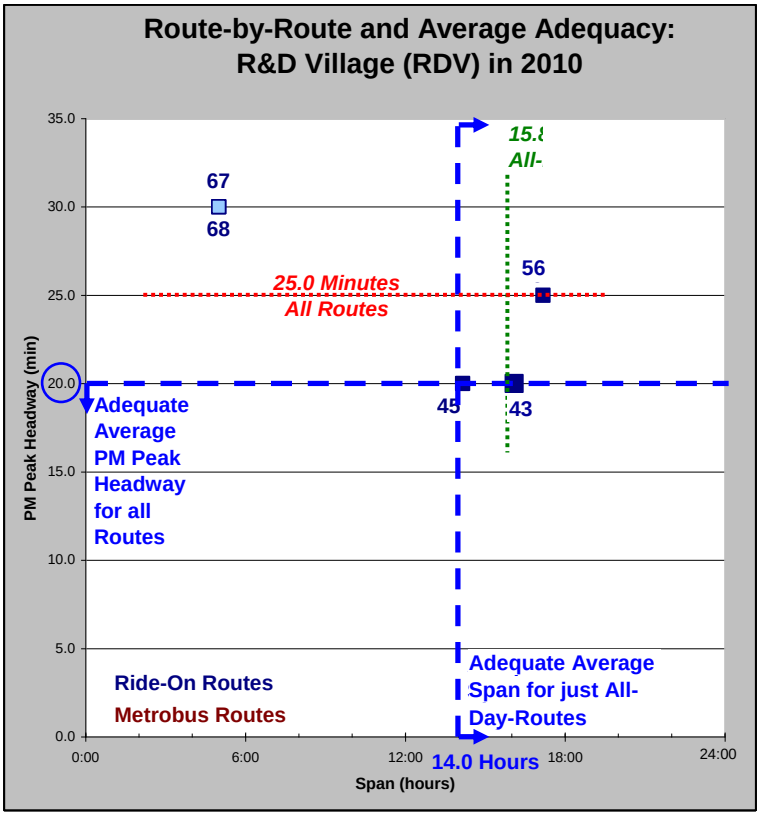
**C. <u>Programmed Transportation Improvements</u>**: There are no programmed projects that serve the RDV area. As also noted in the discussion of other Policy Areas, a "conditional project" has been identified to provide Peak Hour Headway improvements to about a dozen Ride-On routes that currently serve about 8 of the Suburban Policy Areas needing improved Peak Hour Headways to attain the Peak Headway Adequacy Standard. Most of those dozen routes would directly serve more than one Policy Area, as well as indirectly serve a similar number of: (a) other Suburban Policy Areas combined with (b) several of the Urban Policy Areas. Such a "conditional project" could be implemented in a few increments over a few years or all at once. Interim ridership results and user responses to travel surveys would be monitored over time and refinements could be made along the way.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | **Project Name** | **Improvement Type and/or Limits** | **Policy Area** | Open by 2012 | Prog. by 2018 | |
| **CIP** | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | **Countywide** | N | Some | **Y** |




**D. <u>Transit Adequacy Analysis</u>**: The RDV Policy Area would be well served by several stations of the Corridor Cities Transitway (CCT) when it is implemented at a future time.

**Coverage of Service:** About 75% of the RDV Policy Area is located within 1/3 of a mile of one of the 5 bus routes currently serving the area, and with the CCT in place that coverage within a 1/3 mile of a station would increase that percentage. The graphic to the left shows where in particular current bus service coverage is provided in the RDV area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the RDV Policy Area is adequate.

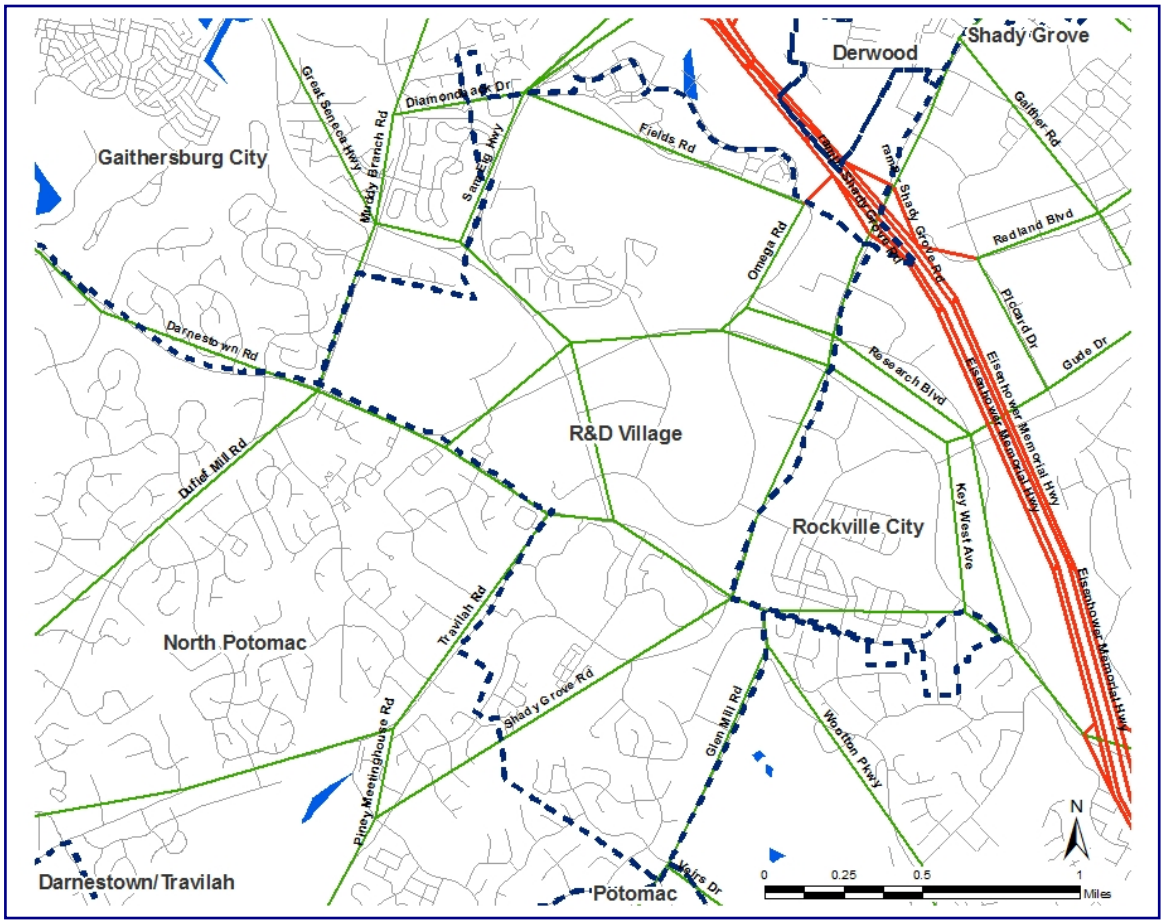



**Peak Headways:** All buses on average provide 25.8 minutes between buses during the weekday evening peak period in the RDV Policy Area. In areas like RDV where future LRT is to be provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the RDV area is not yet adequate. A "conditional" countywide project to improve peak headways could attain adequacy within the next 10 years.

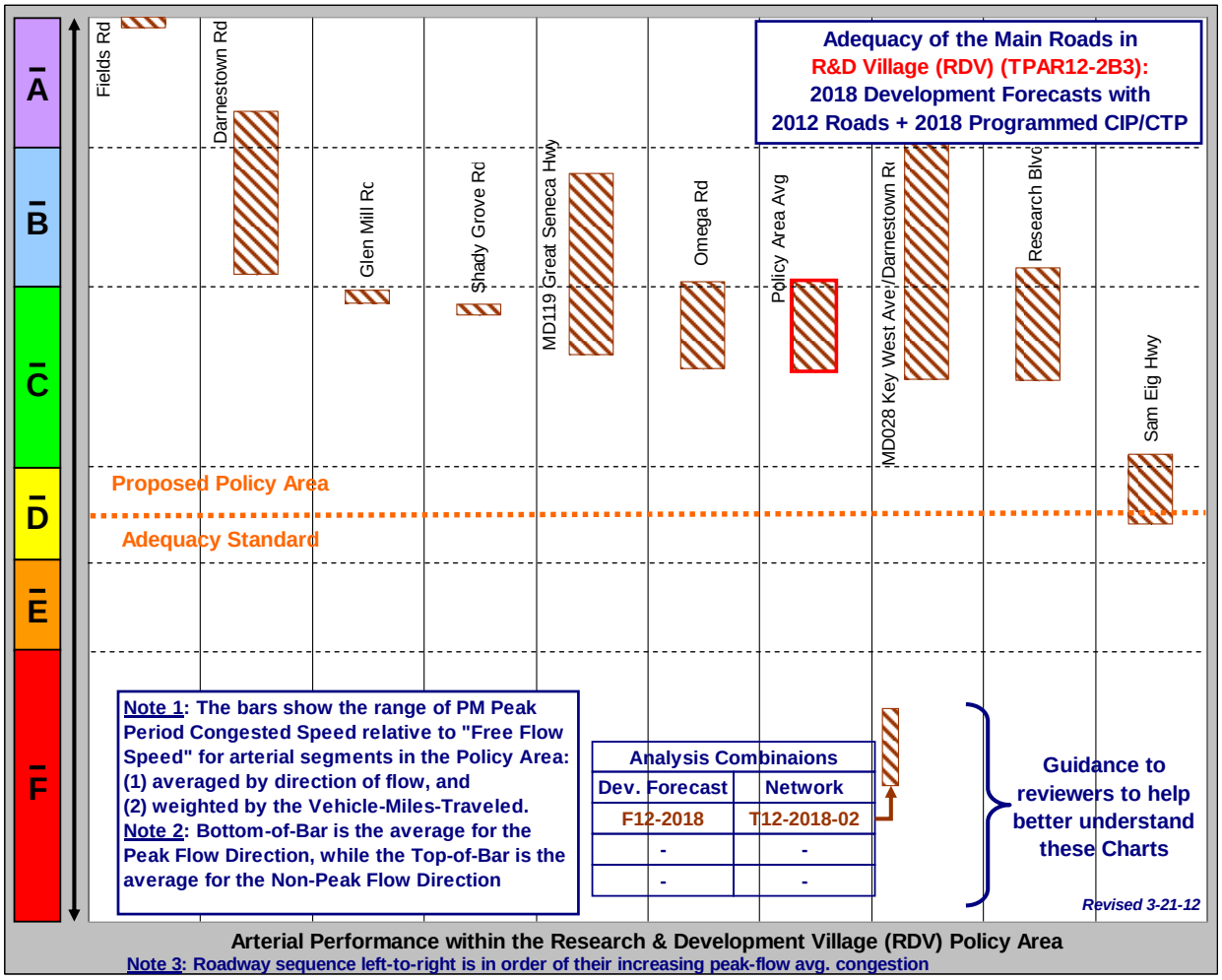
**Span of Service**: The average value of span is 15.8 hours per day for routes that operate all-day. The urban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the RDV Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the RDV Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for RDV roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the RDV Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the RDV that were shown in the prior graphic. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

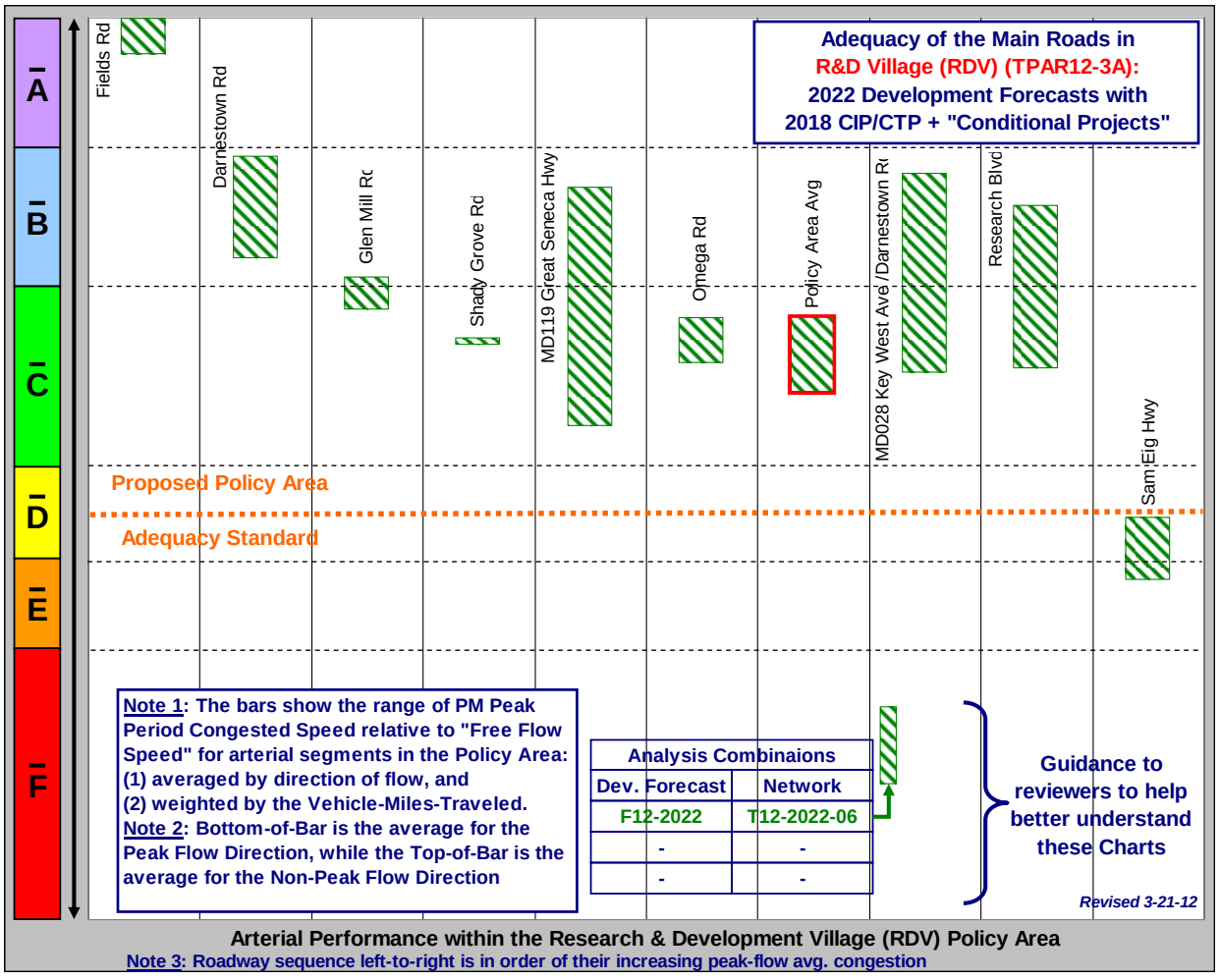
**Assessment of Areawide Roadway Adequacy for the RDV Policy Area**: The overall weighted average for the RDV Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Suburban Policy Areas, such as the RDV area. Therefore, the RDV Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the RDV Policy Area**: The prior graphic shows that none of the depicted left-most arterial roads have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is above, or less congested than the Standard for a Suburban Policy Area, often considerably above. Yet the graphic also shows that there is only one roadway link-segments in the RDV Policy Area that is more congested than the Standard for a Suburban Policy Area. In the prior graphic, locally

inadequate congested conditions would be more likely found associated with parts of Sam Eig Highway. Particular attention should be given to the LATRs for proposed subdivisions that use that arterial road for access to their proposed site.

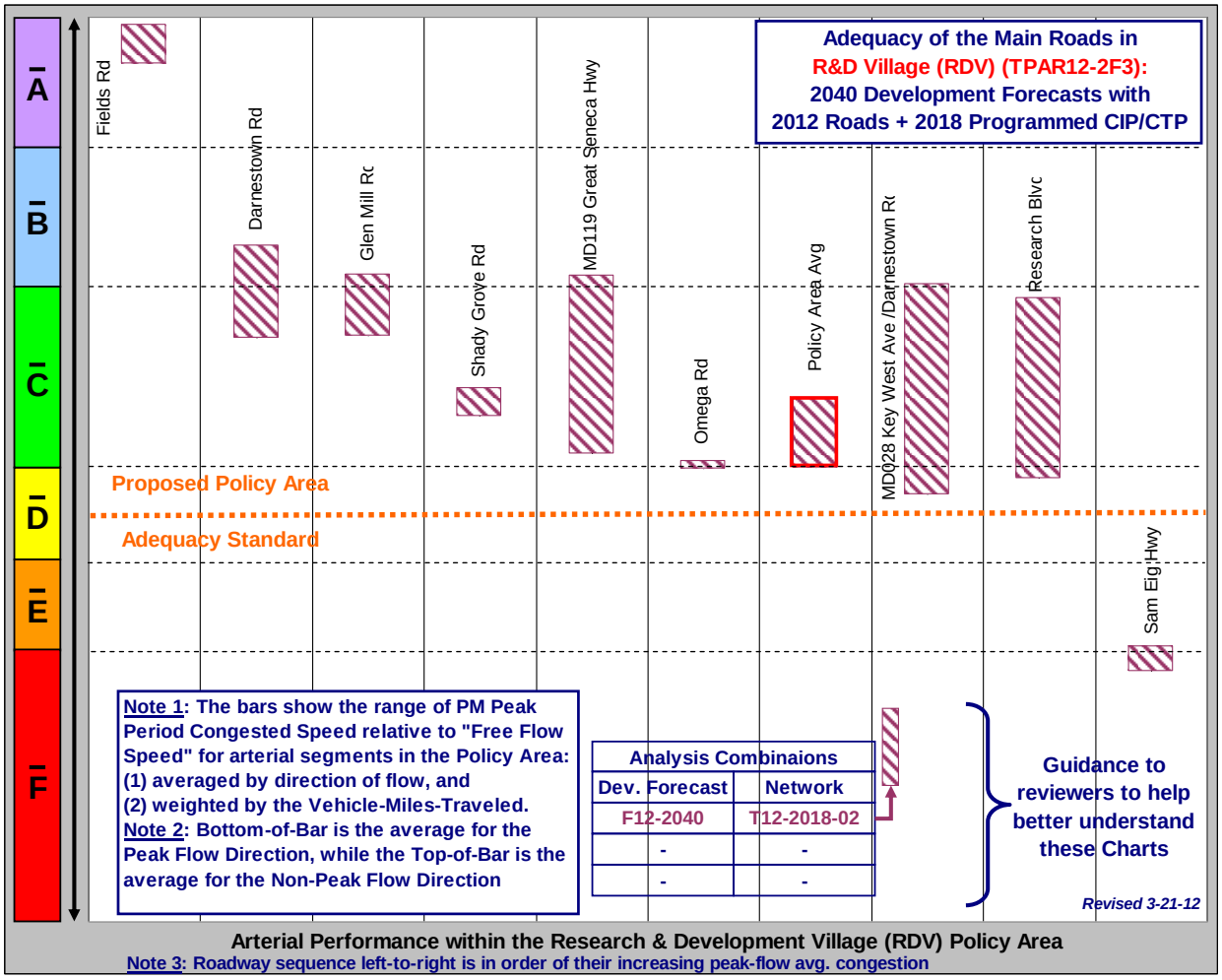
In addition, given the overall moderate to high volumes of traffic throughout many parts of the RDV Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the RDV area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements, including turn-lanes at nearby intersections, access or local circulation needs, bus stops and sidewalks.

**G. <u>Guidance for Conditional Transportation Solutions</u>:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the RDV Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized for this Policy Area at this time.



While other options to improve the roadway network over the next 10 years in the RDV Policy Area are not being proposed at this time, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the RDV Policy Area would continue to maintain its current regulatory stage overall roadway adequacy into the long term master plan stage. However, the main access to and from I-270 would likely be severely congested in the absence of further "conditional projects" from the Master Plan. Given this longer-term outlook, in the nearer term and mid-term, emphasis should be given to developing a R&D Village-specific Traffic Management and Operations program as well as a Transportation Demand Management program.



## Gaithersburg Policy Area

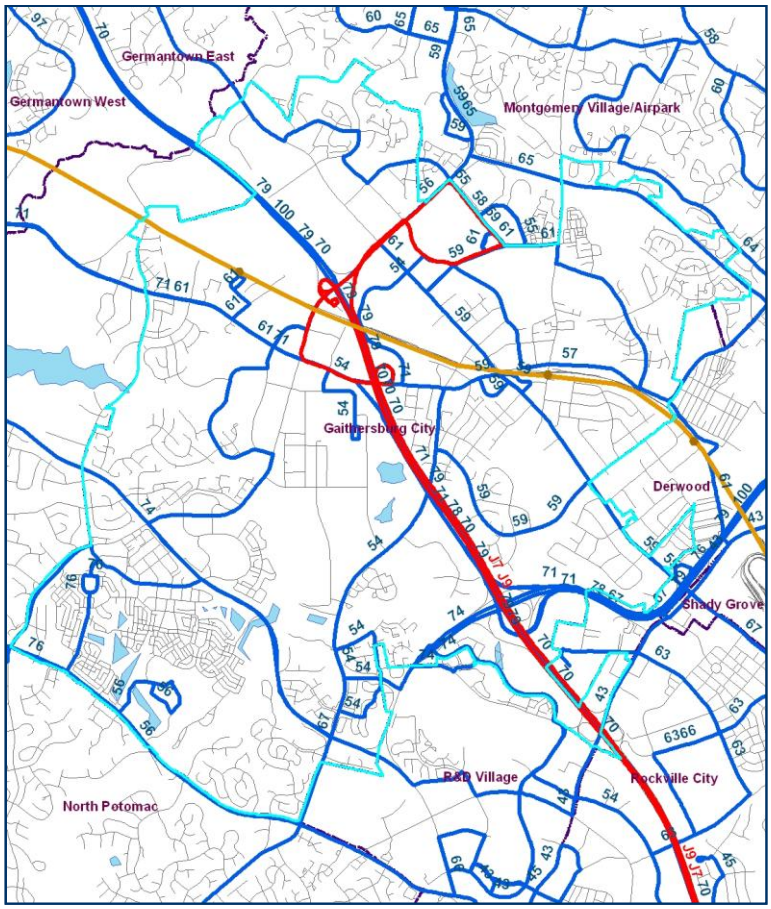
**A. <u>Overview of the Policy Area</u>**: Gaithersburg (GBG) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. This area is characterized by two MARC Commuter Rail – Amtrak stations (Gaithersburg and Metropolitan Grove) as well as a third nearby one at Washington Grove in the adjacent Derwood Policy Area. There are high population and employment densities and overall transit coverage of about 75% of its area. Notable growth has been occurring associated with the Kentlands and Lakelands areas, as well as nearby employment locations. Significant growth is just beginning on the Crown Farm area that has been annexed to be part of the City of Gaithersburg. The City of Gaithersburg exercises development regulation authority over property located within the boundary of that municipality. The County exercises development authority over property located in the non-municipal areas of the Gaithersburg Policy Area.

**B. <u>Forecast of Development Activity</u>**: The GBG Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 969 households and 10,491 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 2,480 households and 2,009 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 6,026 households and 18,289 jobs. While this growth is high, it is also an increasing share of the total growth in the County.

| *Source of the Forecasts*: *Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Gaithersburg City** | 24,182 | | 25,151 | | 27,631 | | 33,657 | 53,185 | | 63,676 | | 65,685 | | 83,974 |
| Growth in the Policy Area | | 969 | | 2,480 | | 6,026 | | | 10,491 | | 2,009 | | 18,289 | |
| Percent Growth of Area | | 4.0% | | 9.9% | | 21.8% | | | 19.7% | | 3.2% | | 27.8% | |
| Percent of County Growth | | 3.3% | | 15.5% | | 10.5% | | | 16.8% | | 5.2% | | 14.8% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

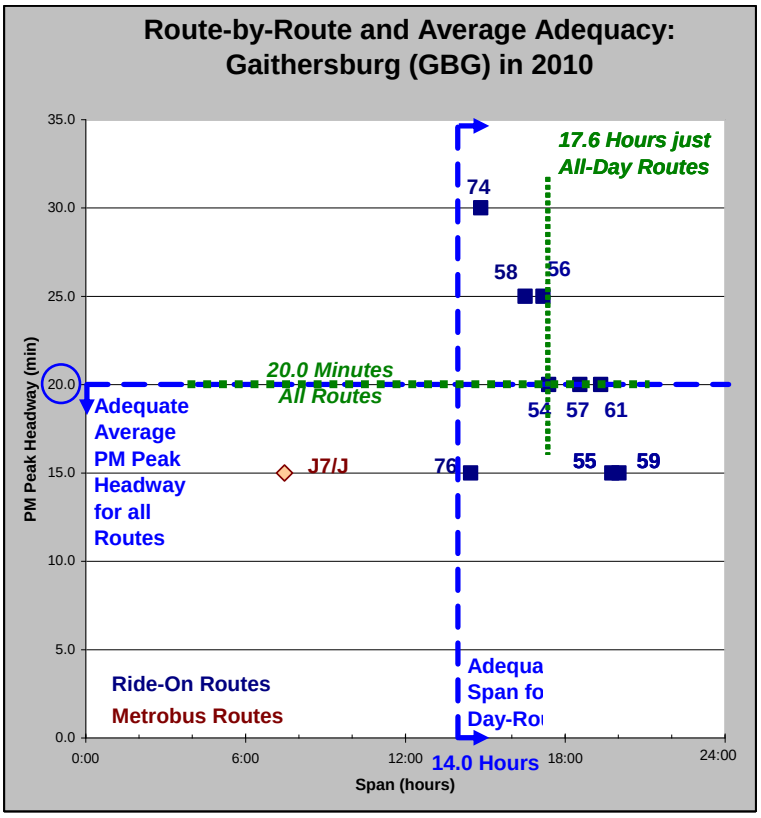
**C. <u>Programmed Transportation Improvements</u>**: There is one programmed project and one proposed "conditional project" in the GBG area, both of which are associated with the extension of Watkins Mill Rd across I-270. The County CIP project will provide roads on each side of I-270 connecting to MD 355 and to MD 117. A subsequent MDOT CTP project would to provide the connecting span over I-270. Providing interchange ramps to and from I-270 would be a future project not proposed as a "conditional project" in TPAR12.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Watkins Mill Rd Extended | MD 355 to MD 117; without a connection yet across I-270 (4 lanes) | GBG | Y | Y | Y |
| CTP | Watkins Mill Rd Bridge of I-270 | *(interchange would be a later project)* | GBG | N | N | **Y** |




**D. <u>Transit Adequacy Analysis</u>:** The GBG Policy Area includes two MARC Commuter Rail – Amtrak stations (Gaithersburg and Metropolitan Grove) and a third nearby at Washington Grove in the Derwood Policy Area. There is also a major commuter Park and Ride lot at I-270 and MD 124 Quince Orchard Rd that is served by the new MDOT/MTA Bus services that use MD 200 and connects to Laurel and Thurgood Marshall Airport.

**Coverage of Service:** About 75% of the GBG Policy Area is located within 1 mile of a Metrorail station or 1/3 of a mile of one of the 10 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the GBG area. The standard for Coverage for an Suburban Policy Area is more than 30%. Therefore transit coverage in the GBG Policy Area is adequate.

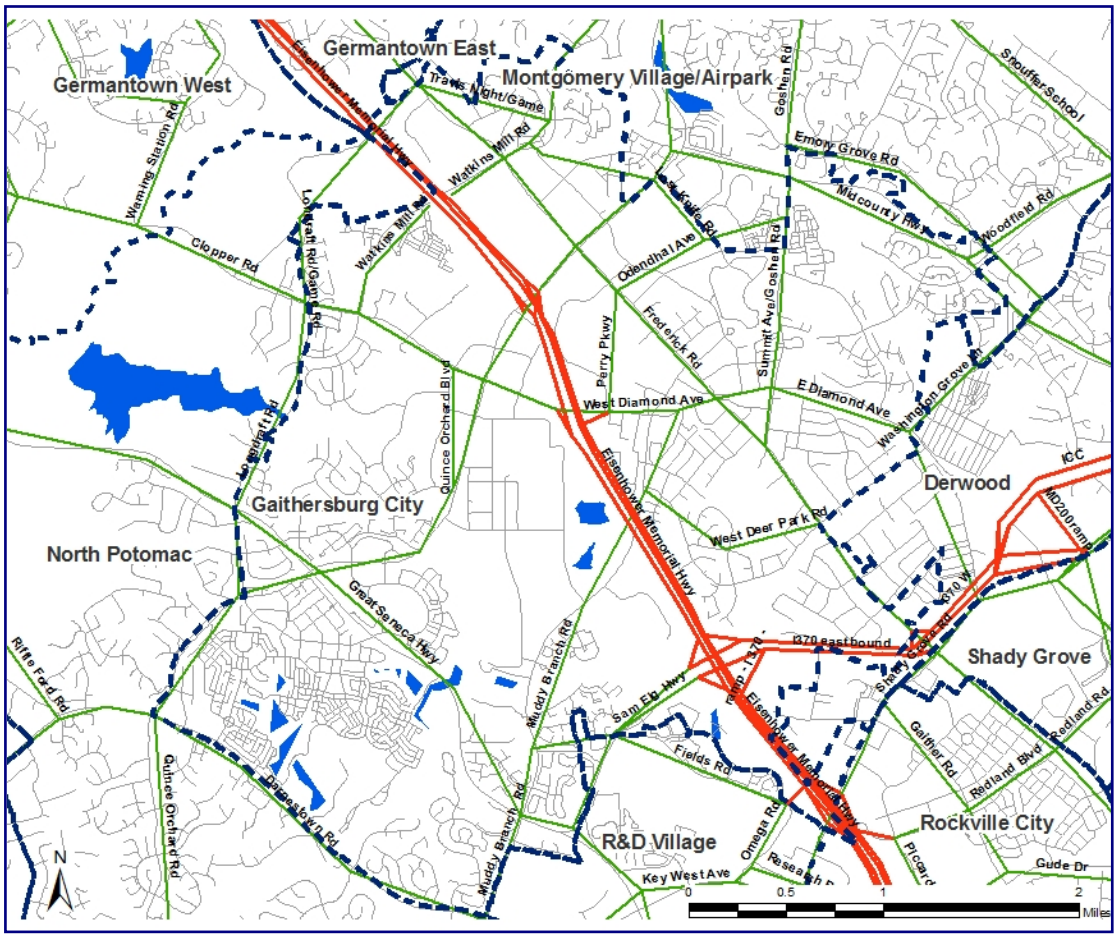



**Peak Headways:** All buses on average provide 20.0 minutes between buses during the weekday evening peak period in the GBG Policy Area. In areas like GBG where commuter rail and bus service is provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the GBG area is adequate. A conditional countywide project to improve peak headways in nearby areas could further improve peak headways within the next 10 years.

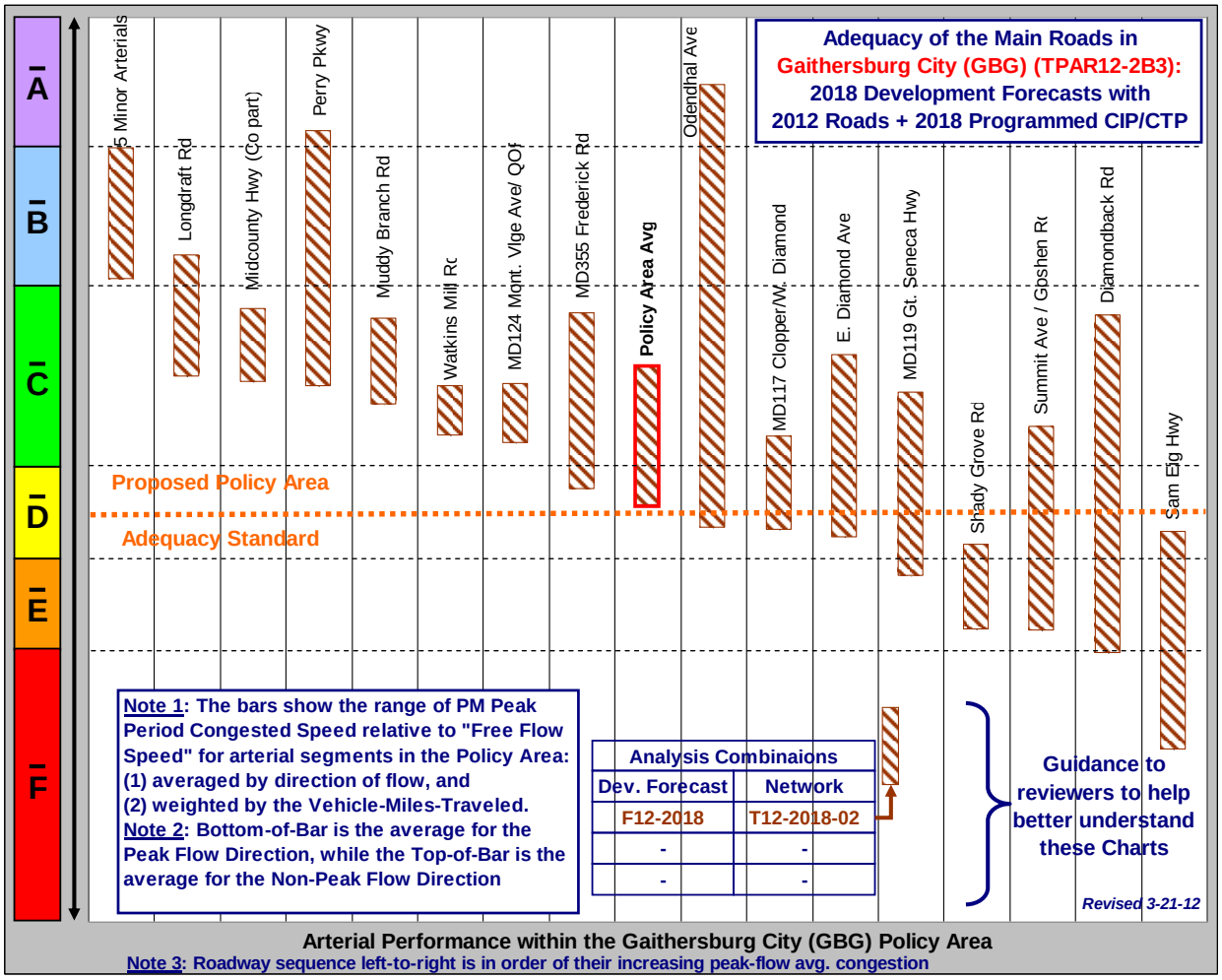
**Span of Service**: The average value of span is 17.6 hours per day for routes that operate all-day. The urban standard is 17.0 hours per day on average for all-day routes. Therefore transit span in the GBG Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the GBG Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for GBG roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the GBG Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.



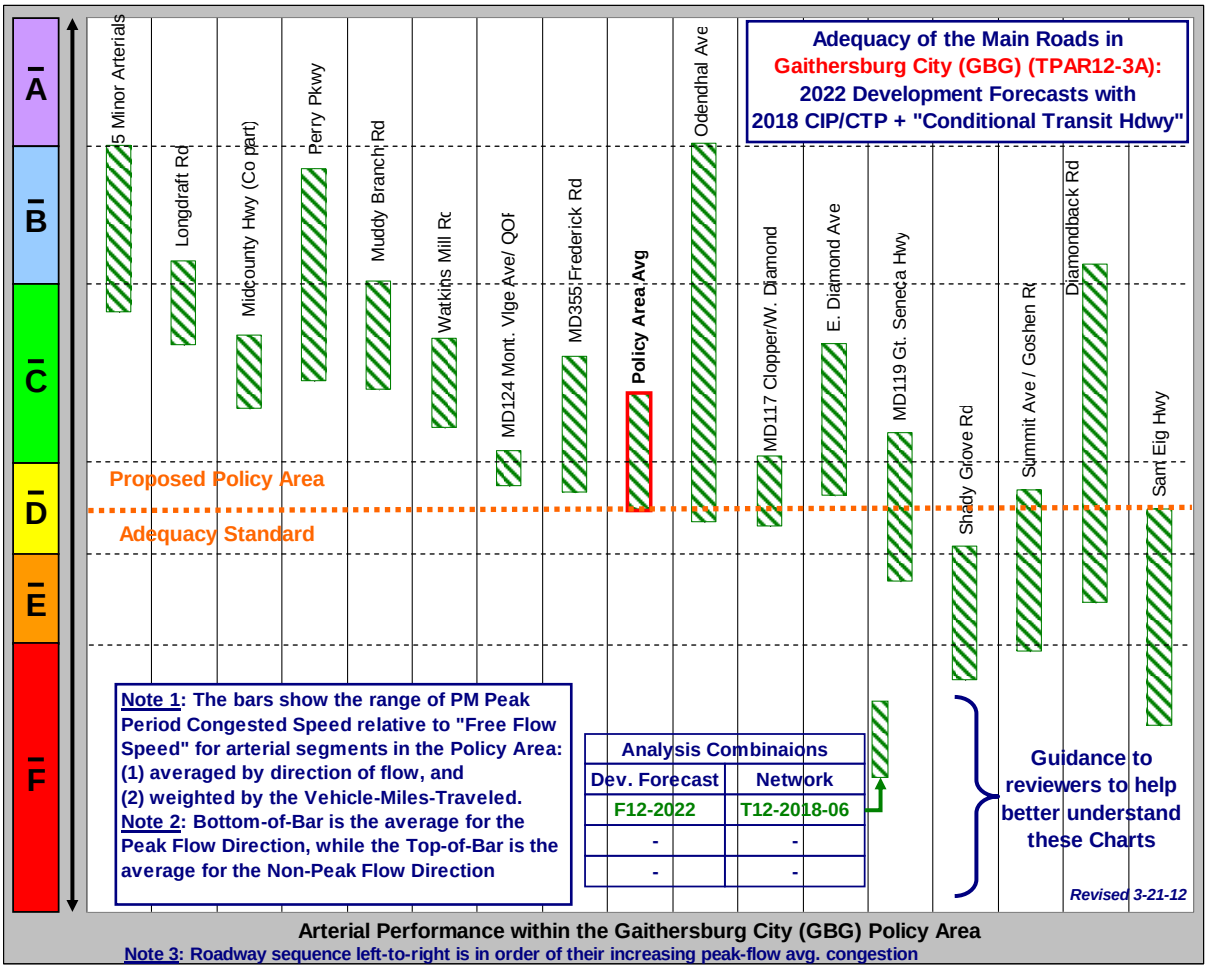

This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the GBG that were shown in the prior graphic. The left-most of the bars is itself an average, in this case of 5 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

**Assessment of Areawide Roadway Adequacy for the GBG Policy Area**: The overall weighted average for the GBG Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the GBG area. Therefore, the GBG Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the GBG Policy Area**: The prior graphic shows that 7 of the depicted left-most arterial roads (and the 5 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Urban Policy Area, often considerably less. Yet the graphic also shows that there are some 8 other roadway link-segments

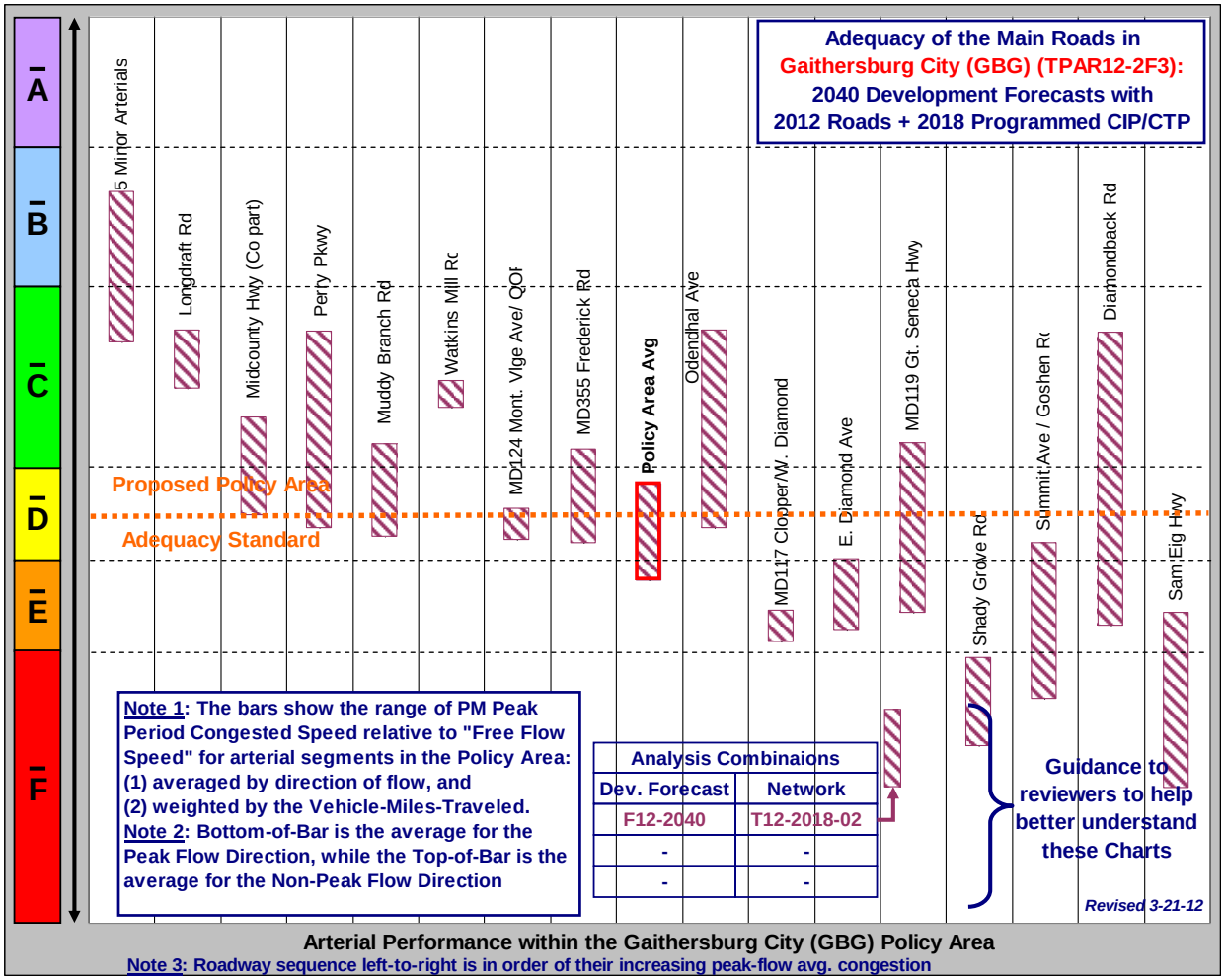
in the GBG Policy Area that are more congested than the Standard for an Urban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) Sam Eig Hwy, (b) Diamondback Rd, (c) Summit Ave/Goshen Rd, (d) part of Shady Grove Rd in the area, (e) MD 119 Great Seneca Hwy, (f) East Diamond Ave, (g) MD 117 Clopper Rd/West Diamond Ave, and (h) Odendhal Ave. Particular attention should be given in the LATRs of the City of Gaithersburg for proposed subdivisions that use those arterial roads for access to their proposed site. In addition, roads in other parts of the GBG Policy Area during peak periods have heavy traffic, and proposed subdivisions that would rely on such other arterial roads serving the GBG area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements, including turn-lanes at nearby intersections, access or local circulation needs, bus stops and, sidewalks.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. Green-hatched bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the GBG Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage. However, as many of the roads are projected to have conditions more congested than the standard, further "conditional projects" need to be identified.



While other options to improve the roadway network over the next 10 years in the GBG Policy Area are not being proposed at this time, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the GBG Policy Area would not maintain its overall roadway adequacy into the long term. Further, it can also be seen that four additional roadways would be more congested in the peak direction than the standard for an Urban Policy Area, which implies either that many long-term transportation improvements will be needed or that the forecasts of development activity are too high. The pattern suggests that most roadways in Gaithersburg would be very congested during peak periods in the long-term. In the nearer term emphasis could be given to developing a Gaithersburg-specific Traffic Management and Operations program as well as a focused Transportation Demand Management program.



## Fairland / White Oak Policy Area

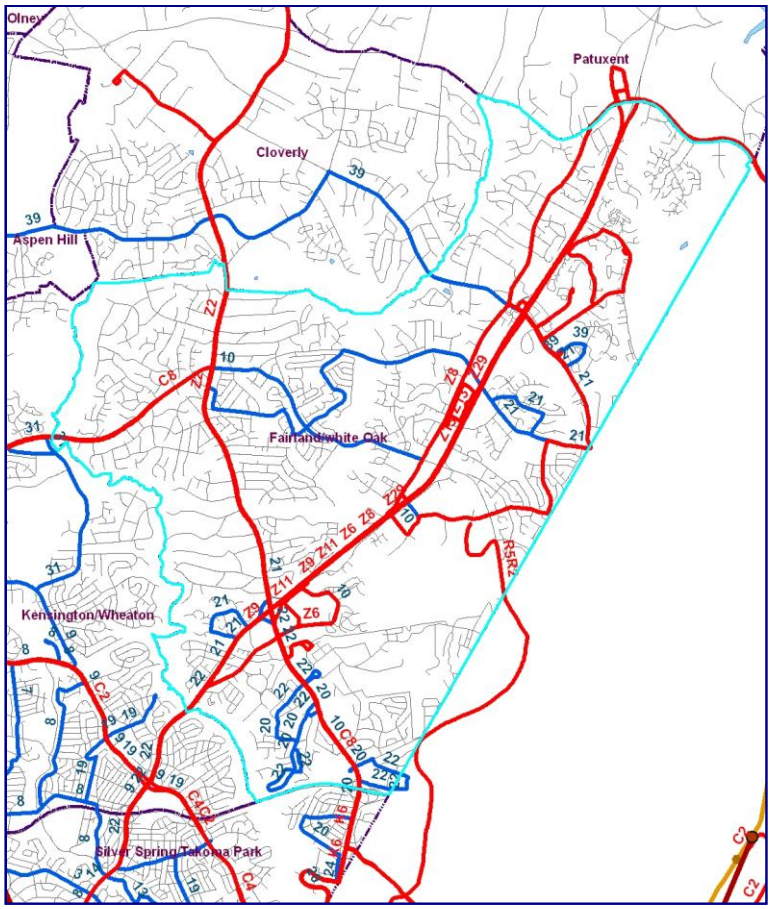
**A. <u>Overview of the Policy Area</u>**: Fairland / White Oak (FWO) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. Has express bus service with several park and ride lots, moderate population and employment densities, and overall transit coverage of more than 30% of its area. Notable employment growth has been occurring at the United States Food and Drug Administration Campus in White Oak and proposals for the White Oak Science Gateway development is likely to a good part of the growth during the next 10-year period.

**B. <u>Forecast of Development Activity</u>**: The FWO Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 366 households and 7,822 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 199 households and 4,118 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 694 households and 6,634 jobs. Further household growth in this area is forecast to be low to moderate but employment growth will be high relative to current employment in the area and be at a faster pace than the total growth in the County, resulting in an increasing share of jobs in this area.

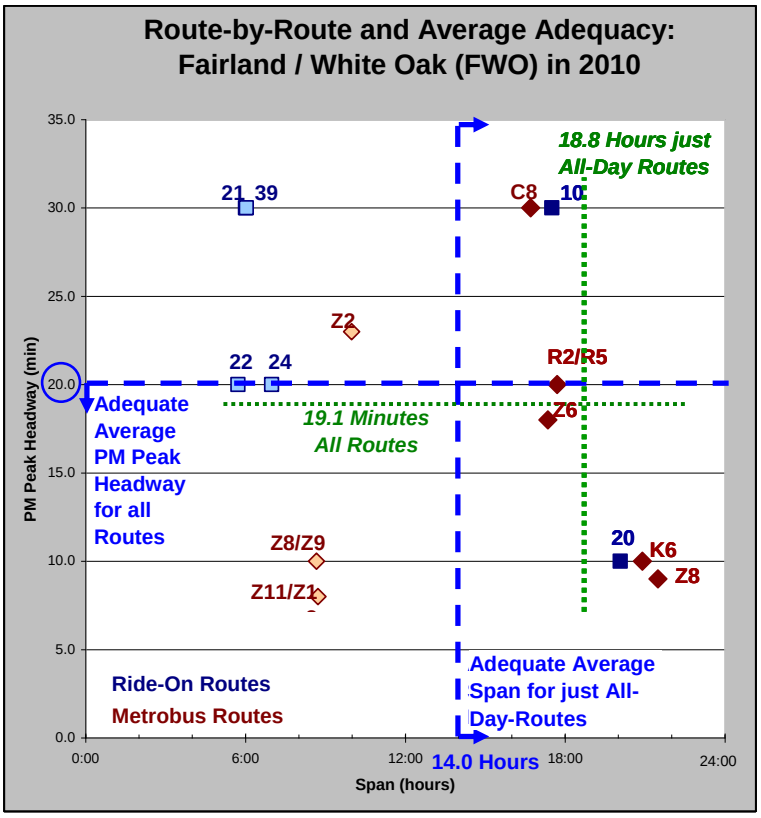
| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Fairland / White Oak** | 28,004 | | 28,370 | | 28,569 | | 29,263 | 30,013 | | 37,835 | | 41,953 | | 48,587 |
| Growth in the Policy Area | | 366 | | 199 | | 694 | | | 7,822 | | 4,118 | | 6,634 | |
| Percent Growth of Area | | 1.3% | | 0.7% | | 2.4% | | | 26.1% | | 10.9% | | 15.8% | |
| Percent of County Growth | | 1.3% | | 1.2% | | 1.2% | | | 12.6% | | 10.7% | | 5.4% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are two programmed projects that would be a modest addition to roadway capacity in the FWO area, one being an extra lane on parts of Fairland Road and the other a short widening of parts of Greencastle Road. In addition, there is a Countywide project associated with MD 200 (the Intercounty Connector) that will extend the new roadway east to connect to US Route 1 in Laurel, which should somewhat shift some travel patterns in the FWO Policy Area.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Fairland Rd Improvement | US 29 to Prince George's County line (3 lanes) | FWO | Y | Y | Y |
| CIP | Greencastle Road | Greencastle Ridge Terrace to Fairland Park Entrance ( 4 lanes) | FWO | Y | Y | Y |




Ride-On Route and # Metrobus Route and #




**D. <u>Transit Adequacy Analysis</u>:** The FWO Policy Area includes express bus service with several park and ride lots particularly along the US 29 Columbia Pike corridor, as well as good local transit service

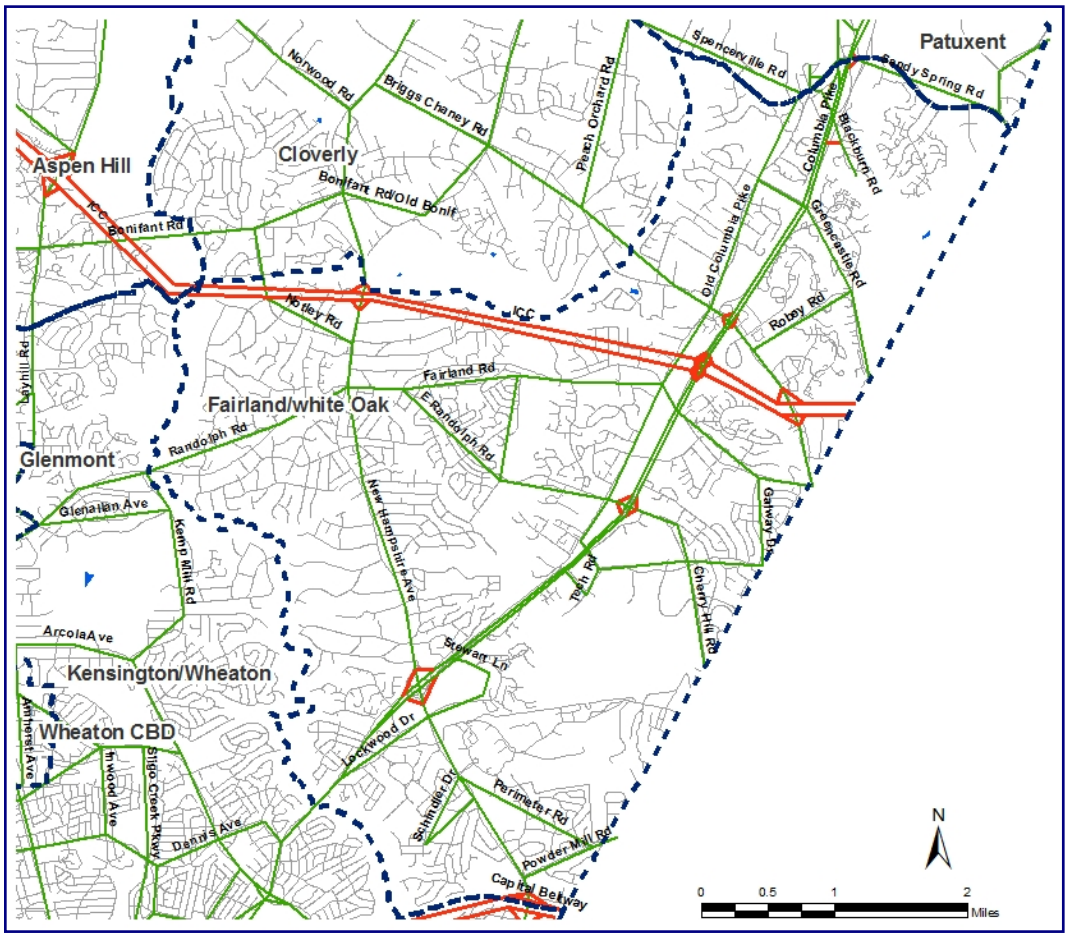
**Coverage of Service:** About 48% of the FWO Policy Area is located within 1/3 of a mile of one of the 14 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the FWO area. The standard for Coverage for a Suburban Policy Area is more than 30% of the area. Therefore transit coverage in the FWO Policy Area is adequate.

**Peak Headways:** All buses on average provide 19.1 minutes between buses during the weekday evening peak period in the FWO Policy Area. Some provide very frequent service such as the K6, or Z8 Metrobuses and the Route 20 Ride-On. In areas like FWO where bus service is provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the FWO area is adequate. A "conditional" county-wide project to improve peak headways in adjacent areas could further improve Peak Headways during the next 10 years.

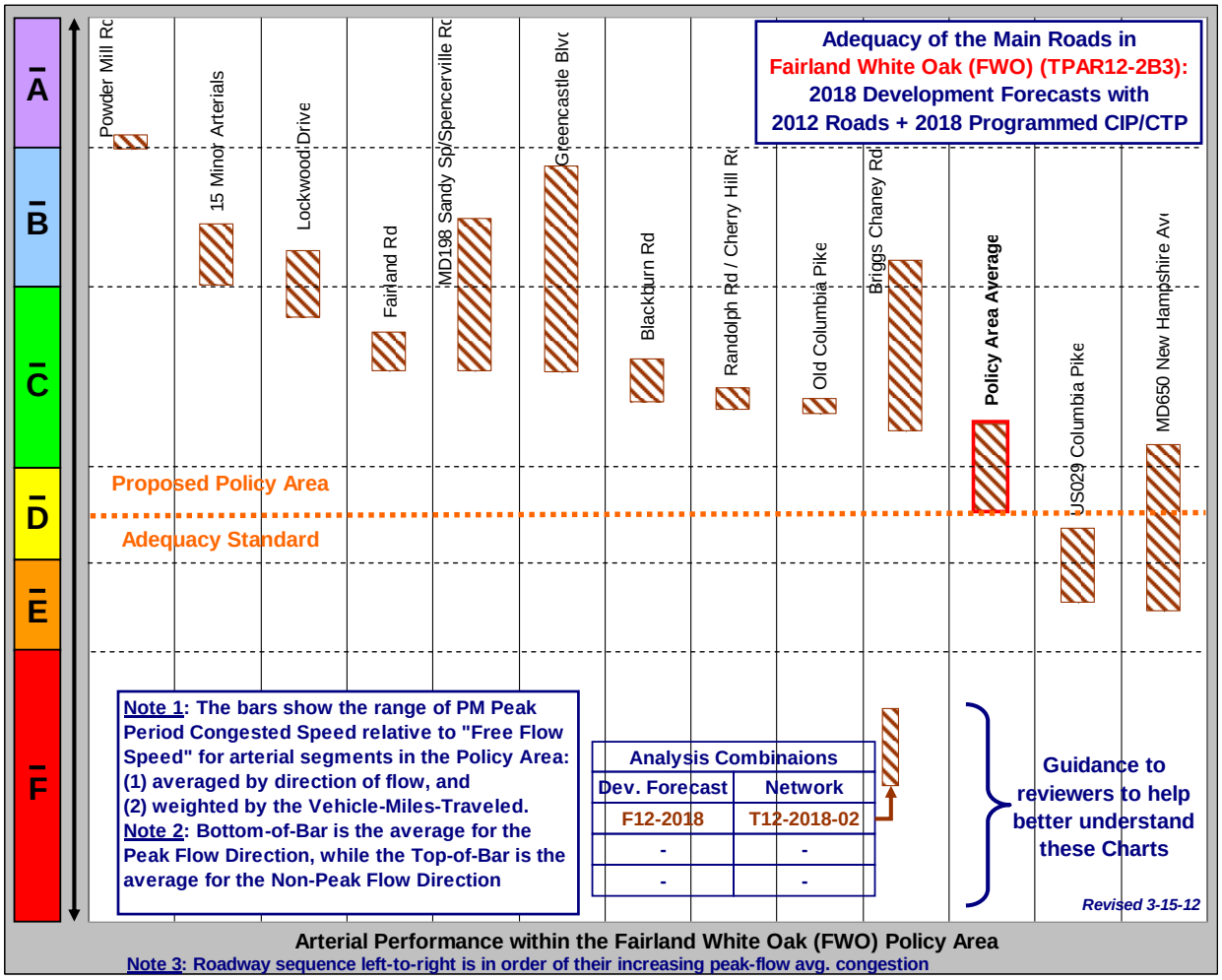
**Span of Service**: The average value of span is 18.8 hours per day for routes that operate all-day. The urban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the FWO Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the FWO Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for FWO roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the FWO Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.



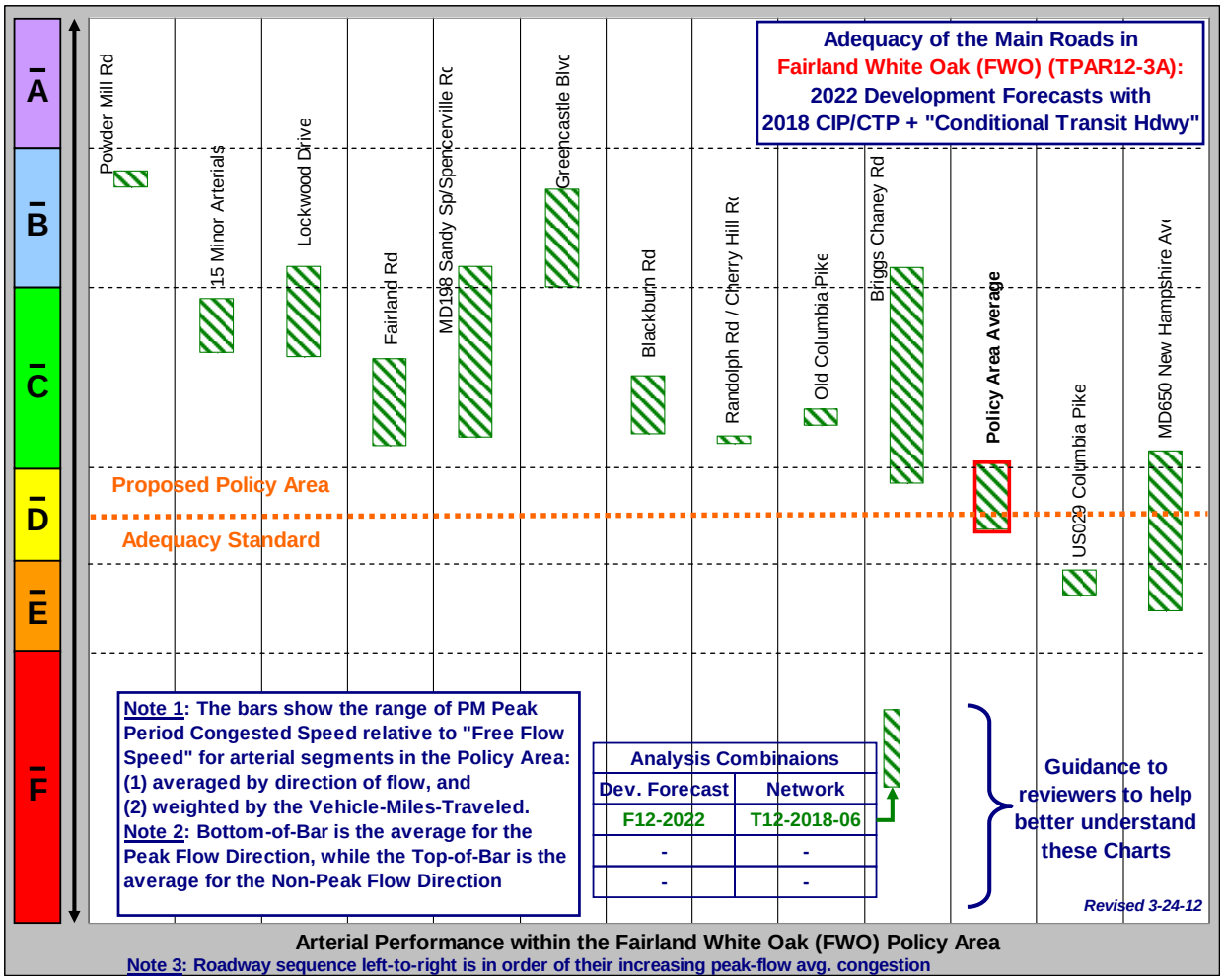

This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the FWO that were shown in the prior graphic. Towards the left, one of the bars is itself an average, in this case of 15 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

**Assessment of Areawide Roadway Adequacy for the FWO Policy Area**: The overall weighted average for the FWO Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is just above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Suburban Policy Areas, such as the FWO area. Therefore, the FWO Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the FWO Policy Area**: The prior graphic shows that 9 of the depicted left-most arterial roads (and the 15 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Suburban Policy Area, often considerably less. Yet the graphic also shows that there are some 2 other roadway link-segments

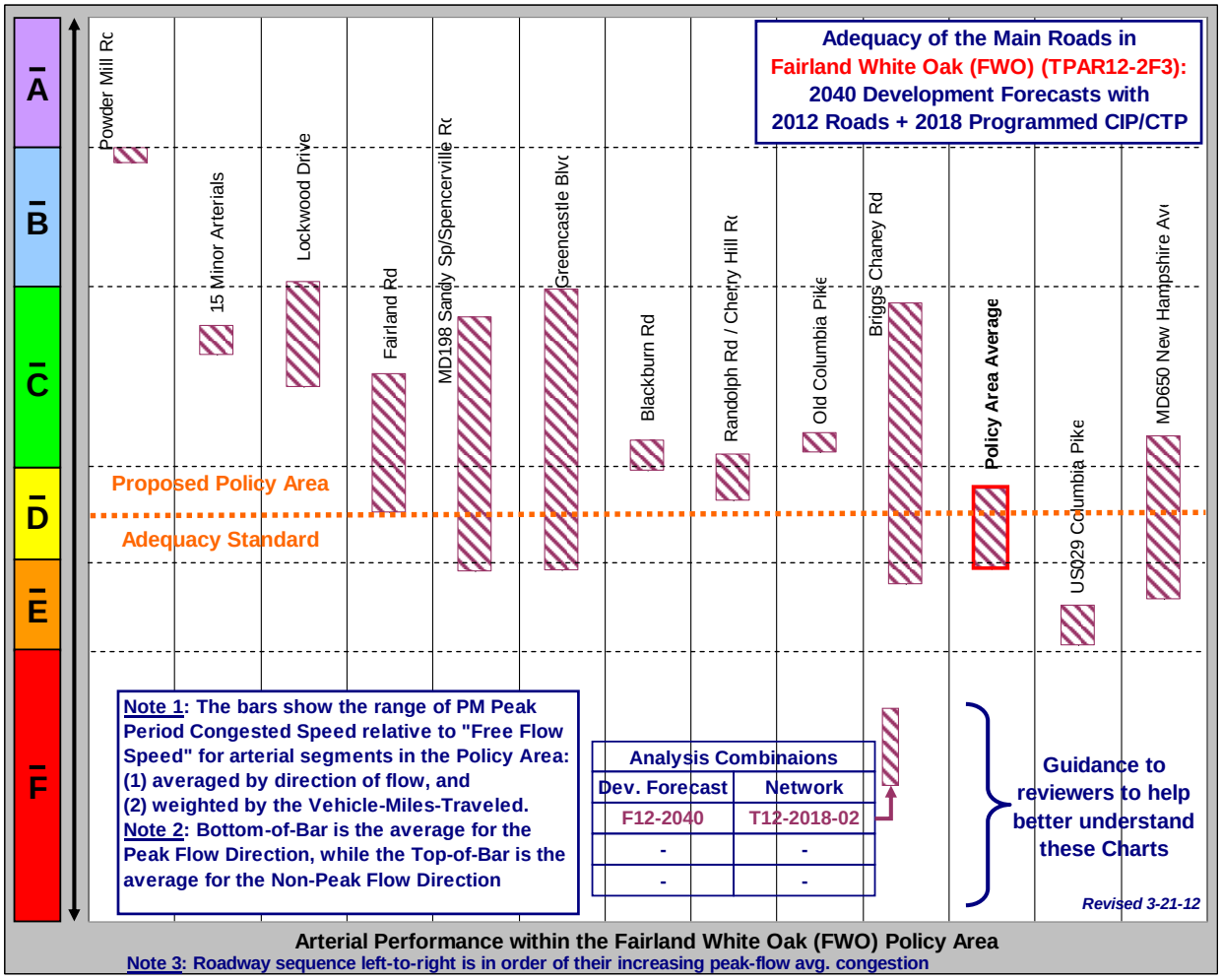
in the FWO Policy Area that are more congested than the Standard for a Suburban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of (a) MD 650 New Hampshire Ave, and (b) US 29 Columbia Pike. Particular attention should be given to the LATRs for proposed subdivisions that use those two major arterial roads for access to their proposed site. In addition, given the overall moderate to high volumes of traffic throughout many parts of the FWO Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the FWO area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. Green-hatched bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated to cause the FWO Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage in the absence of identifying and beginning to program new "conditional projects". The prior analyses done for the Proposed TPAR in 2010 did consider a planned interchange of US 29 with Fairland Road. Although it was not considered in the TPAR12 Roadway Adequacy Analysis, it could become a future project.



While other options to improve the roadway network over the next 10 years in the FWO Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the FWO Policy Area would continue to not maintain its current regulatory stage overall roadway adequacy into the long term master plan stage. It can also be seen that four additional roads would become very congested in the absence of further "conditional projects" from the Master Plan. Given this longer-term outlook, in the nearer term and mid-term emphasis should be given to developing a Fairland White Oak-specific Traffic Management and Operations program as well as a Transportation Demand Management program.



## Germantown West Policy Area

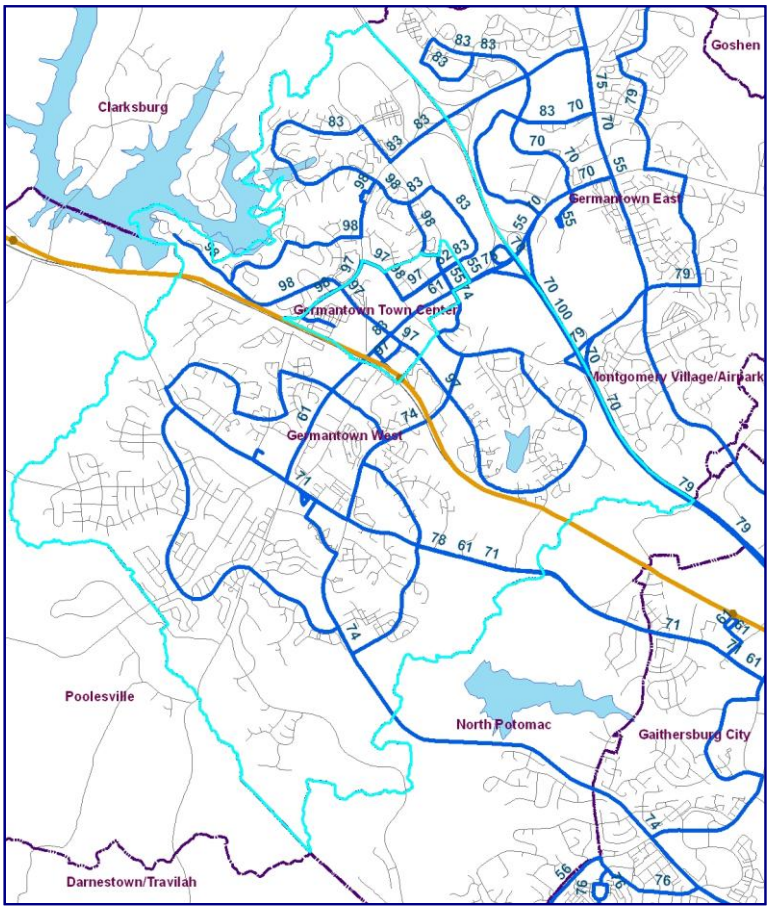
**A. <u>Overview of the Policy Area</u>**: Germantown West (GTW) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. This area is characterized by a MARC Commuter Rail – Amtrak stations (Germantown) and would be served by several stations of the Corridor Cities Transitway (CCT) when it is implemented at a future time. There is high population and moderate employment densities, and overall transit coverage of more than 30% of its area. Notable growth is occurring in the vicinity of the Germantown Town Center Area.…

**B. <u>Forecast of Development Activity</u>**: The GTW Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 894 households and 2,091 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 1,269 households and 2,856 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 5,828 households and 12,208 jobs. While the household growth is low to moderate, and the job growth is high relatively to the current development activity, it is only a moderate but increasing share of the total growth in the County.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Germantown West** | 22,203 | | 23,097 | | 24,366 | | 30,194 | 14,883 | | 16,974 | | 19,830 | | 32,038 |
| Growth in the Policy Area | | 894 | | 1,269 | | 5,828 | | | 2,091 | | 2,856 | | 12,208 | |
| Percent Growth of Area | | 4.0% | | 5.5% | | 23.9% | | | 14.0% | | 16.8% | | 61.6% | |
| Percent of County Growth | | 3.1% | | 7.9% | | 10.2% | | | 3.4% | | 7.4% | | 9.9% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are two programmed projects to improve roadway capacity in the GTW area one to extend and connect Farther Hurley Boulevard to MD 118 Germantown Road, the other a circulation project related to Century Boulevard loop to Crystal Rock Drive. As also noted in the discussion of other Policy Areas, a "conditional project" has been identified to provide Peak Hour Headway improvements to about a dozen Ride-On routes that currently serve about 8 of the Suburban Policy Areas needing improved Peak Hour Headways to attain the Peak Headway Adequacy Standard. Most of those dozen routes would directly serve more than one Policy Area, as well as indirectly serve a similar number of: (a) other Suburban Policy Areas combined with (b) several of the Urban Policy Areas. Such a "conditional project" could be implemented in a few increments over a few years or all at once. Interim ridership results and travel survey user responses would be monitored over time and refinements could be made along the way.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Father Hurley Blvd Extended | Wisteria Dr to Germantown Rd (MD 118) (4 lanes) | GTW | Y | Y | Y |
| CIP | Century Boulevard | Complete connecting loop road to Crystal Rock Drive (4 lanes) | GTW | N | Y | Y |
| CIP | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | [illegible]e | N | Some | Y |

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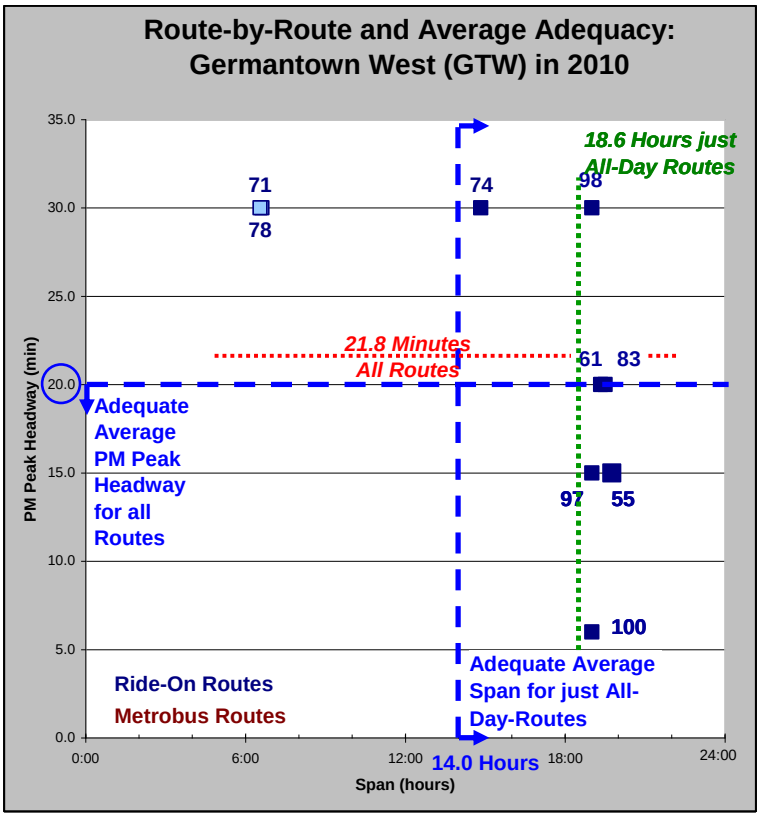



**D. <u>Transit Adequacy Analysis</u>:** The GTW Policy Area is currently well served by Commuter Rail and express bus service to Shady Grove Metro and would be well served by several stations of the Corridor Cities Transitway (CCT) when it is implemented at a future time.

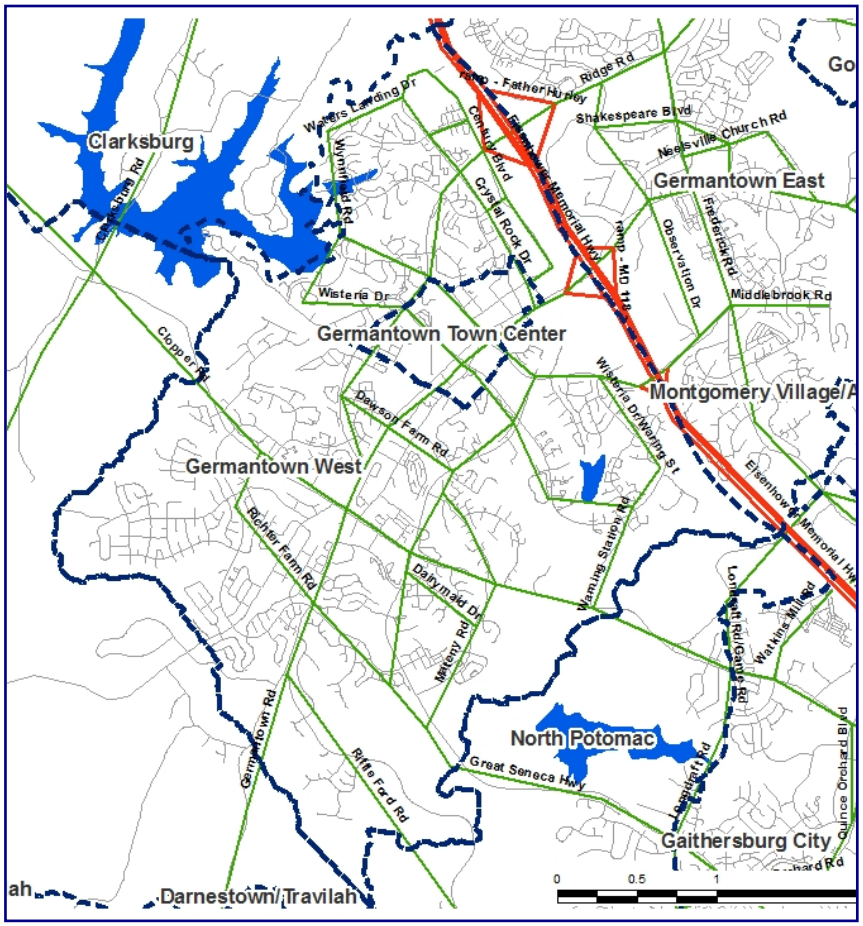
**Coverage of Service:** About 48% of the GTW Policy Area is located within 1/3 of a mile of one of the 9 bus routes or currently serving the area, and with current Commuter Rail the future CCT in place that coverage within a 1/3 mile of a station would increase that percentage. The graphic to the left shows where in particular bus service coverage is provided in the GTW area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the GTW Policy Area is adequate.

**Peak Headways:** All buses on average provide 21.8 minutes between buses during the weekday evening peak period in the GTW Policy Area. Some provide very frequent service such as the Route 100 Ride-on buses. In areas like GTW with Commuter Rail and future LRT, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the GTW area is not yet adequate. A "conditional" countywide project to improve peak headways could attain adequacy within the next 10 years.

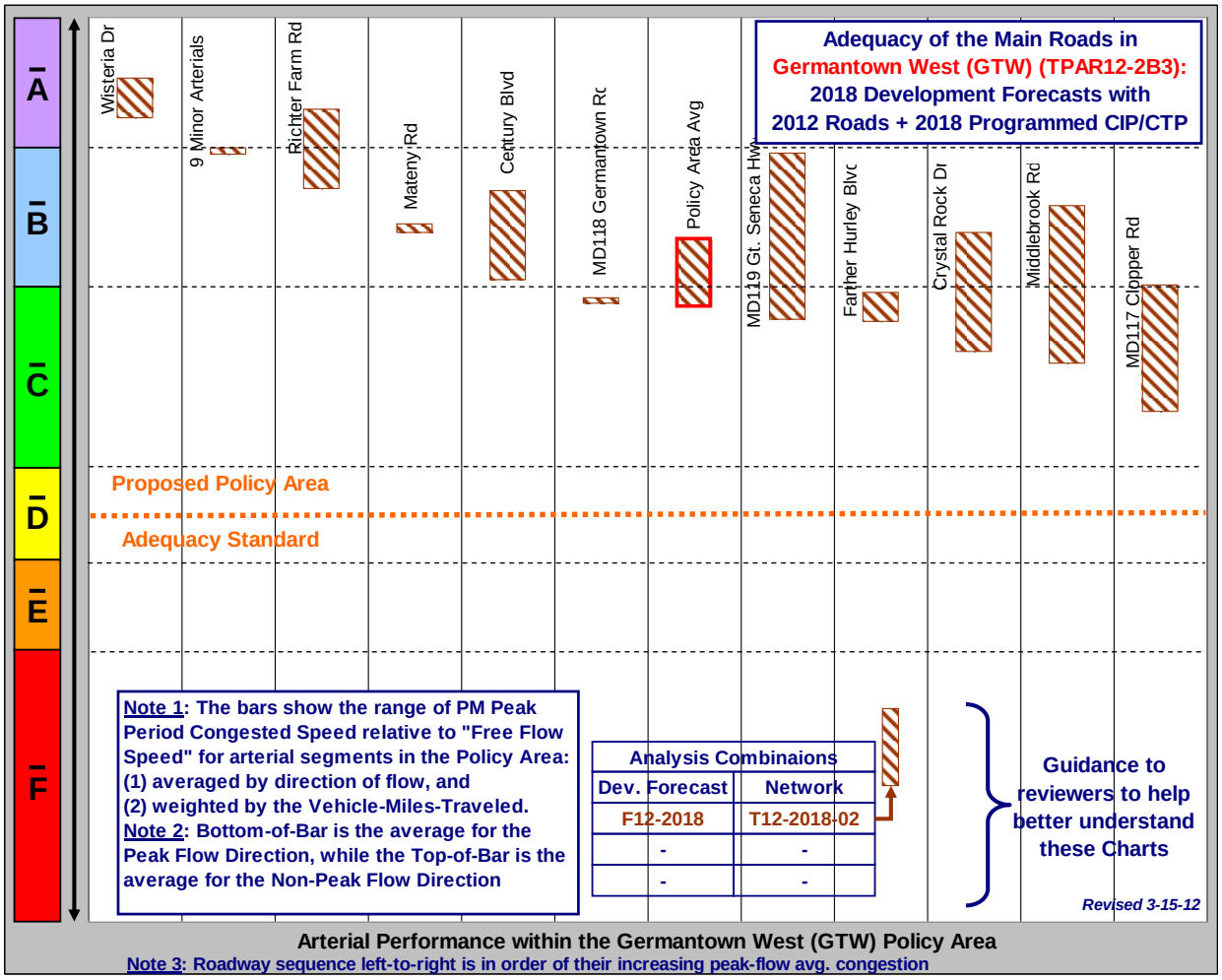
**Span of Service**: The average value of span is 18.6 hours per day for routes that operate all-day. The Suburban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the GTW Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the GTW Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for GTW roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the GTW Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be help. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the GTW that were shown in the prior graphic. Two from the left, one of the bars is itself an average, in this case of 9 minor arterial roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

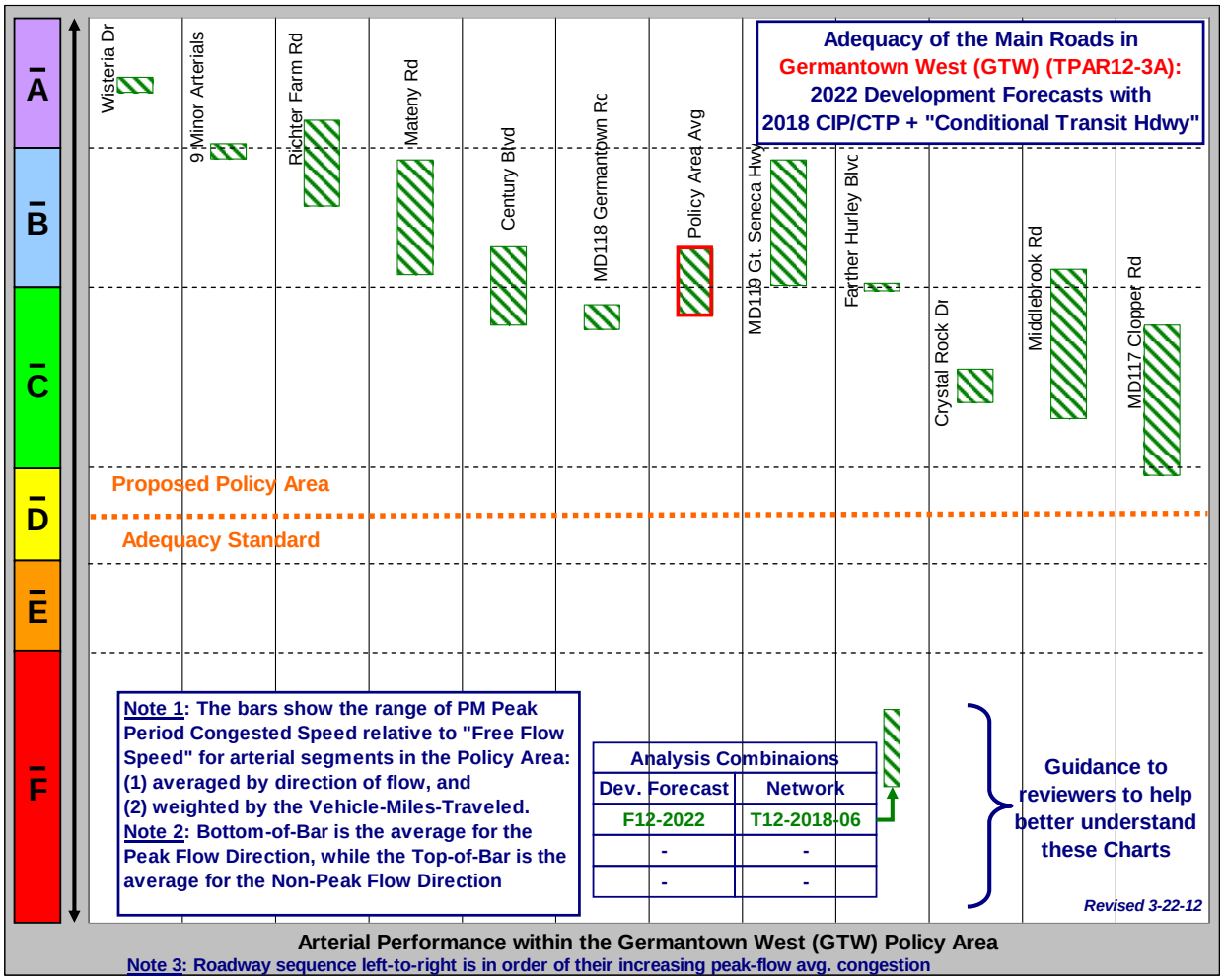
**Assessment of Areawide Roadway Adequacy for the GTW Policy Area**: The overall weighted average for the GTW Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the GTW area. Therefore, the GTW Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the GTW Policy Area**: The prior graphic shows that none of the depicted left-most arterial roads (and the 9 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Urban Policy Area, often considerably less. Nevertheless, particular attention should be given to the LATRs for

proposed subdivisions that use some of the more congested arterial roads for access to their proposed site.

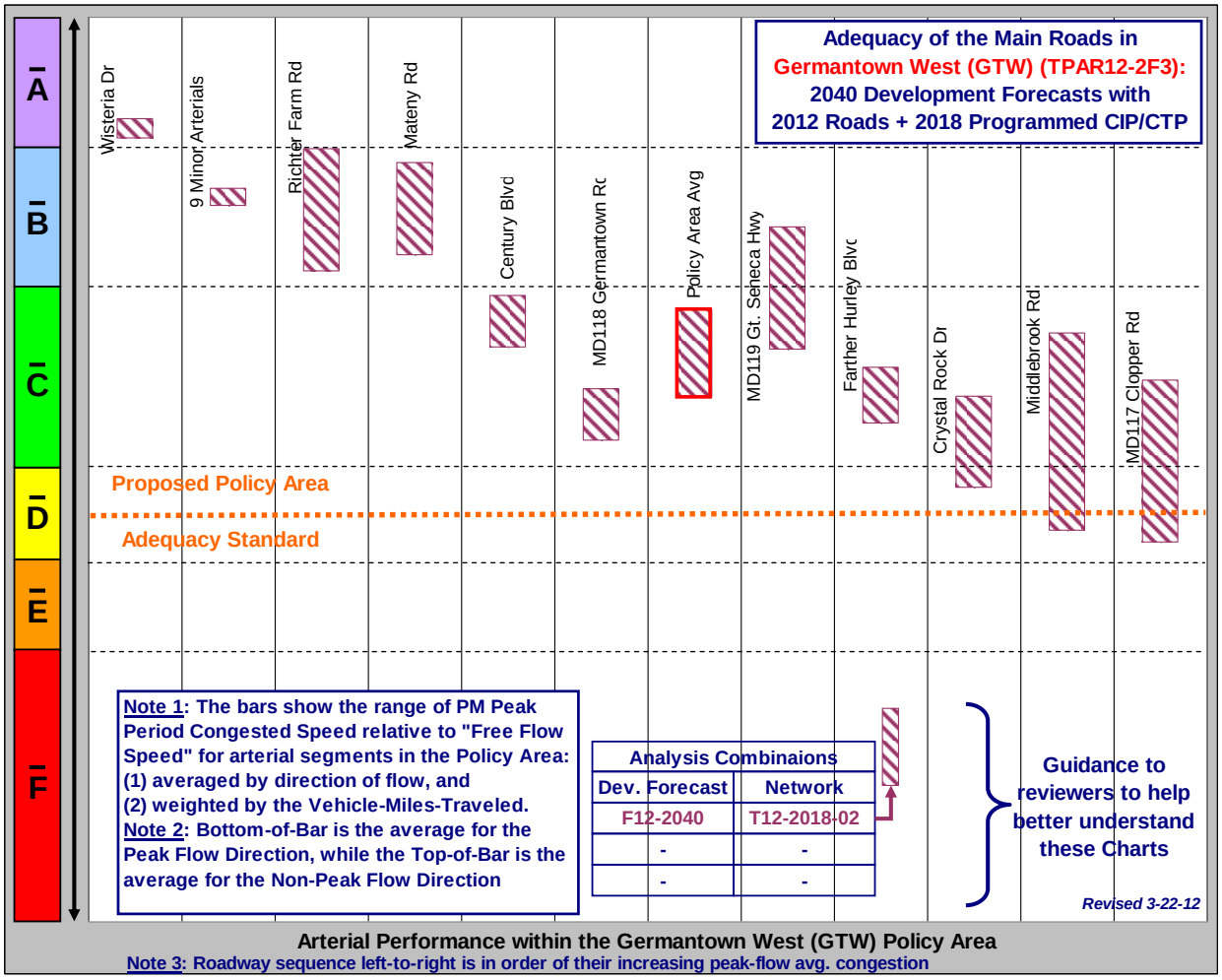
In addition, given the overall light-to-moderate volumes of traffic throughout many parts of the GTW Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the GTW area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. <u>Guidance for Conditional Transportation Solutions</u>:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in households and employment between 2018 and 2022, are estimated not to cause the GTW Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized at this time.



While other options to improve the roadway network over the next 10 years in the GTW Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the GTW Policy Area would continue to maintain its current regulatory stage overall roadway adequacy into the long term master plan stage. It can also be seen however, that two of the roads segments in the area would likely become congested in the absence of further "conditional projects" from the Master Plan. Given this longer-term outlook, in the nearer term and mid-term emphasis should be given to developing a Germantown-specific Traffic Management and Operations program.



## Montgomery Village / Airpark Policy Area

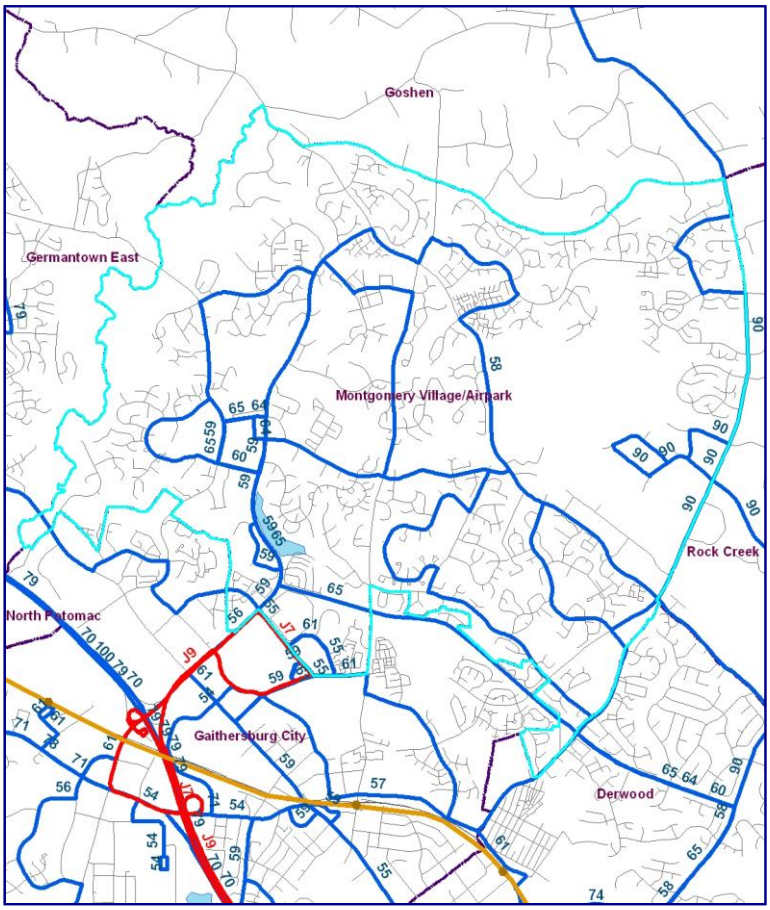
**A. <u>Overview of the Policy Area</u>**: Montgomery Village / Airpark (MVA) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. This area is served by bus transit service, high population and moderate employment densities, and overall transit coverage of more than 30% of its area.

**B. <u>Forecast of Development Activity</u>**: The MVA Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 110 households and 644 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 20 households and 219 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 32 households and 924 jobs. This growth is low, particularly in terms of the number of households and the employment growth would be a small (1 percent or less) share of the total growth in the County.

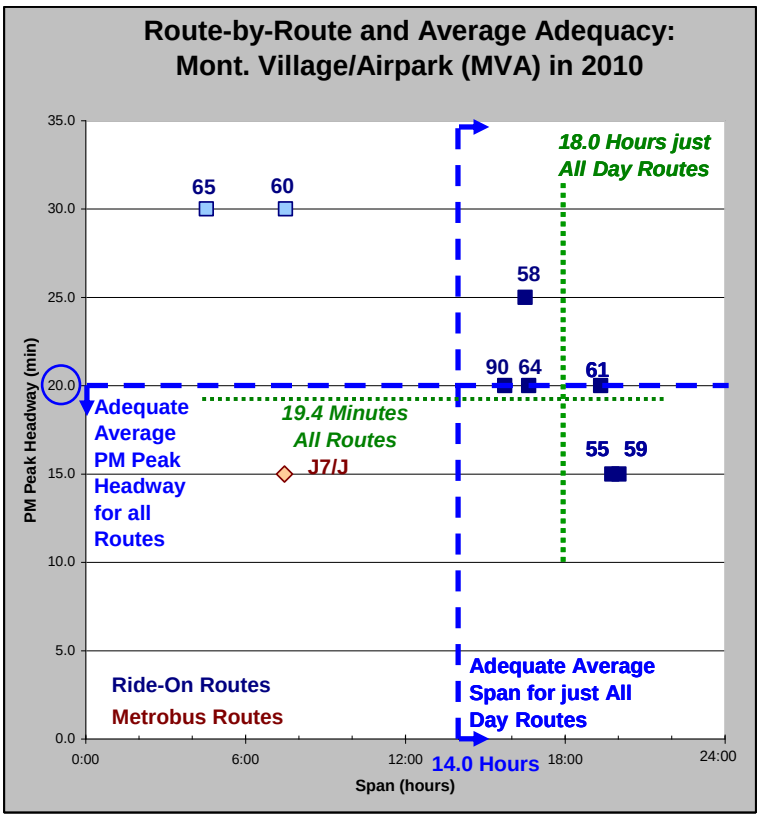
| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Mont. Village/Airpark** | 18,520 | | 18,630 | | 18,650 | | 18,682 | 11,594 | | 12,238 | | 12,457 | | 13,381 |
| Growth in the Policy Area | | 110 | | 20 | | 32 | | | 644 | | 219 | | 924 | |
| Percent Growth of Area | | 0.6% | | 0.1% | | 0.2% | | | 5.6% | | 1.8% | | 7.4% | |
| Percent of County Growth | | 0.4% | | 0.1% | | 0.1% | | | 1.0% | | 0.6% | | 0.7% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are three programmed projects to improve roadway capacity in the MVA area including recent improvements to parts of MD 124 Woodfield Road and two parts of a staged improvement to parts of Snouffer School Road.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Snouffer School Road | Sweet Autumn Drive to Centerway Road (5 lanes) | MVA | N | Y | Y |
| CIP | Snouffer School Road North | Centerway Rd to Ridge Heights Drive (4 lanes) (Webb Tract) | MVA | N | Y | Y |
| CTP | Woodfield Rd. (MD 124) | Airpark Road to Fieldcrest Road (6 lanes) | MVA | Y | Y | Y |




Ride-On Route and # Metrobus Route and #




**D. <u>Transit Adequacy Analysis</u>:** The MVA Policy Area has adequate bus transit service in terms of each of the three service factors: Coverage, Peak Headway and Span of Service.

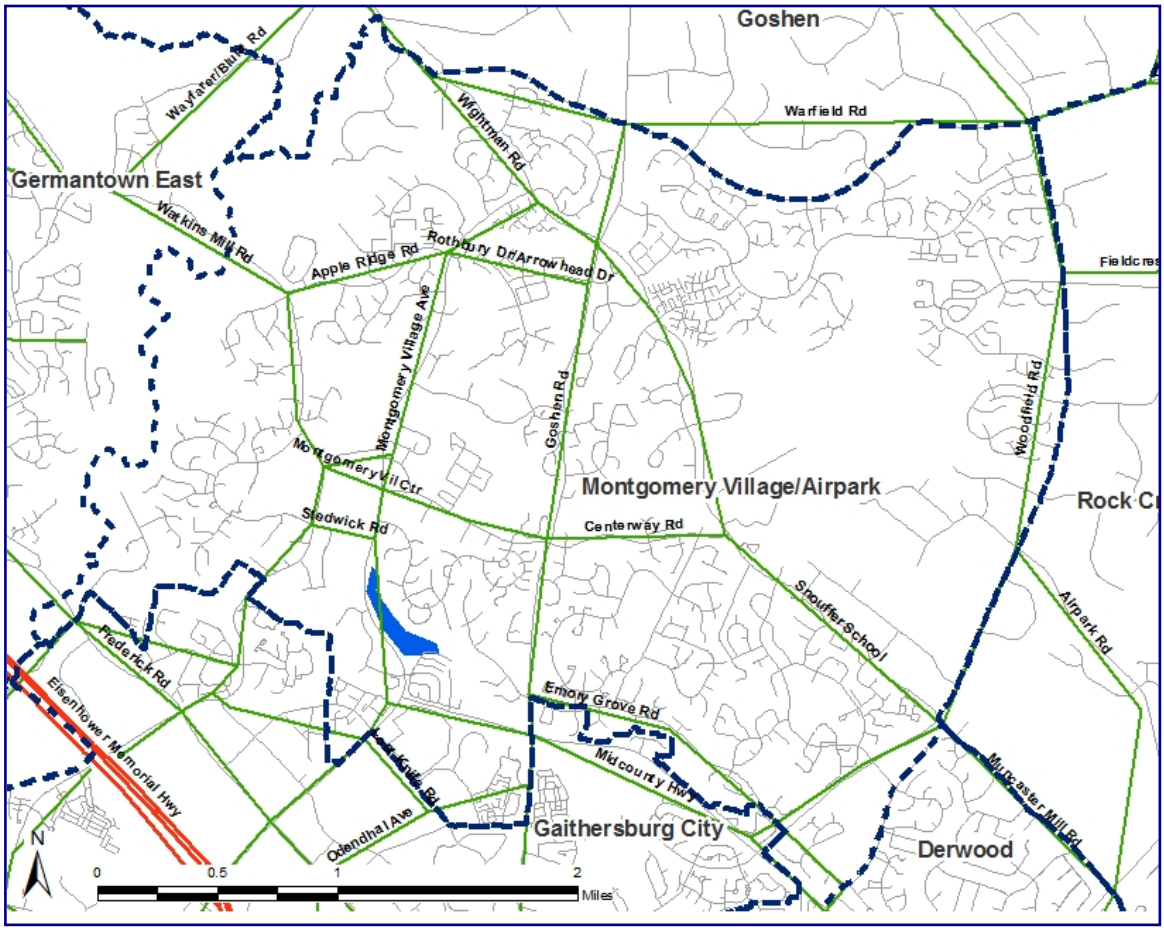
**Coverage of Service:** About 47% of the MVA Policy Area is located within 1/3 of a mile of one of the 9 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the MVA area. One of those routes is the J7/J9 Metrobus route that terminates at the Transit Center adjacent to Lakeforest Mall and that center is within walking distance of parts of the southern portion of Montgomery Village. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the MVA Policy Area is adequate.

**Peak Headways:** All buses on average provide 19.4 minutes between buses during the weekday evening peak period in the MVA Policy Area. In areas like MVA where only buses are provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the MVA area is adequate. A "conditional" countywide project to directly improve peak headways in nearby areas could indirectly further improve Peak Headways in the MVA area within the next 10 years.

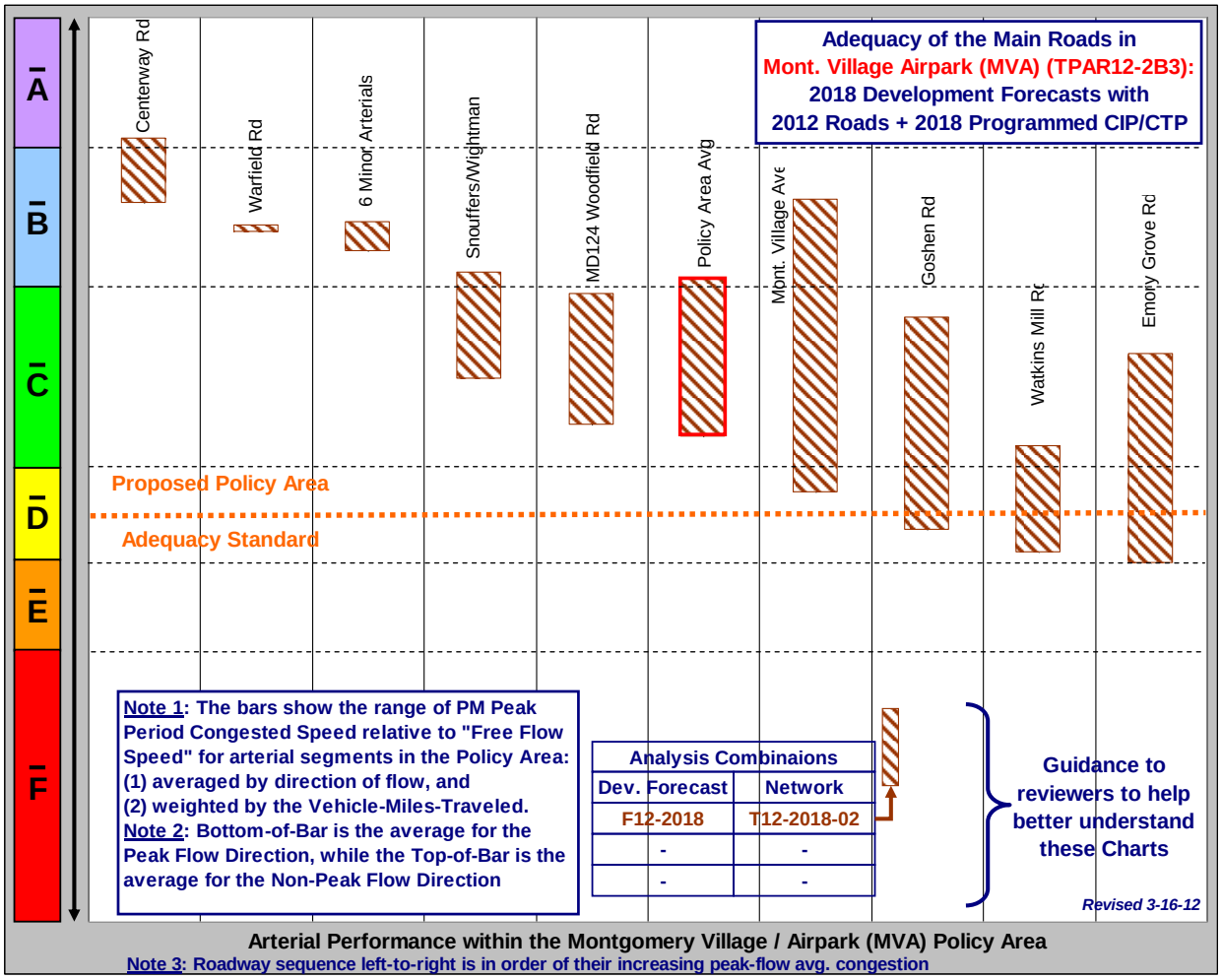
**Span of Service**: The average value of span is 18.0 hours per day for routes that operate all-day. The urban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the MVA Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the MVA Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is shown as background in the roadway network graphic to provide context and facilitate understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for MVA roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the MVA Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the MVA that were shown in the prior graphic. Towards the left, one of the bars is itself an average, in this case of 6 minor arterial roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

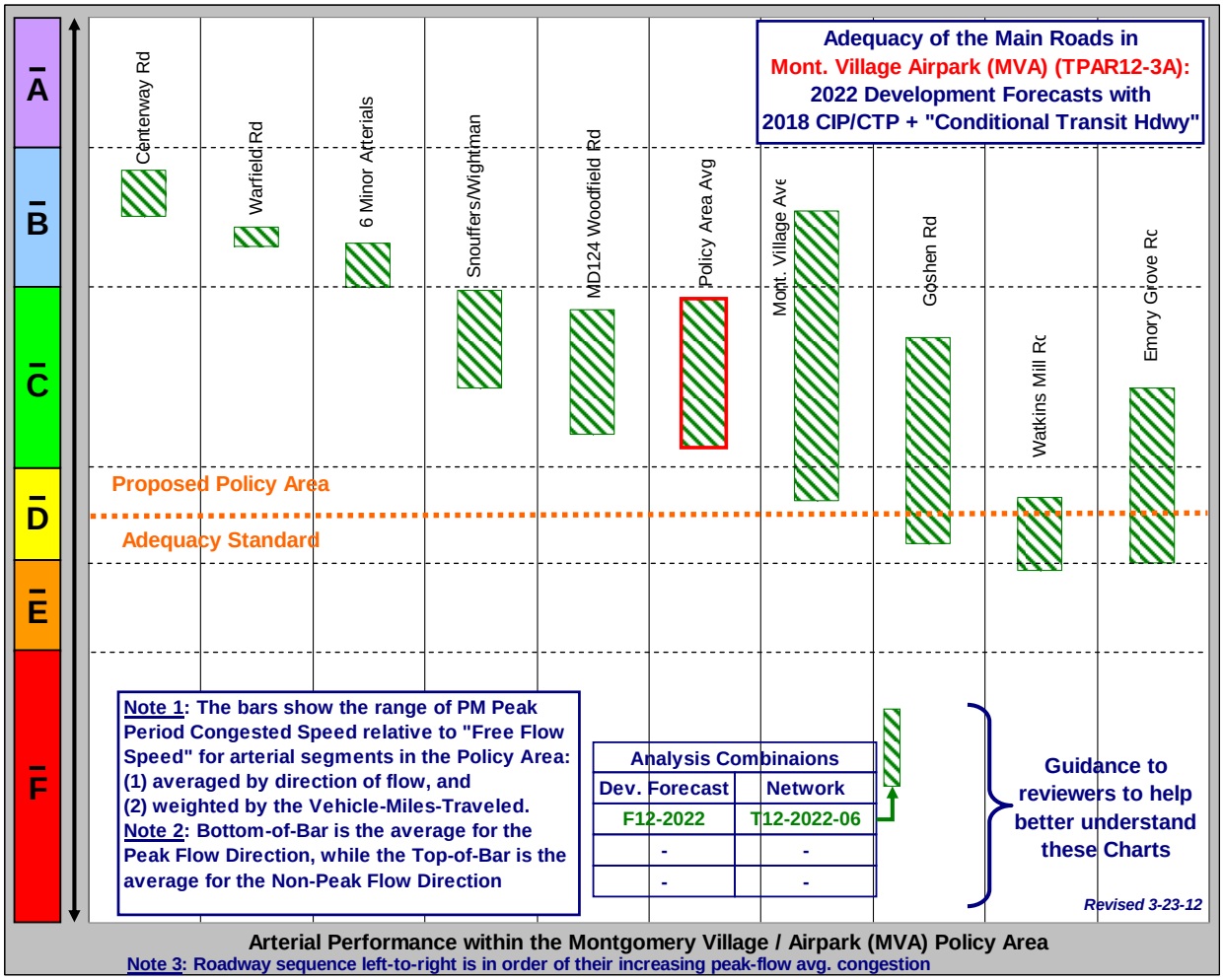
**Assessment of Areawide Roadway Adequacy for the MVA Policy Area**: The overall weighted average for the MVA Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Suburban Policy Areas, such as the MVA area. Therefore, the MVA Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the MVA Policy Area**: The prior graphic shows that 5 of the depicted left-most arterial roads (and the 6 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for a Suburban Policy Area, often considerably less. Yet the graphic also shows that there are 3 other roadway link-segments in the

MVA Policy Area that are more congested than the Standard for a Suburban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) Emory Grove Road, (b) Watkins Mill Rd, and (c) Goshen Road. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

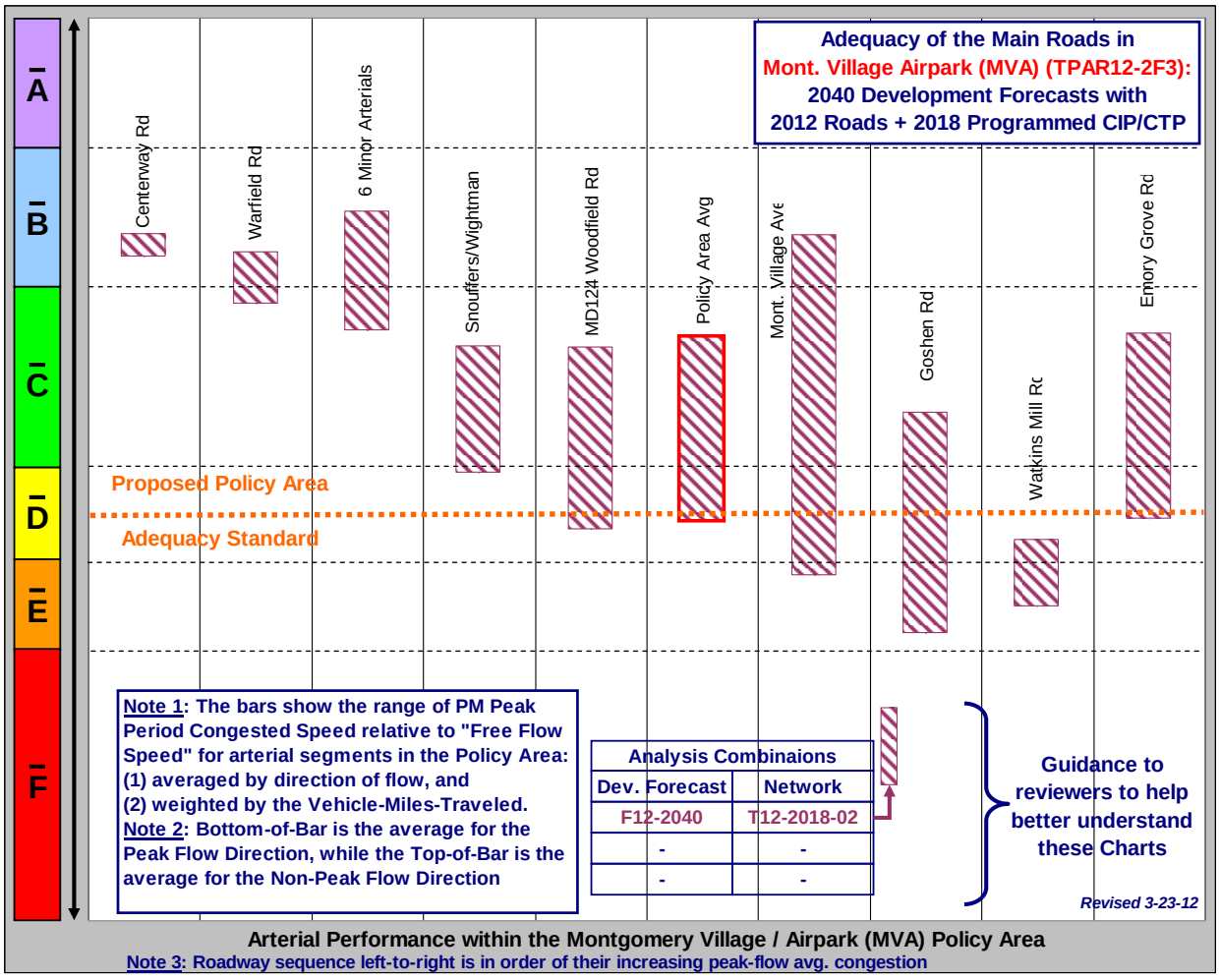
In addition, given the overall high volumes of traffic throughout many parts of the MVA Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the MVA area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the MVA Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized.



While other options to improve the roadway network over the next 10 years in the MVA Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the MVA Policy Area would not maintain its current regulatory stage overall roadway adequacy into the long-term master plan stage. It can also be seen that two additional roads (Montgomery Village Avenue and MD 124 (Woodfield Rd) would become somewhat congested in the peak flow direction in the absence of further "conditional projects" from the Master Plan. Given this longer-term outlook, in the nearer term and mid-term emphasis should be given to developing a MVA-specific Traffic Management and Operations program as well as a Transportation Demand Management program.



## Aspen Hill Policy Area

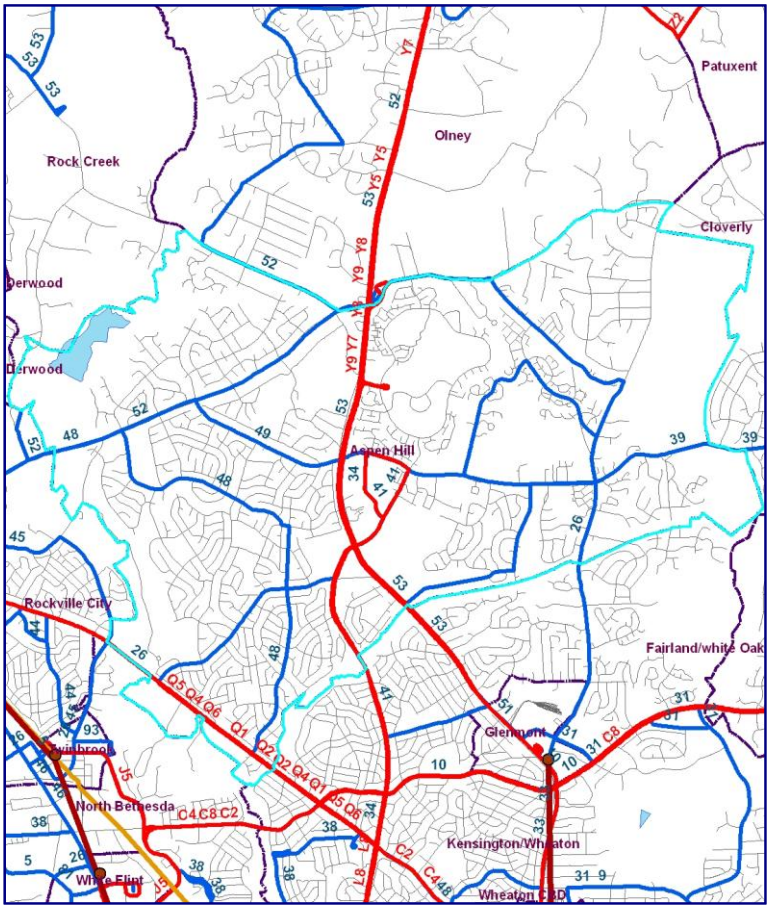
**A. <u>Overview of the Policy Area</u>**: Aspen Hill (AH) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. This area is served by bus transit service, high population and low employment densities, and overall transit coverage of more than 30% of its area. There is no notable growth that recently occurred or is expected to occur in this Policy Area. The large retirement community of Leisure World is located in the AH Policy Area. The recently opened MD 200 (Intercounty County Connector) traverses the eastern part of the area and access and egress is provided by an interchange at MD 182 Layhill Rd.

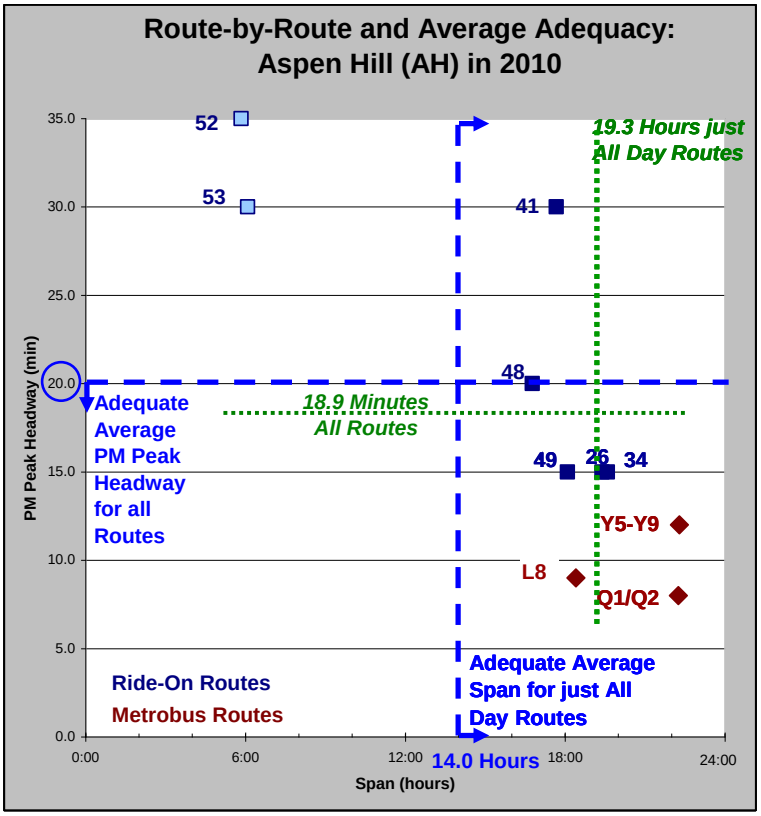
**B. <u>Forecast of Development Activity</u>**: The AH Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 195 households and 53 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 26 households and 14 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 97 households and 75 jobs. This growth is very low and results in this area having very low shares of the total growth in the County.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Aspen Hill** | 24,699 | | 24,894 | | 24,920 | | 25,017 | 7,175 | | 7,228 | | 7,242 | | 7,317 |
| Growth in the Policy Area | | 195 | | 26 | | 97 | | | 53 | | 14 | | 75 | |
| Percent Growth of Area | | 0.8% | | 0.1% | | 0.4% | | | 0.7% | | 0.2% | | 1.0% | |
| Percent of County Growth | | 0.7% | | 0.2% | | 0.2% | | | 0.1% | | 0.0% | | 0.1% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are no programmed projects to improve roadway or transit projects that would directly serve this area.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| | | | AH | | | |




**D. <u>Transit Adequacy Analysis</u>**: The AH Policy Area has adequate bus transit service in terms of each of the three service factors: Coverage, Peak Headway and Span of Service.

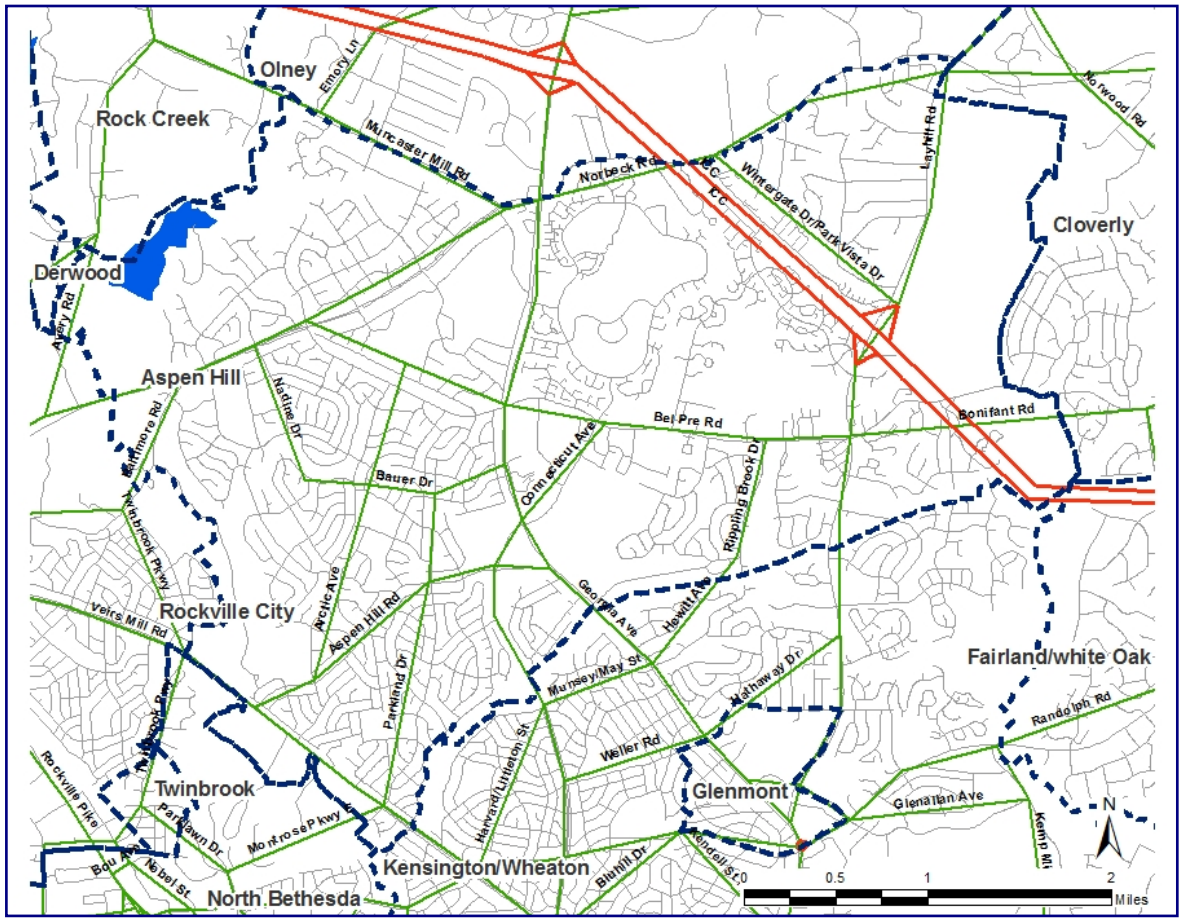
**Coverage of Service:** About 44% of the AH Policy Area is located within 1/3 of a mile of one of the 11 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the AH area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the AH Policy Area is adequate.

**Peak Headways:** All buses on average provide 19.9 minutes between buses during the weekday evening peak period in the AH Policy Area. Some provide very frequent service such as the Q1/Q2 Metrobuses. In areas like AH where only buses are provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the AH area is adequate. A "conditional" countywide project to directly improve peak headways in nearby areas could indirectly further improve Peak Headways in the AH area within the next 10 years.

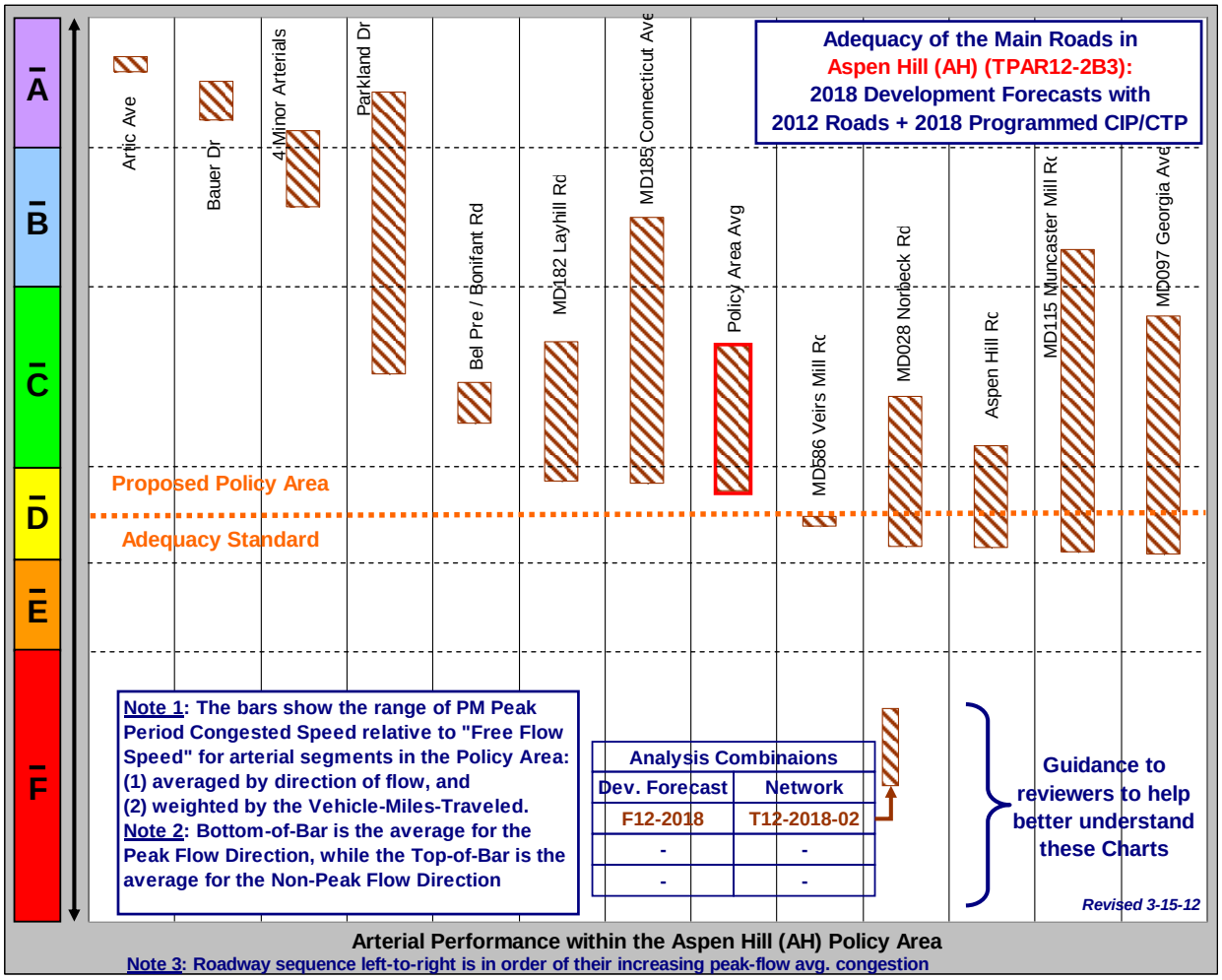
**Span of Service**: The average value of span is 19.3 hours per day for routes that operate all-day. The urban standard is 14 hours per day on average for all-day routes. Therefore transit span in the AH Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the AH Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for AH roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the AH Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the AH that were shown in the prior graphic. Towards the left, one of the bars is itself an average, in this case of 4 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

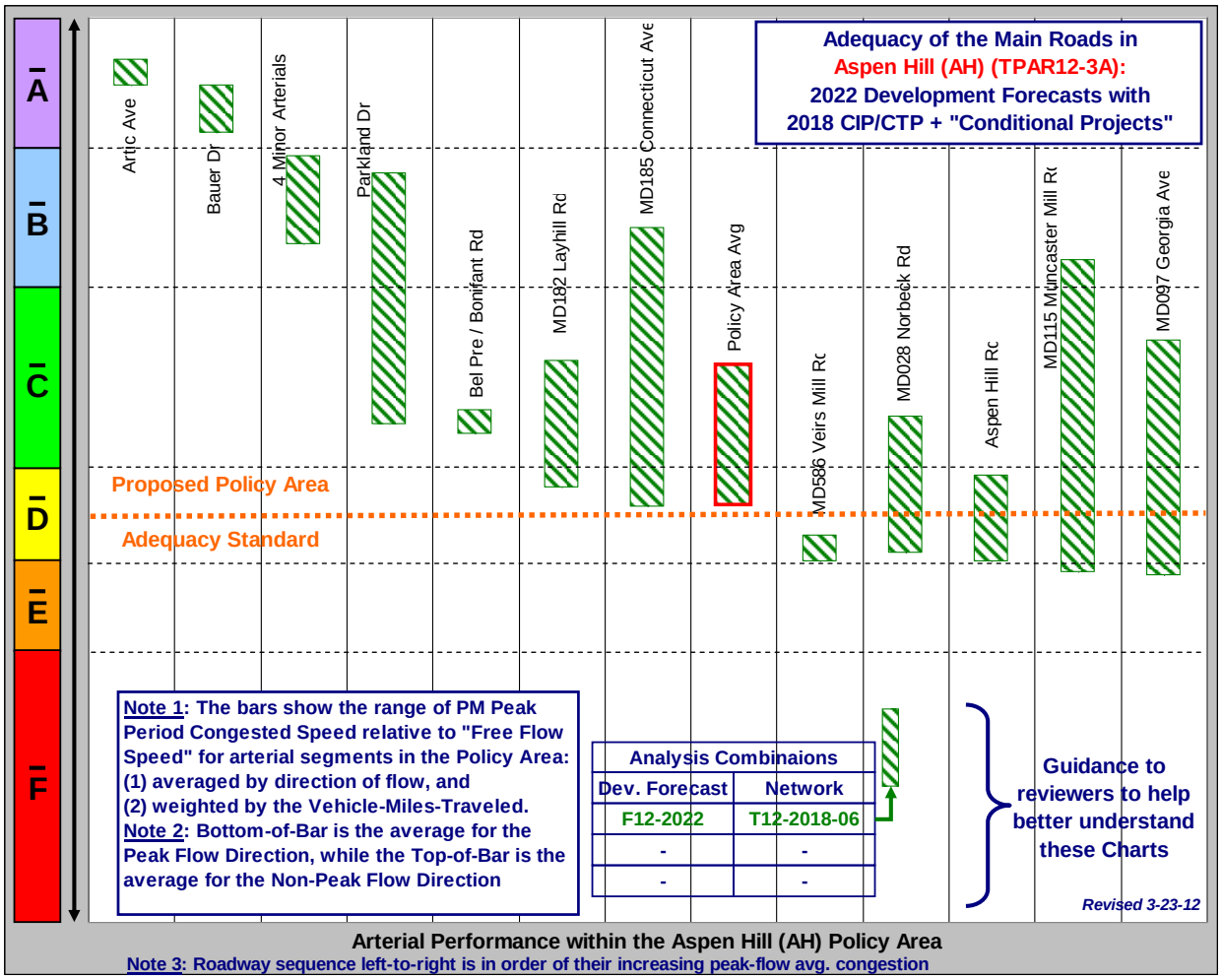
**Assessment of Areawide Roadway Adequacy for the AH Policy Area**: The overall weighted average for the AH Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Suburban Policy Areas, such as the AH area. Therefore, the AH Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the AH Policy Area**: The prior graphic shows that 6 of the depicted left-most arterial roads (and the 4 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for a Suburban Policy Area, often considerably less. Yet the graphic also shows that there are some 5 other roadway link-segments

in the AH Policy Area that are more congested than the Standard for a Suburban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) MD 97 Georgia Ave, (b) MD 115 Muncaster Mill Rd, (c) Aspen Hill Rd, (d) MD 28 Norbeck Rd, and (e) MD586 Veirs Mill Rd. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

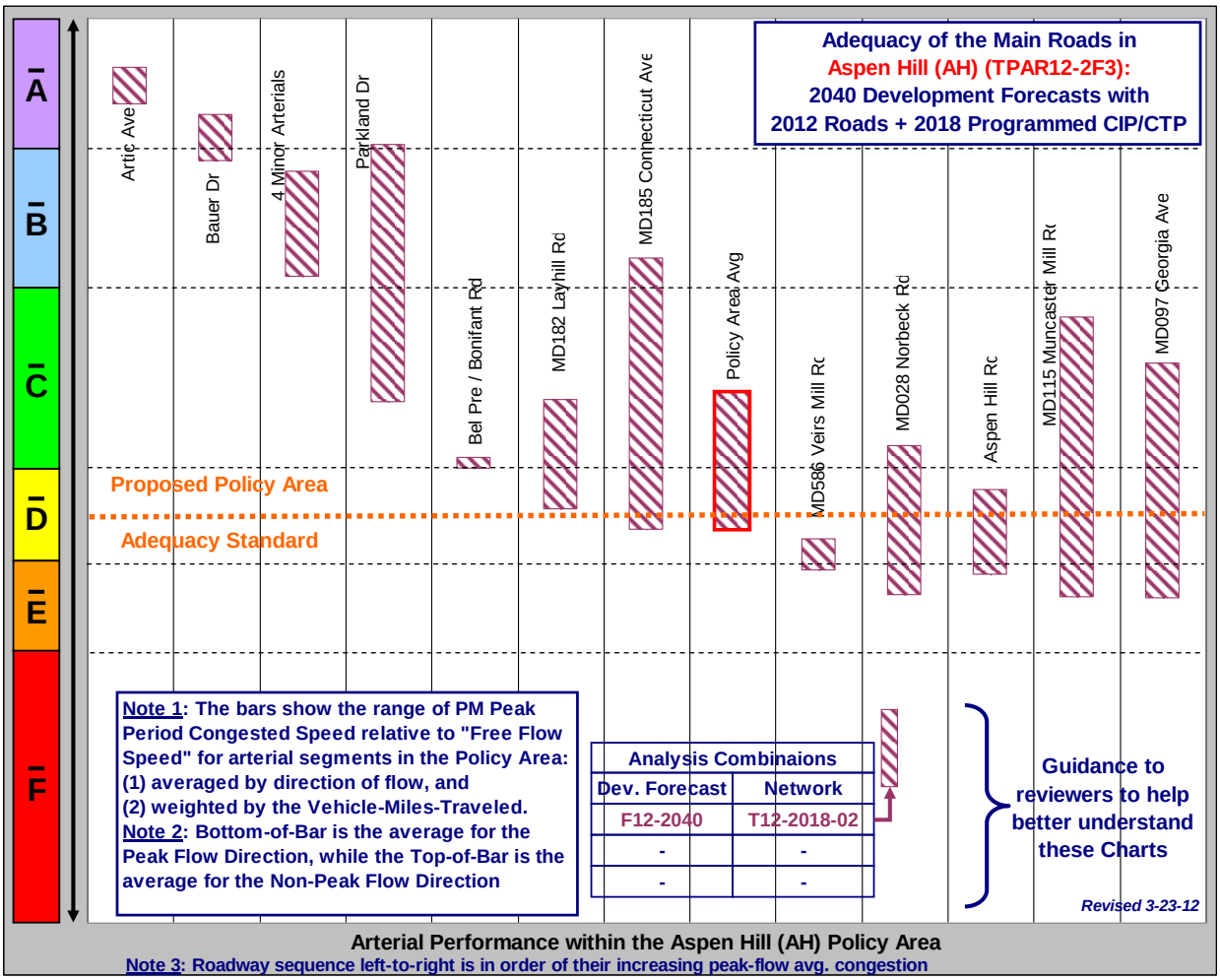
In addition, given the overall high volumes of traffic throughout many parts of the AH Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the AH area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in households and employment between 2018 and 2022, are estimated not to cause the AH Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized



While other options to improve the roadway network over the next 10 years in the AH Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the AH Policy Area would not maintain its current regulatory stage overall roadway adequacy into the long term master plan stage. It can also be seen that one or two additional roads would become very congested in the absence of further "conditional projects" from the Master Plan. Given this longer-term outlook, in the nearer term and mid-term emphasis should be given to developing a Aspen Hill-specific Traffic Management and Operations program.



## Germantown East Policy Area

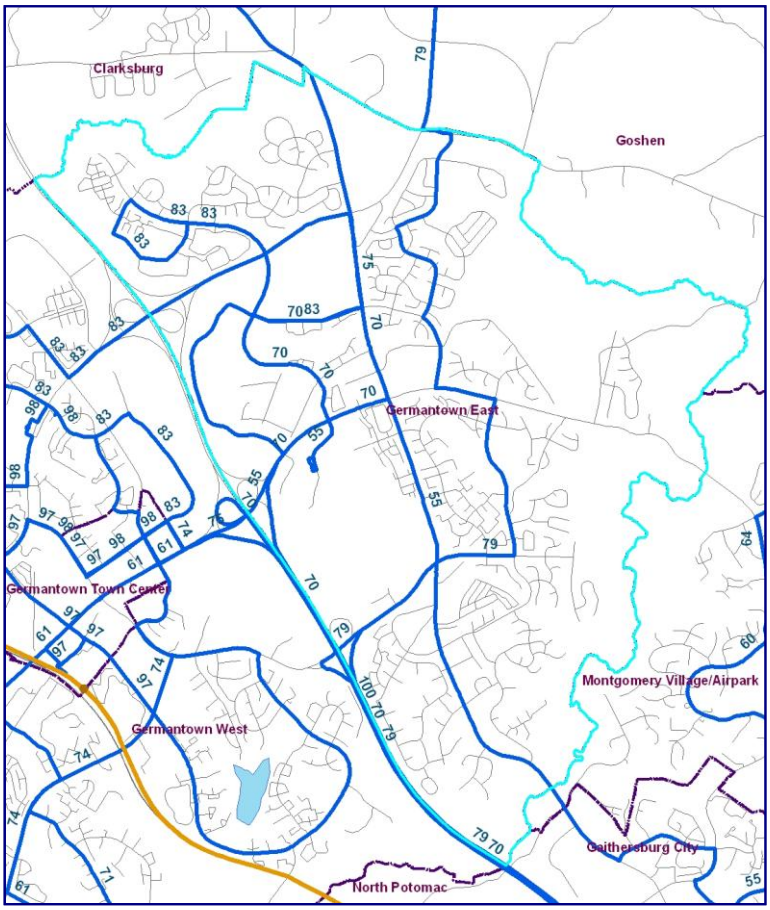
**A. Overview of the Policy Area**: Germantown East (GTE) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. There is moderate population and moderate employment densities, and overall transit coverage of more than 30% of its area. Notable growth is occurring associated with the Master Plan recommendations for the Germantown Employment Area.

**B. Forecast of Development Activity**: The GTE Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 313 households and 2,019 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 595 households and 2,118 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 2,111 households and 9,427 jobs. While the household growth is low-to-moderate and the job growth is high relative to the current development activity, it is only a moderate but increasing share of the total growth in the County.

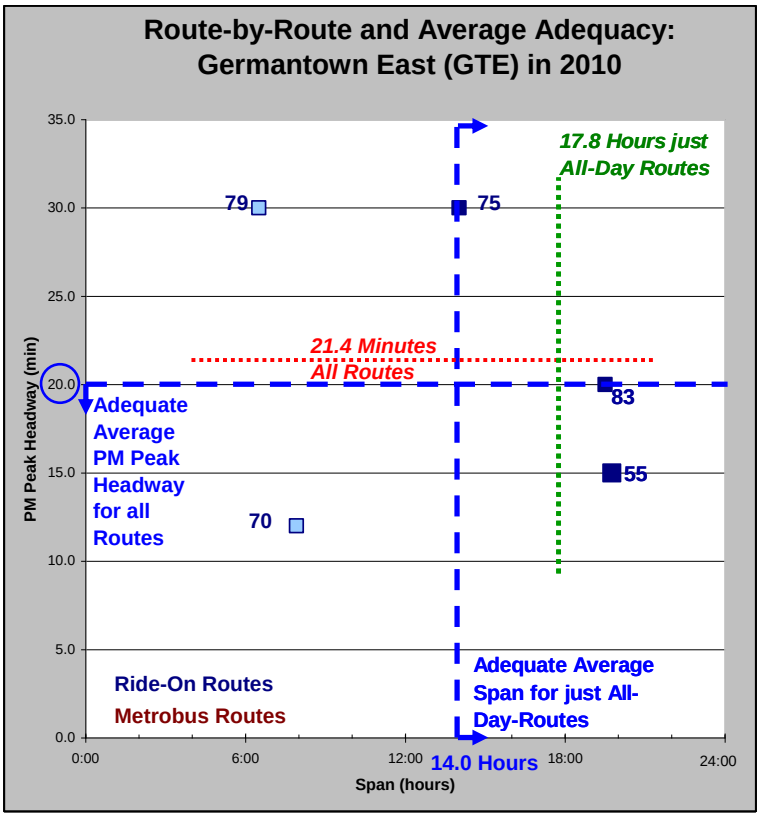
| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Germantown East** | 8,097 | | 8,410 | | 9,005 | | 11,116 | 9,896 | | 11,915 | | 14,033 | | 23,460 |
| Growth in the Policy Area | | 313 | | 595 | | 2,111 | | | 2,019 | | 2,118 | | 9,427 | |
| Percent Growth of Area | | 3.9% | | 7.1% | | 23.4% | | | 20.4% | | 17.8% | | 67.2% | |
| Percent of County Growth | | 1.1% | | 3.7% | | 3.7% | | | 3.2% | | 5.5% | | 7.6% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. Programmed Transportation Improvements**: There are no programmed projects to improve roadway or transit capacity in the GTE area. As also noted in the discussion of other selected Policy Areas, a "conditional project" has been identified to provide Peak Hour Headway improvements to about a dozen Ride-On routes that currently serve about 8 of the Suburban Policy Areas needing improved Peak Hour Headways to attain the Peak Headway Adequacy Standard. Most of those dozen routes would directly serve more than one Policy Area, as well as indirectly serve a similar number of: (a) other Suburban Policy Areas combined with (b) several of the Urban Policy Areas. Such a "conditional project" could be implemented in a few increments over a few years or all at once. Interim ridership results and user travel survey responses would be monitored over time and refinements could be made along the way.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | Countywide | N | Some | Y |




Ride-On Route and # Metrobus Route and #




**D. <u>Transit Adequacy Analysis</u>**: The GTE Policy Area has adequate coverage and span of service but is not yet adequate in terms of Peak Headway.

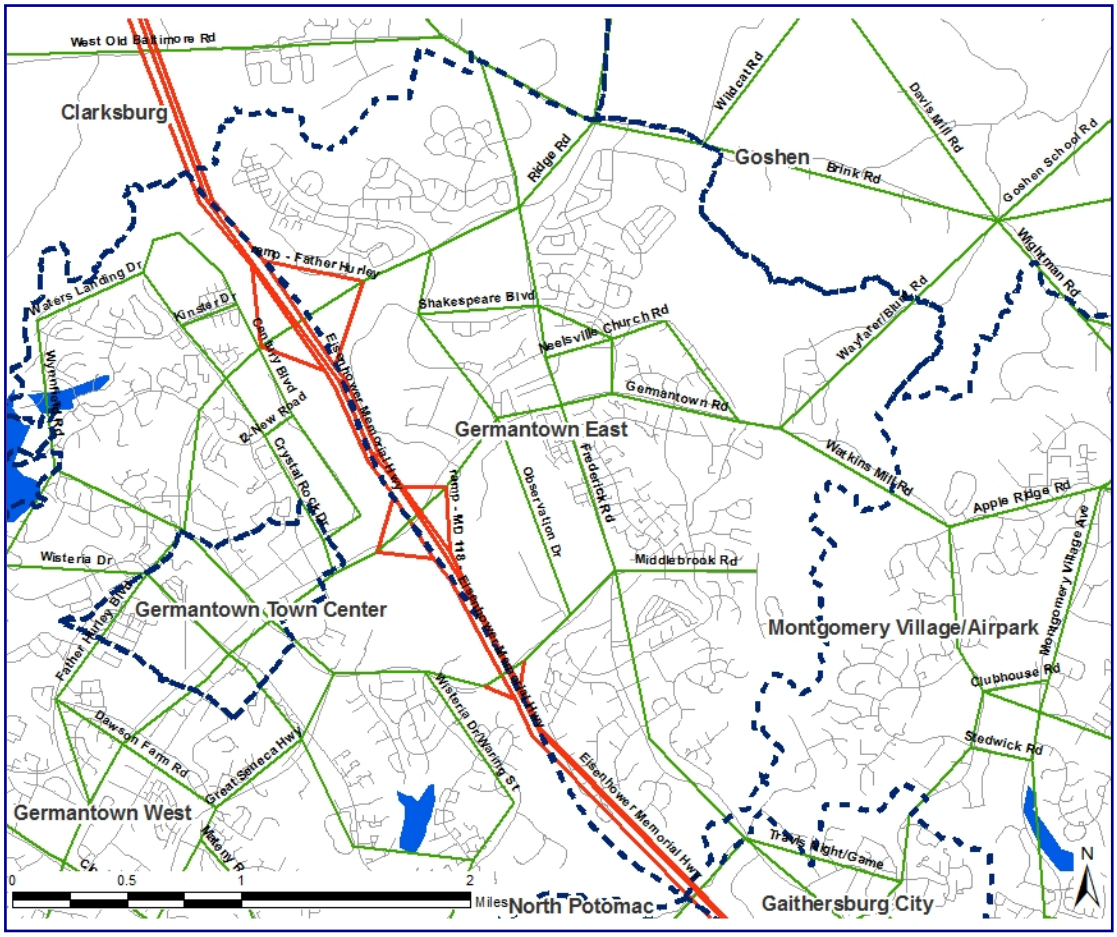
**Coverage of Service:** About 39% of the GTE Policy Area is located within 1/3 of a mile of one of the 5 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the GTE area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the GTE Policy Area is adequate.

**Peak Headways:** All buses on average provide 21.4 minutes between buses during the weekday evening peak period in the GTE Policy Area. Some provide moderately frequent service is provided by two of the Ride-On routes, No. 55 and No. 70, the latter of which only operates in the morning and afternoon peaks. In areas like GTE where only buses are provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the GTE area is not yet adequate. A "conditional" countywide project to improve peak headways could attain adequacy within the next 10 years.

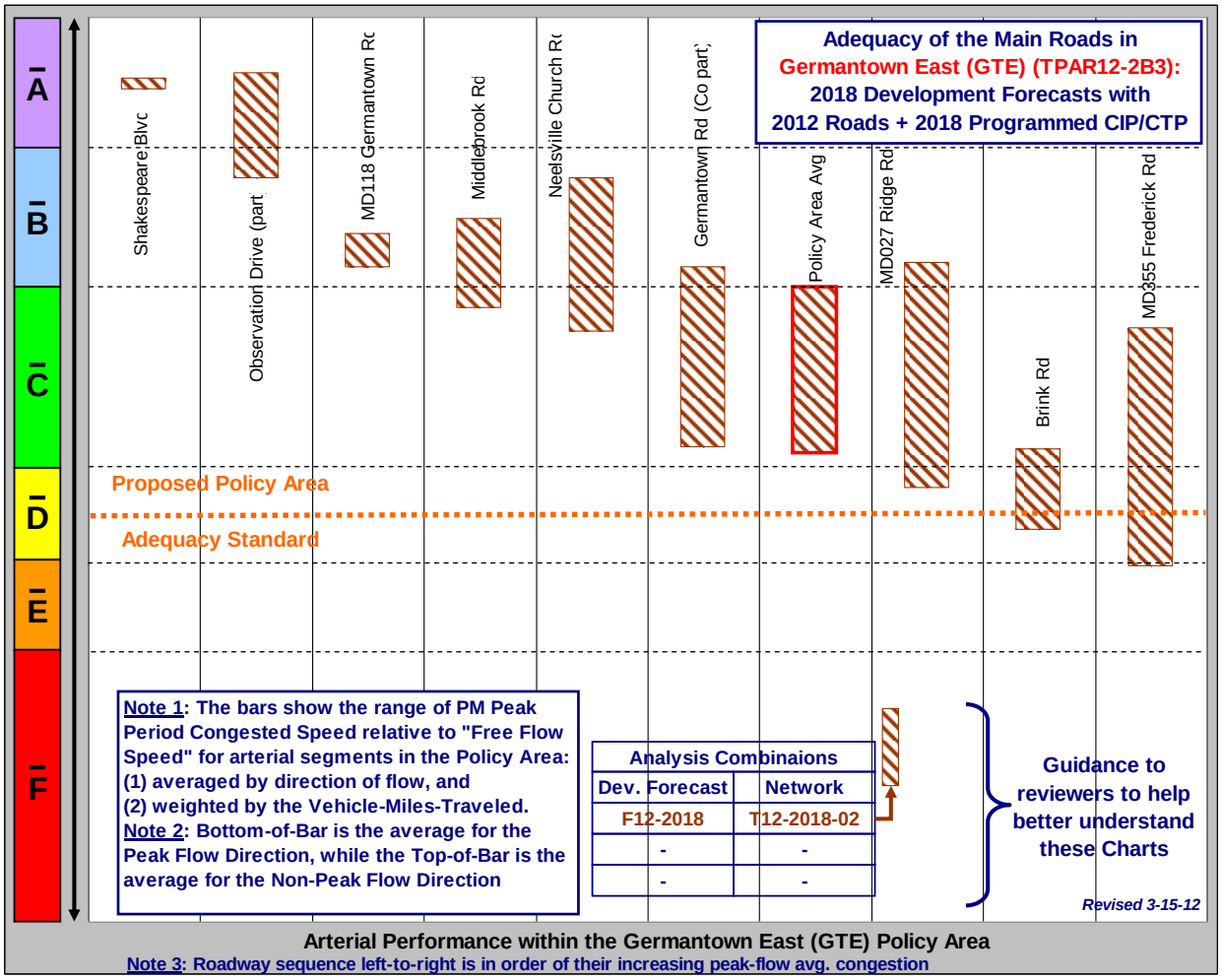
**Span of Service**: The average value of span is 17.8 hours per day for the three routes that operate all-day. The Suburban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the GTE Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the GTE Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for GTE roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the GTE Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.



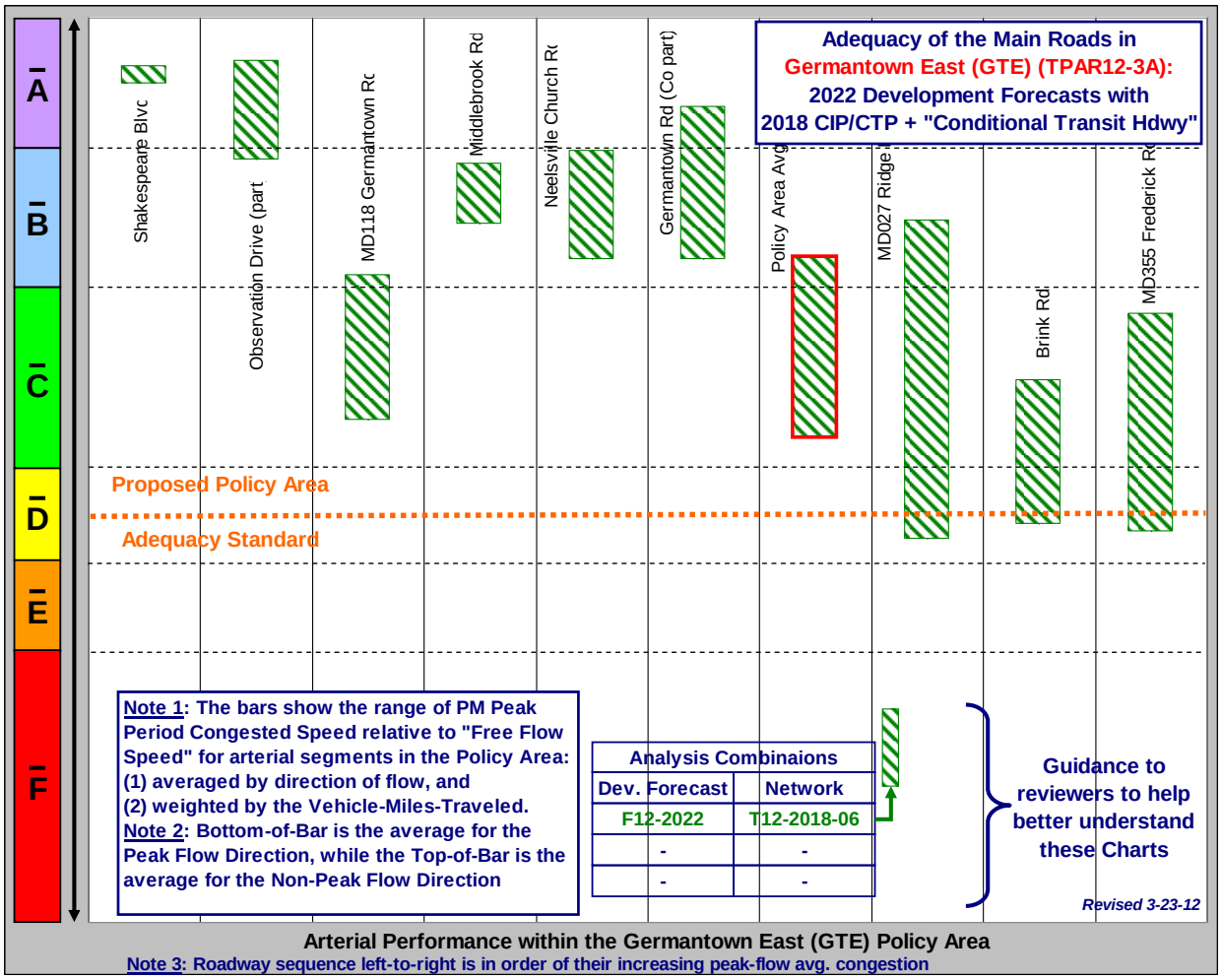

This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the GTE that were shown in the prior graphic. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

**Assessment of Areawide Roadway Adequacy for the GTE Policy Area**: The overall weighted average for the GTE Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the GTE area. Therefore, the GTE Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the GTE Policy Area**: The prior graphic shows that seven of the depicted left-most arterial roads have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for a Suburban Policy Area, some considerably less congested. Yet the graphic also shows that there are two other roadway link-segments in the GTE Policy Area that are more congested than the Standard for a Suburban Policy Area. Reading from right

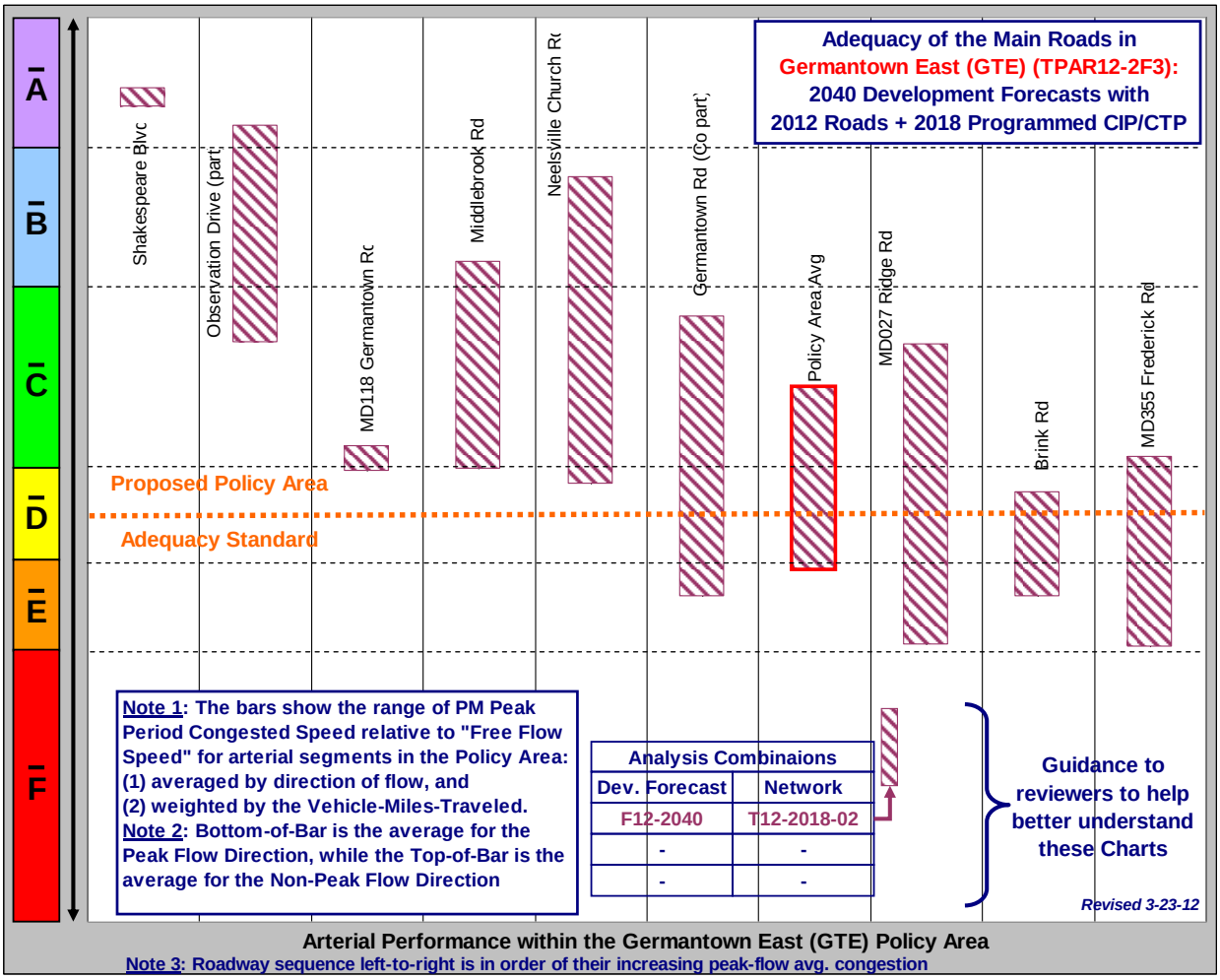
to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: a) MD 355 Frederick Road and (b) Brink Road. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site. In addition, given the overall moderate-to-high volumes of traffic throughout many parts of the GTE Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the GTE area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements, including turn-lanes at nearby intersections, access or local circulation needs, bus stops and sidewalks.

**G. <u>Guidance for Conditional Transportation Solutions</u>:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the GTE Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized at this time. However, it is noted that the peak traffic flow congestion on MD 27 Ridge Road, Brink Road and MD 355 Frederick Road are forecasted, on average, to be more congested than the areawide standard.



While other options to improve the roadway network over the next 10 years in the GTE Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the GTE Policy Area would not maintain its current regulatory stage overall roadway adequacy into the long-term, master plan stage. It can also be seen that two additional roads, MD 27 Ridge Road and Germantown Road, would become more congested than forecast for the regulatory time period in the absence of further "conditional projects" from the Master Plan. Given this longer-term outlook, in the nearer term and mid-term emphasis should be given to developing a GTE-specific Traffic Management and Operations program as well as a Transportation Demand Management program to serve the growing employment concentrations in the area. The analyses done for the Proposed TPAR10 considered parts of Midcounty Highway extended as a potential "conditional" project and it appears that future TPAR adequacy analyses may need to consider that further.



## Cloverly Policy Area

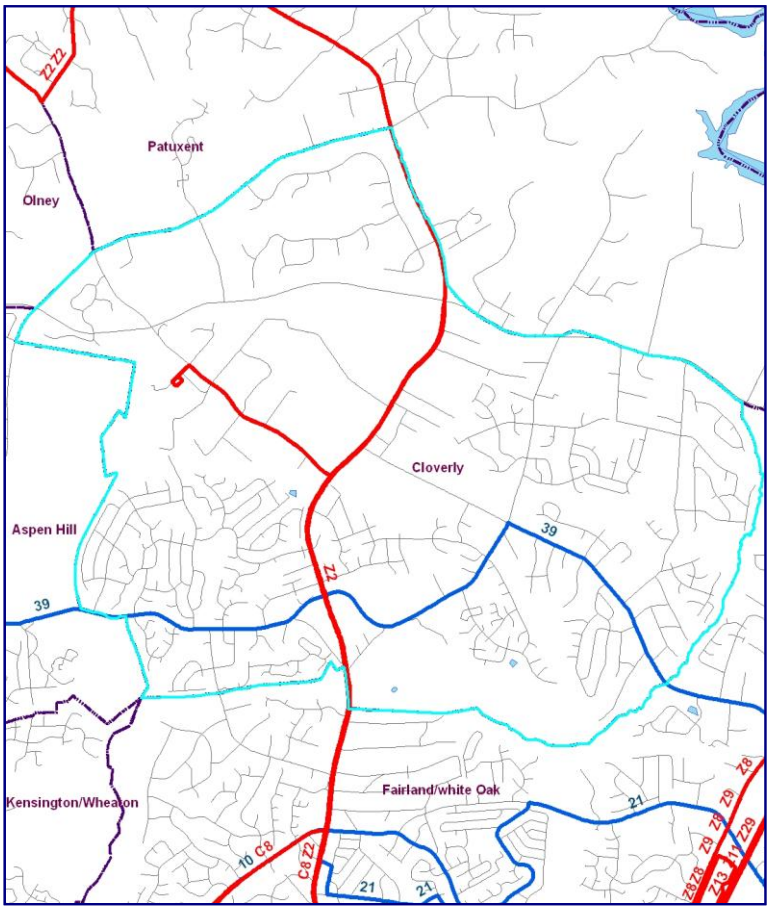
**A. <u>Overview of the Policy Area</u>**: Cloverly (CLV) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. This area is served by bus transit service, low population and extremely low employment densities, and overall transit coverage of just at 30% of its area. There is no notable growth that recently occurred or is expected to occur in this Policy Area. The recently opened MD 200 (Intercounty County Connector) traverses the southern boundary of the CLV area and access and egress is provided by an interchange at MD 650 New Hampshire Avenue.

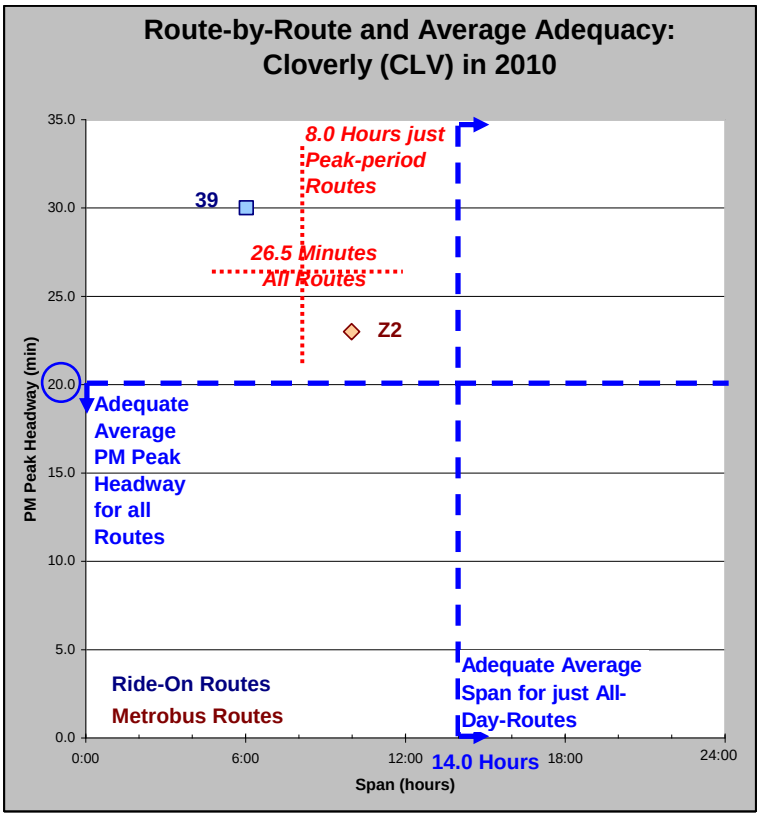
**B. <u>Forecast of Development Activity</u>**: The CLV Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 58 households and 0 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 29 households and 0 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 22 households and 0 jobs. This growth is extremely low in terms of past growth in the area as well as a share of the total growth in the County.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Cloverly** | 5,312 | | 5,370 | | 5,399 | | 5,421 | 1,607 | | 1,607 | | 1,607 | | 1,607 |
| Growth in the Policy Area | | 58 | | 29 | | 22 | | | 0 | | 0 | | 0 | |
| Percent Growth of Area | | 1.1% | | 0.5% | | 0.4% | | | 0.0% | | 0.0% | | 0.0% | |
| Percent of County Growth | | 0.2% | | 0.2% | | 0.0% | | | 0.0% | | 0.0% | | 0.0% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are no programmed projects to improve roadway capacity in the CLV area. As also noted in the discussion of other Policy Areas, a "conditional project" has been identified to provide Peak Hour Headway improvements to about a dozen Ride-On routes that currently serve about 8 of the Suburban Policy Areas needing improved Peak Hour Headways to attain the Peak Headway Adequacy Standard. Most of those dozen routes would directly serve more than one Policy Area, as well as indirectly serve a similar number of: (a) other Suburban Policy Areas combined with (b) several of the Urban Policy Areas. Such a "conditional project" could be implemented in a few increments over a few years or all at once. Interim ridership results and travel survey user responses would be monitored over time and refinements could be made along the way.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | Countywide | N | Some | Y |




**D. <u>Transit Adequacy Analysis</u>**: The CLV Policy Area does not yet have adequate transit service in terms of the factors of Peak Headway and in terms of the factor of Span of service. It is right at the standard of having adequate Coverage.

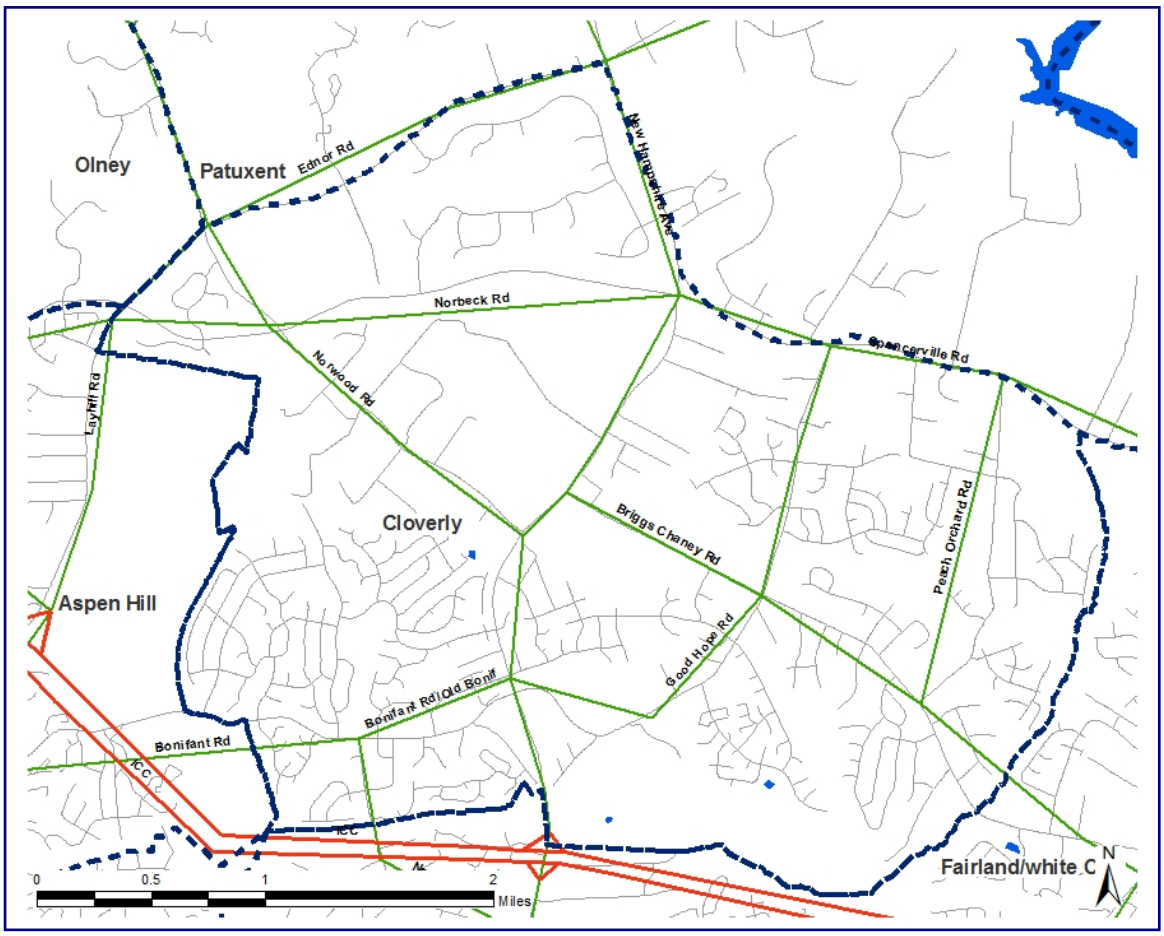
**Coverage of Service:** About 30% of the CLV Policy Area is located within 1/3 of a mile of one of the 2 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the CLV area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the CLV Policy Area is adequate.

**Peak Headways:** All buses on average provide 24.3 minutes between buses during the weekday evening peak period in the CLV Policy Area. In bus serviced areas like CLV the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the CLV area is not yet adequate. A "conditional" countywide project could directly improve peak headways in the CLV area and the area could attain adequacy within the next 10 years.

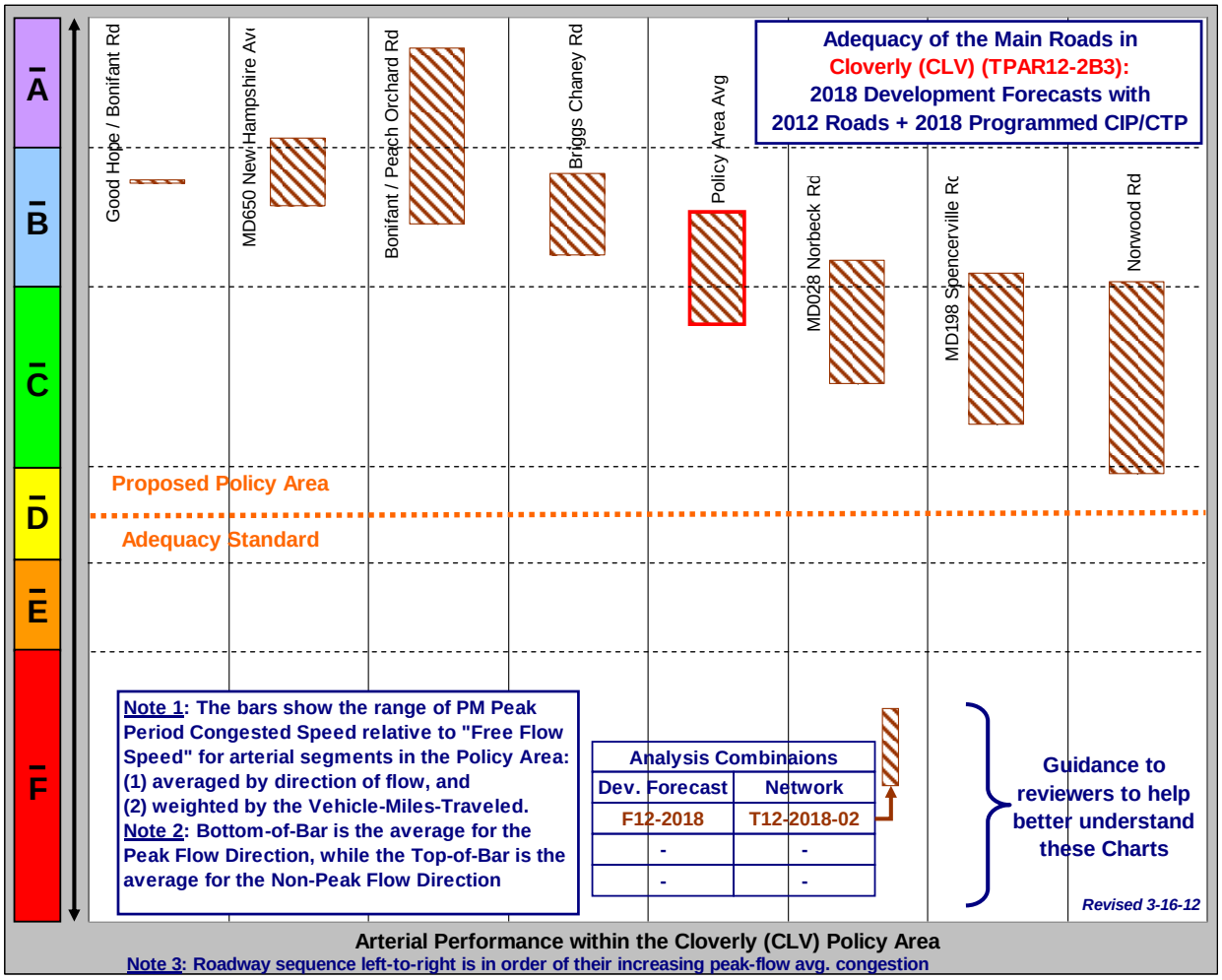
**Span of Service**:. Both bus routes serving the CLV area currently only provide peak period and not all-day service. The Suburban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the CLV Policy Area is not yet adequate. It is may be feasible to change the bus schedule for one of the routes to provide improved Span as part of the Peak Headway "conditional" project.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the CLV Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for CLV roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the CLV Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.



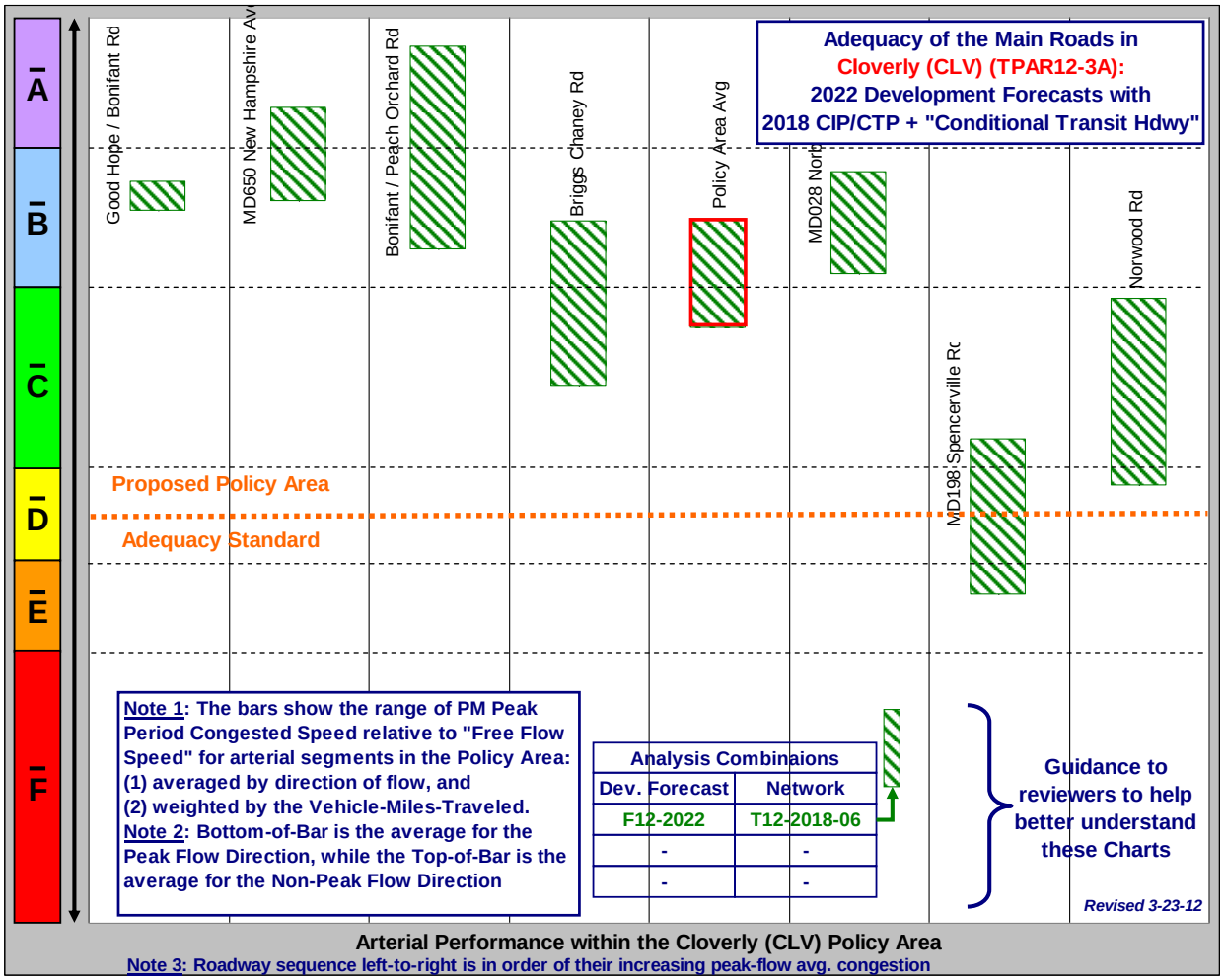

This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the CLV that were shown in the prior graphic. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

**Assessment of Areawide Roadway Adequacy for the CLV Policy Area**: The overall weighted average for the CLV Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the CLV area. Therefore, the CLV Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the CLV Policy Area**: The prior graphic shows that all of the depicted seven arterial roads have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for a Suburban Policy Area, often considerably less. Unlike other Policy Area, this graphic shows that there are no roadway link-segments in the CLV Policy Area that are more congested than the Standard for a Suburban Policy Area. As such little direct

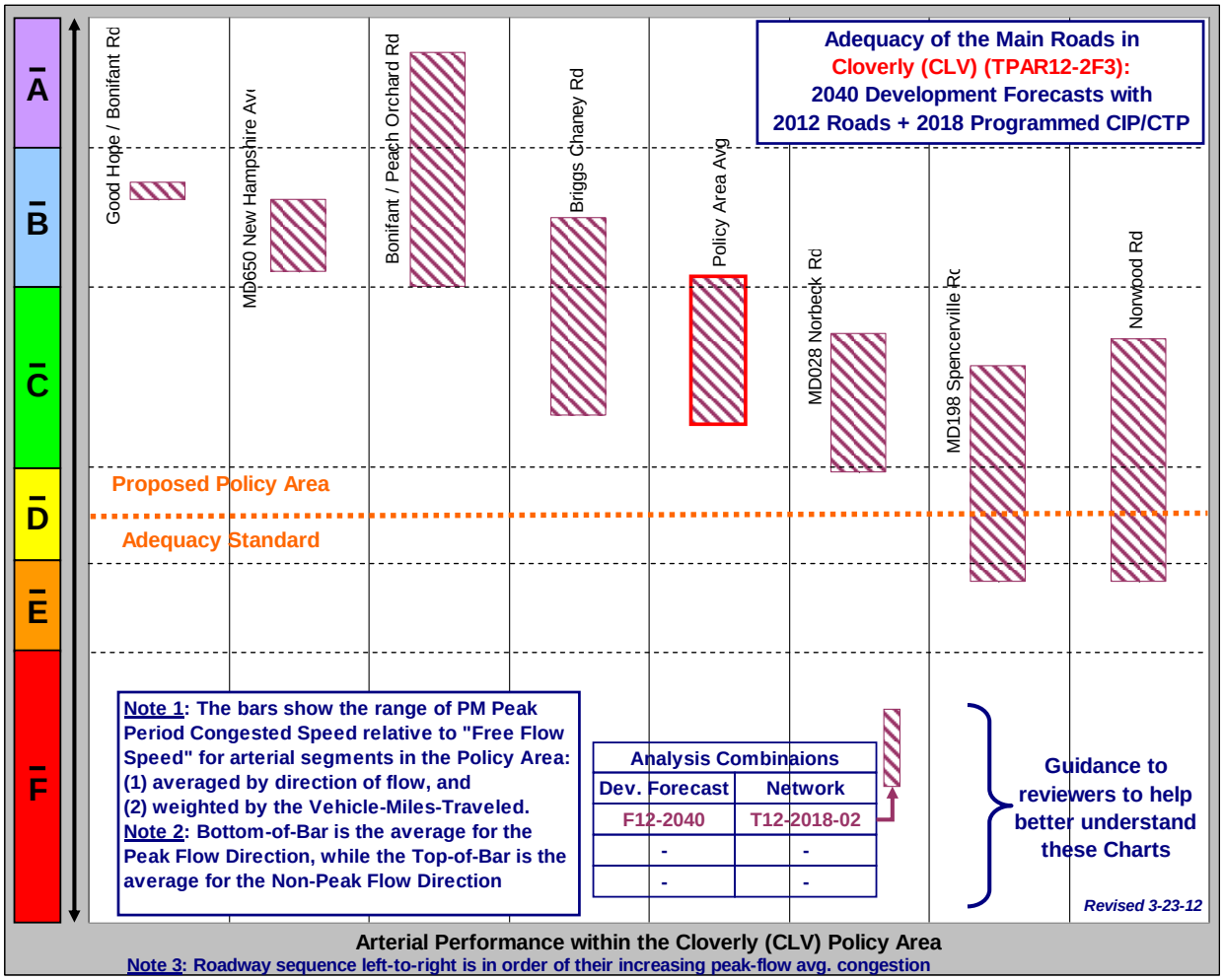
guidance or attention needs to be given to the LATRs for proposed subdivisions in the CLV Policy Area. In addition, given the overall low-to-moderate volumes of traffic throughout many parts of the CLV Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the CLV area there may nevertheless be some arterials that would need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements, including turn-lanes at nearby intersections, access or local circulation needs, bus stops and, sidewalks.

**G. <u>Guidance for Conditional Transportation Solutions</u>:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the CLV Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized. However, conditions along the two relatively congested roadways in the CLV Policy Area, Norwood Road and MD 198 Spencerville Road, will need to be monitored.



While other options to improve the roadway network over the next 10 years in the CLV Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the CLV Policy Area would continue to maintain its current regulatory stage overall roadway adequacy into the long term master plan stage. It can also be seen that two roads in the long tem would become congested in the peak flow direction absence further "conditional projects" from the Master Plan.



## North Potomac Policy Area

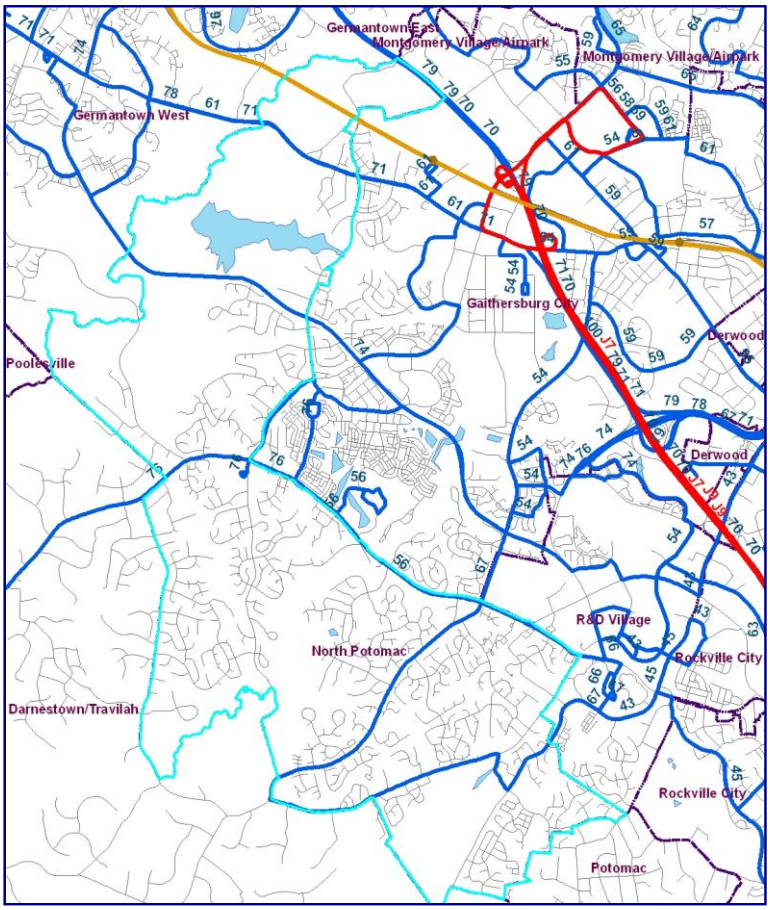
**A. <u>Overview of the Policy Area</u>**: North Potomac (NP) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. This area is served by bus transit service, moderate population and employment densities, and overall transit coverage of just under 30% of its area. There is no notable growth that recently occurred or is expected to occur in this Policy Area, although that is not the case in adjacent Policy Areas.

**B. <u>Forecast of Development Activity</u>**: The NP Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 165 households and 43 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 465 households and 51 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 1,273 households and 134 jobs. This household growth is slow compared to previous household development in the area. While the job growth is also low and a small share of the total growth in the County, it is a moderate growth compared to previous job growth within the area.

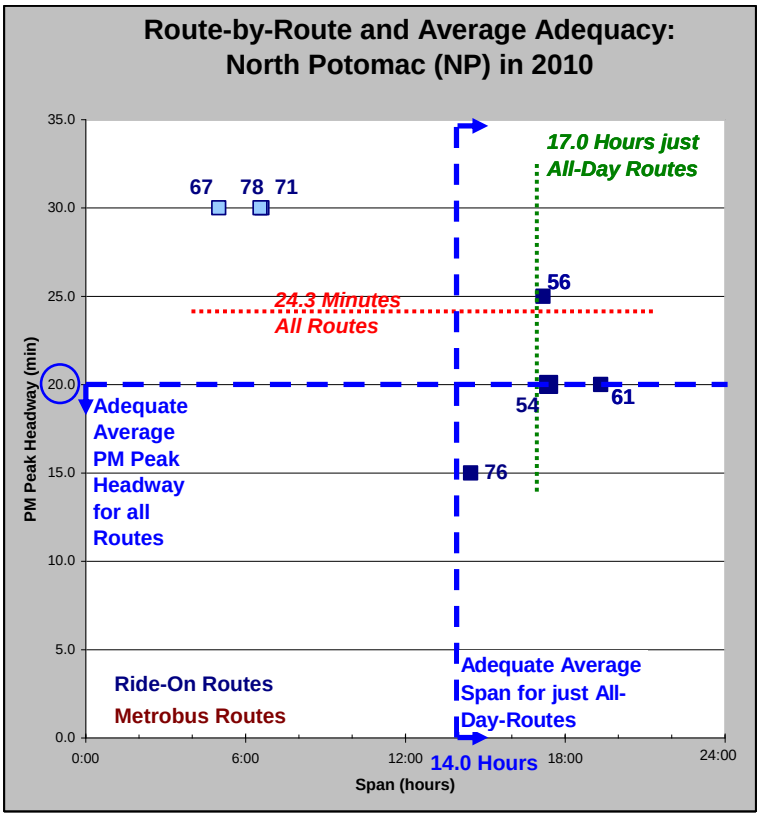
| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **North Potomac** | 9,085 | | 9,250 | | 9,452 | | 10,725 | 1,572 | | 1,615 | | 1,666 | | 1,800 |
| Growth in the Policy Area | | 165 | | 465 | | 1,273 | | | 43 | | 51 | | 134 | |
| Percent Growth of Area | | 1.8% | | 5.0% | | 13.5% | | | 2.7% | | 3.2% | | 8.0% | |
| Percent of County Growth | | 0.6% | | 2.9% | | 2.2% | | | 0.1% | | 0.1% | | 0.1% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are no programmed projects to improve roadway or transit capacity in the NP area. As also noted in the discussion of other Policy Areas, a "conditional project" has been identified to provide Peak Hour Headway improvements to about a dozen Ride-On routes that currently serve about 8 of the Suburban Policy Areas needing improved Peak Hour Headways to attain the Peak Headway Adequacy Standard. Most of those dozen routes would directly serve more than one Policy Area, as well as indirectly serve a similar number of: (a) other Suburban Policy Areas combined with (b) several of the Urban Policy Areas. Such a "conditional project" could be implemented in a few increments over a few years or all at once. Interim ridership results and travel survey user responses would be monitored over time and refinements could be made along the way.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | Countywide | N | Some | Y |




Ride-On Route and # Metrobus Route and #




**D. <u>Transit Adequacy Analysis</u>:** The NP Policy Area does not yet have adequate transit service in terms of the factors of Peak Headway and it is just shy of having adequate Coverage. However, the NP area is adequate in terms of the factor of Span of service. The future CCT will be serving this area.

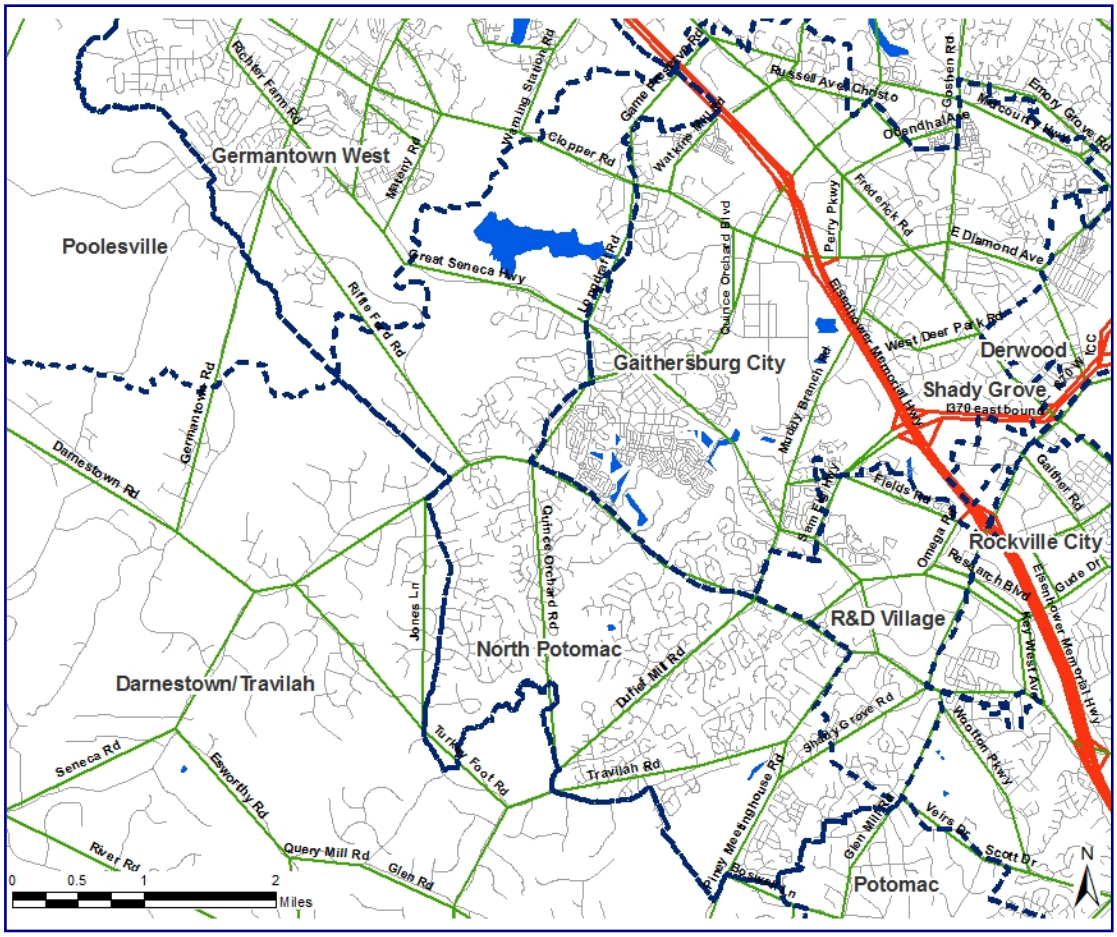
**Coverage of Service:** About 29% of the NP Policy Area is located within 1/3 of a mile of one of the 7 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the NP area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the NP Policy Area is not yet adequate. Given the several routes and a "conditional" project for Peak Headways it seems very feasible to extend somewhat one or more routes to attain adequate Coverage.

**Peak Headways:** All buses on average provide 24.3 minutes between buses during the weekday evening peak period in the NP Policy Area. In areas like NP where future LRT will be provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the NP area is not yet adequate. A "conditional" countywide project that could directly serve this area to improve peak headways could attain adequacy within the next 10 years.

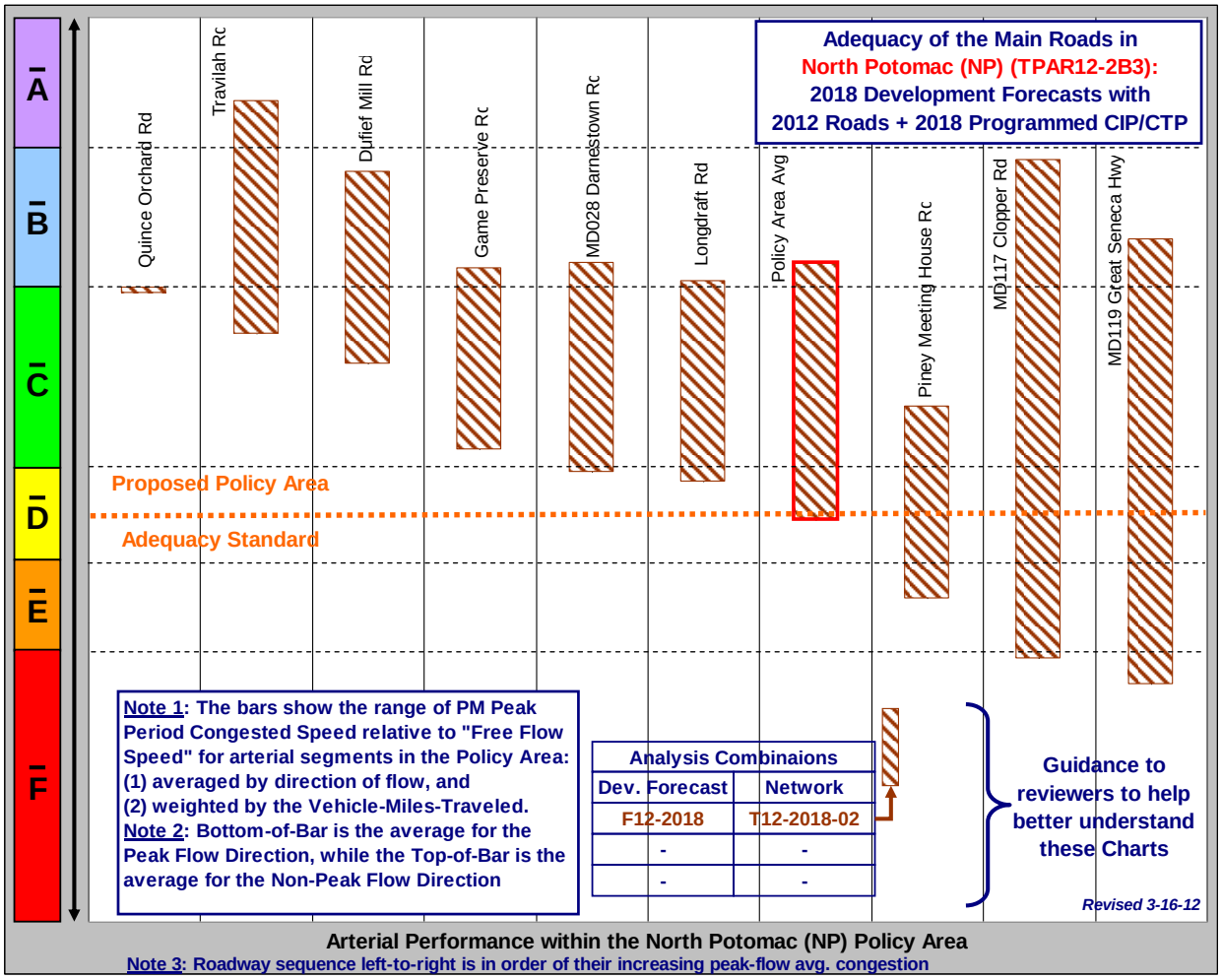
**Span of Service**: The average value of span is 17.0 hours per day for routes that operate all-day. The urban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the NP Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the NP Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for NP roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the NP Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the NP that were shown in the prior graphic. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

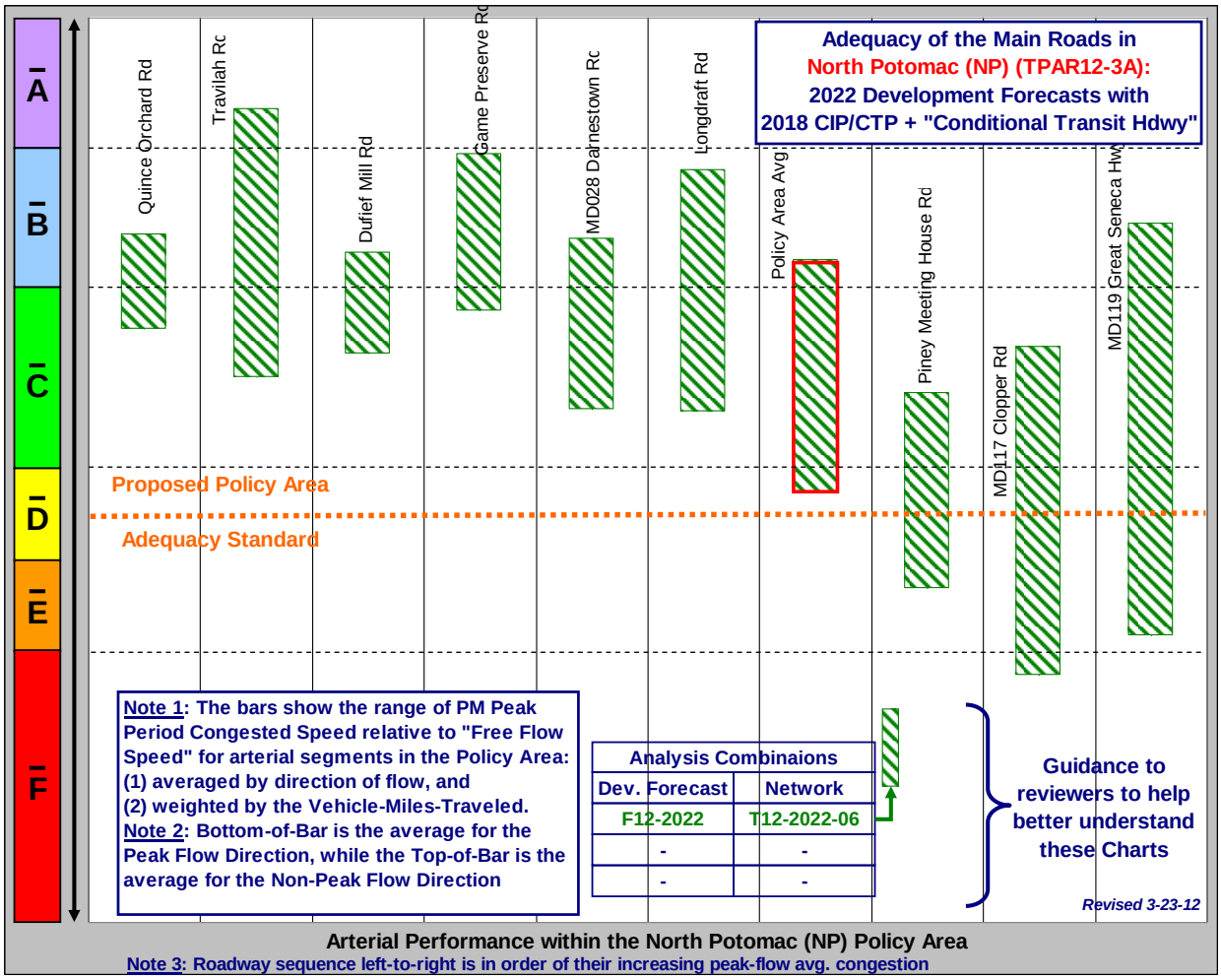
**Assessment of Areawide Roadway Adequacy for the NP Policy Area**: The overall weighted average for the NP Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is <u>below</u> the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Suburban Policy Areas, such as the NP area. Therefore, the NP Policy Area overall does not have adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. <u>Guidance to Local Area Transportation Review (LATR) in the NP Policy Area</u>**: The prior graphic shows that six of the depicted left-most arterial roads have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is <u>less</u> congested that the Standard for an Urban Policy Area, some considerably less. Yet the graphic also shows that there are three other roadway link-segments in the NP Policy Area that are <u>more</u> congested than the Standard for an Urban Policy Area. Reading from right to the left in the prior

graphic, locally inadequate congested conditions would be more likely found on parts of: (a) MD 119 Great Seneca Highway, (b) MD 117 Clopper Road, and (c) Piney Meeting House Road. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

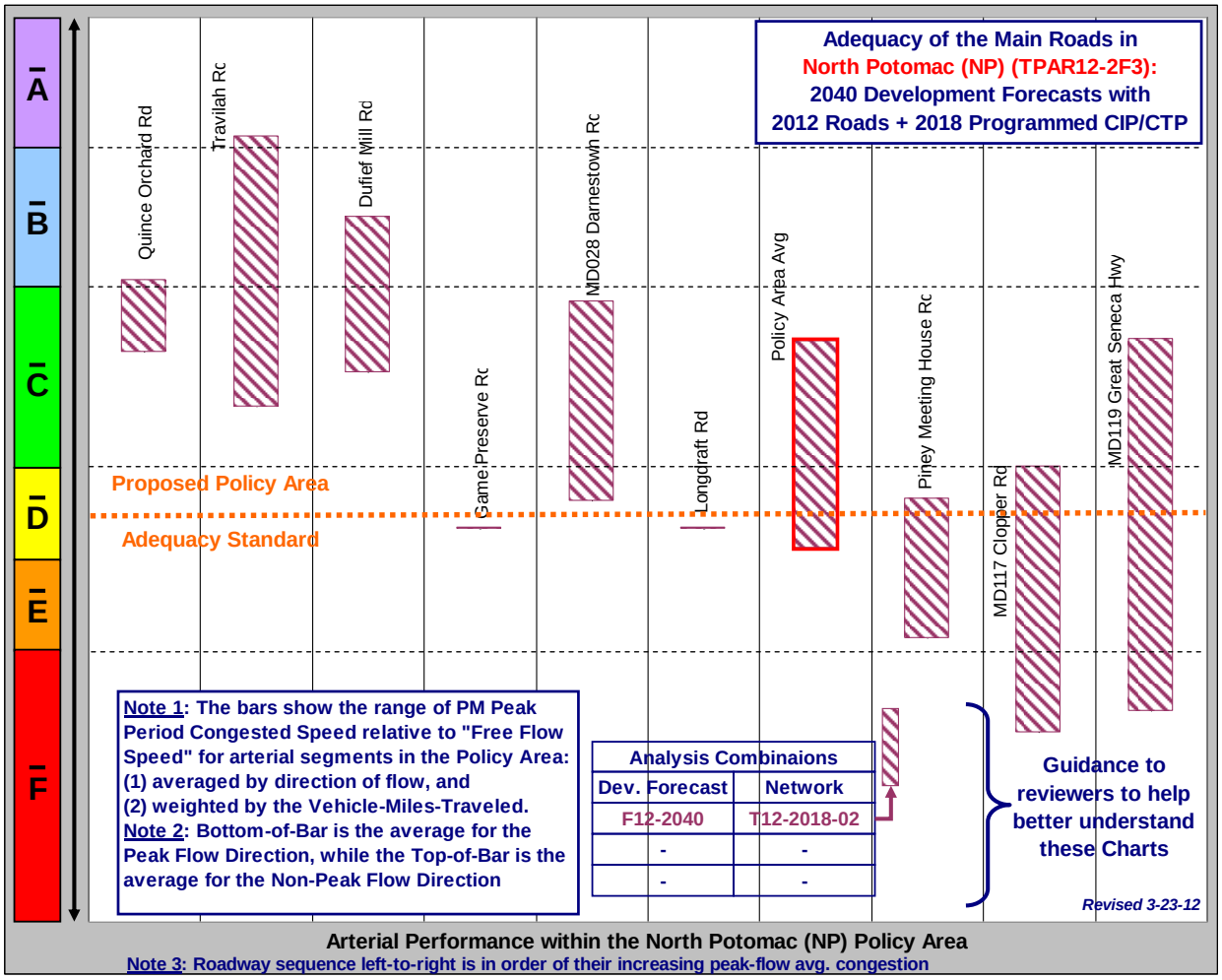
In addition, given the overall high volumes of traffic throughout many parts of the NP Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the NP area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements, including turn-lanes at nearby intersections, access or local circulation needs, bus stops, and sidewalks, and so on.

**G. <u>Guidance for Conditional Transportation Solutions</u>:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The low growth in household and employment between 2018 and 2022, high growth elsewhere, and reduced traffic due to conditional Peak Headway changes, would result in the NP Policy Area attaining overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized at this time.



While other options to improve the roadway network over the next 10 years in the FWO Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the NP Policy Area would return to overall roadway inadequate conditions of the current regulatory stage adequacy in the long term master plan stage. It can also be seen that two additional roads would become congested in the absence of further "conditional projects" from the Master Plan. The analyses done for the Proposed TPAR10 considered widening parts of MD 117 Clopper Road as a potential "conditional" project and it appears that future TPAR adequacy analyses will need to consider that sooner than later.



## Olney Policy Area

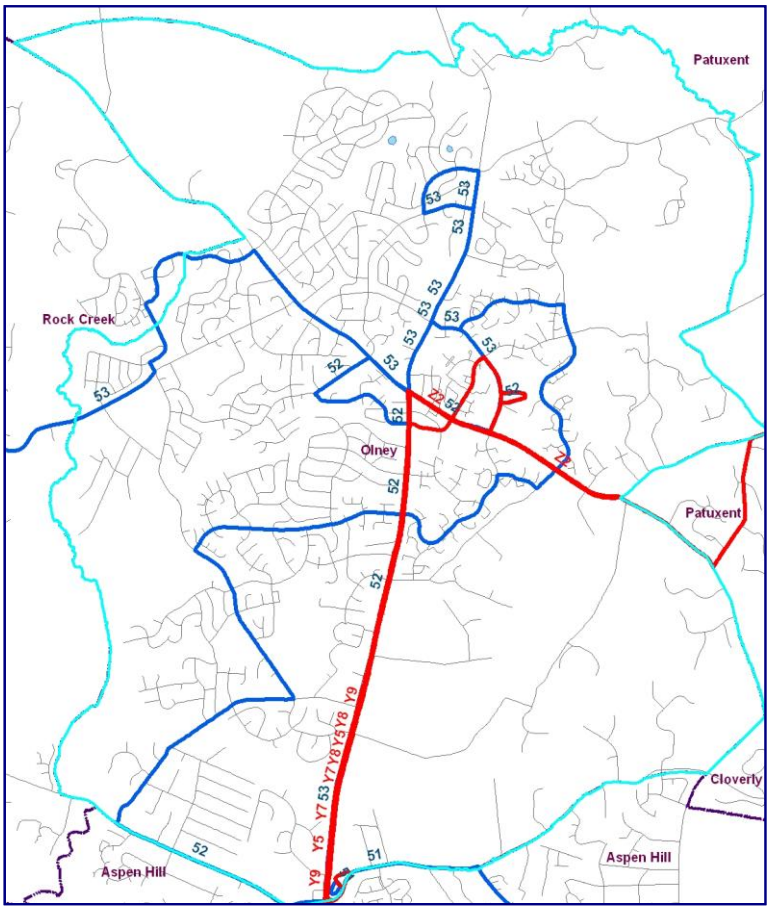
**A. <u>Overview of the Policy Area</u>**: Olney (OLY) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. This area is served by bus transit service, moderate population and low employment densities, and overall transit coverage of less than 30% of its area. There is no notable growth that recently occurred or is expected to occur in this Policy Area. The recently opened MD 200 (Intercounty County Connector) traverses the southern part of the Olney area and access and egress is provided by an interchange at MD 97 Georgia Avenue.

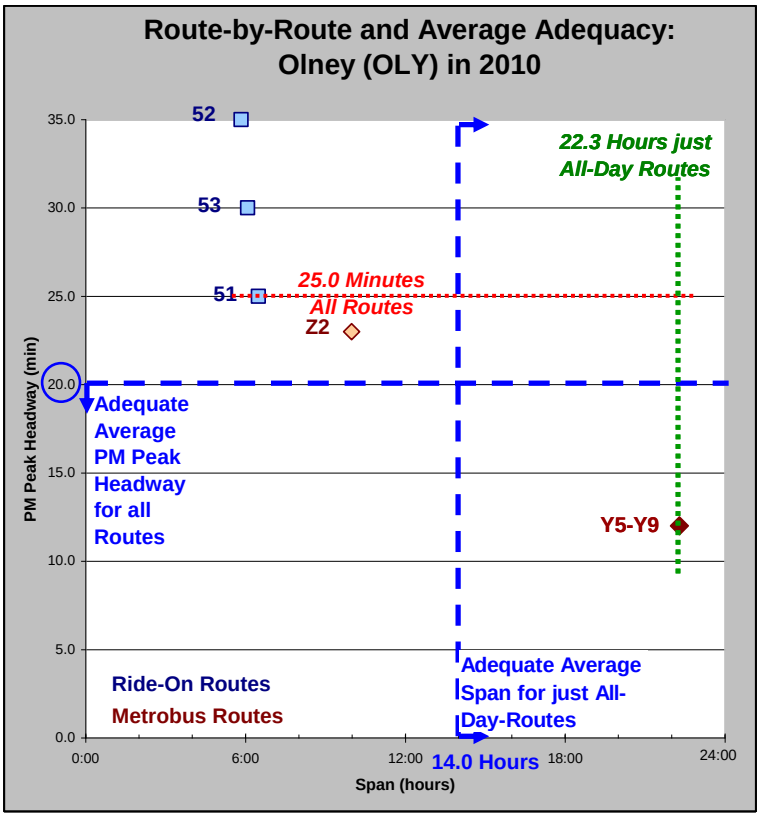
**B. <u>Forecast of Development Activity</u>**: The OLY Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 502 households and 52 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 443 households and 20 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 961 households and 117 jobs. This household growth is moderate and the job growth is low with respect to previous house development in the area. While the household growth is forecast to be a small to low share of the total growth in the County and the job growth is very small growth compared to total job growth in the County.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Olney** | 11,455 | | 11,957 | | 12,400 | | 13,361 | 5,532 | | 5,584 | | 5,604 | | 5,721 |
| Growth in the Policy Area | | 502 | | 443 | | 961 | | | 52 | | 20 | | 117 | |
| Percent Growth of Area | | 4.4% | | 3.7% | | 7.8% | | | 0.9% | | 0.4% | | 2.1% | |
| Percent of County Growth | | 1.7% | | 2.8% | | 1.7% | | | 0.1% | | 0.1% | | 0.1% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are no programmed new projects to improve roadway capacity in the Olney area at this time. As also noted in the discussion of other Policy Areas, a "conditional project" has been identified to provide Peak Hour Headway improvements to about a dozen Ride-On routes that currently serve about 8 of the Suburban Policy Areas needing improved Peak Hour Headways to attain the Peak Headway Adequacy Standard. Most of those dozen routes would directly serve more than one Policy Area, as well as indirectly serve a similar number of: (a) other Suburban Policy Areas combined with (b) several of the Urban Policy Areas. Such a "conditional project" could be implemented in a few increments over a few years or all at once. Interim ridership results and travel survey user responses would be monitored over time and refinements could be made along the way.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | Countywide | N | Some | Y |




**D. <u>Transit Adequacy Analysis</u>**: The Olney Policy Area does not yet have adequate transit service in terms of the factors of Peak Headway nor having adequate Coverage. However, the Olney area is adequate in terms of the factor of Span of service.

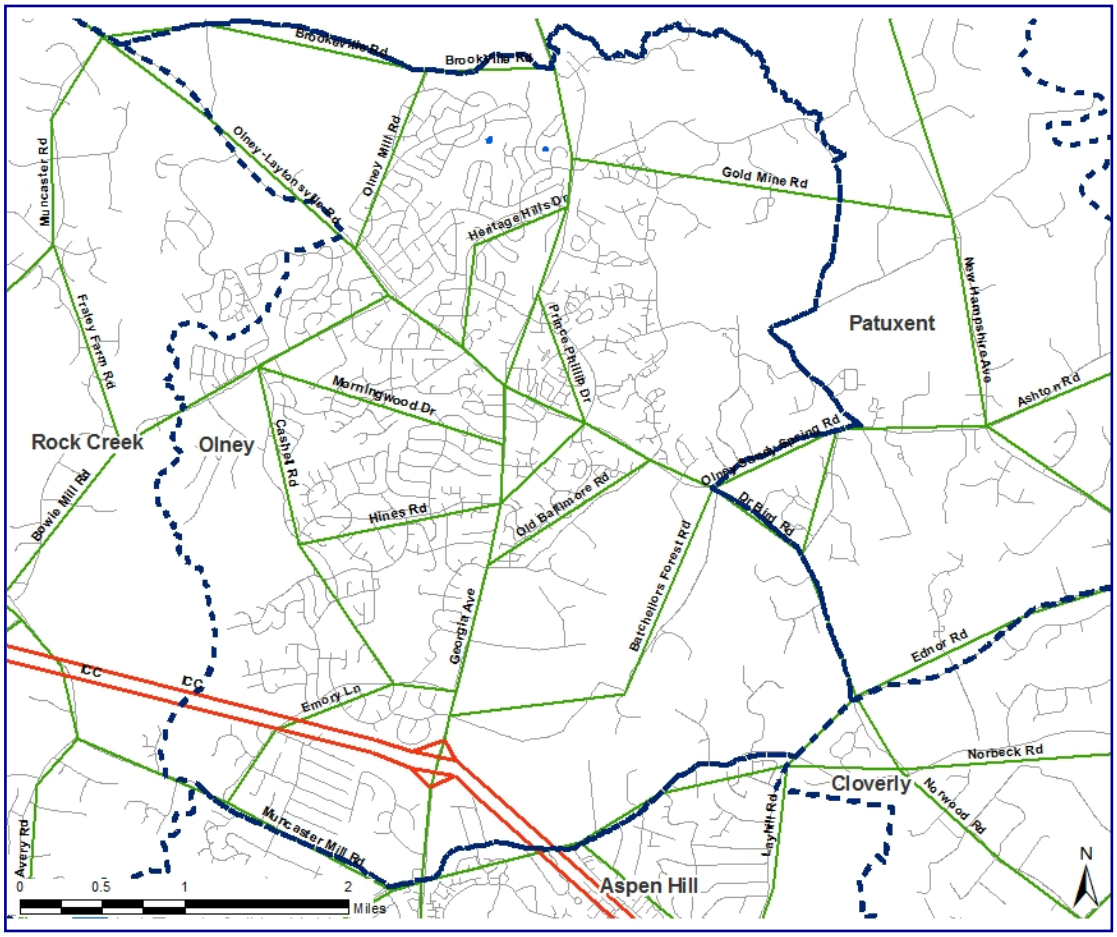
**Coverage of Service:** About 26% of the Olney Policy Area is located within 1/3 of a mile of one of the 5 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the OLY area. The standard for Coverage for a Suburban Area is 30%. Therefore transit coverage in the Olney Policy Area is not yet adequate. Given the several routes and a "conditional" project for Peak Headways it seems feasible to extend one or more of the routes to get adequate Coverage.

**Peak Headways:** All buses on average provide 25.0 minutes between buses during the weekday evening peak period in the Olney Policy Area. Some provide frequent service such as the Y5-Y9 Metrobuses. In bus served areas like OLY the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the OLY area is not yet adequate. A "conditional" countywide project that could directly serve this area to improve peak headways could attain adequacy within the next 10 years.

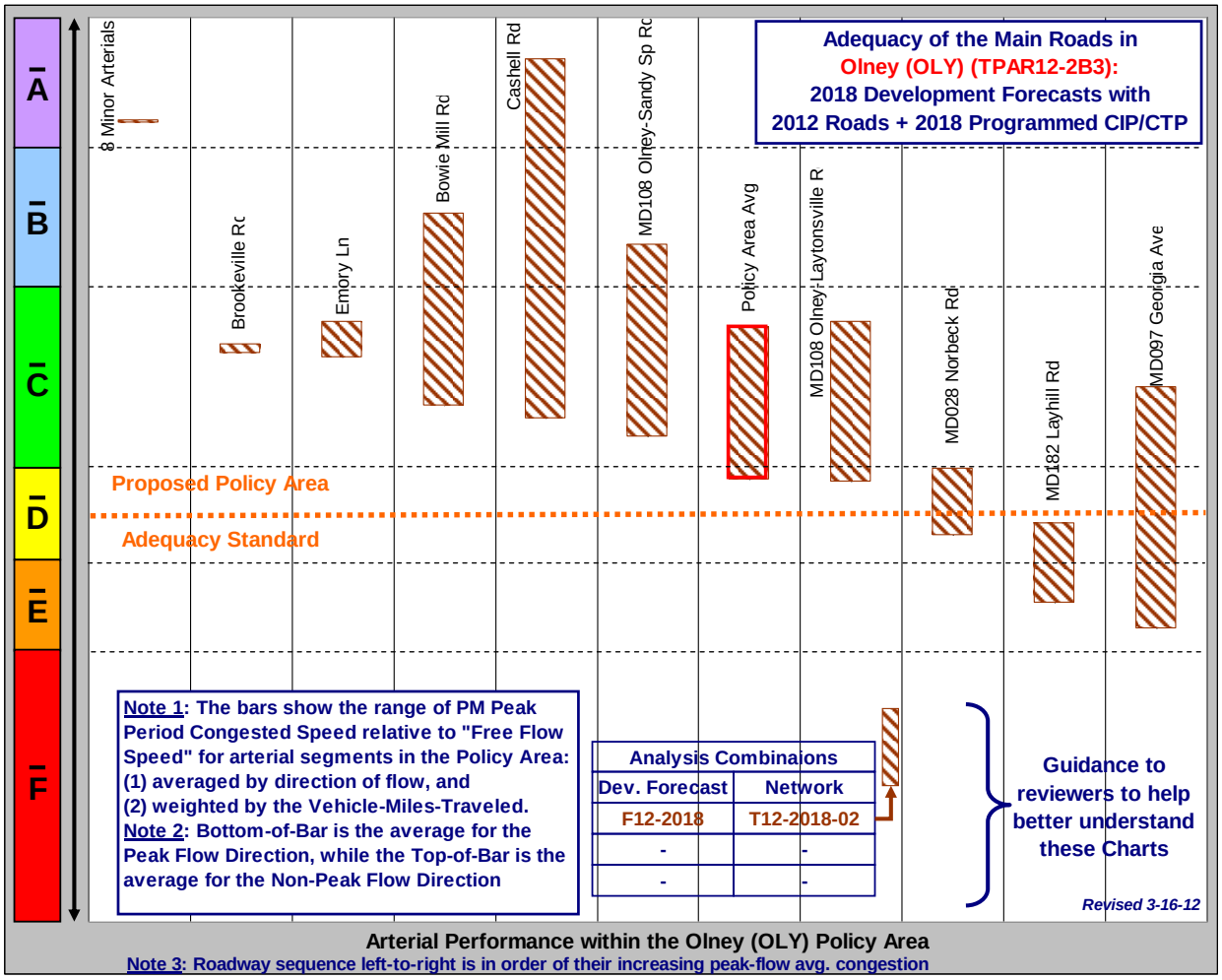
**Span of Service**: The value of span is 22.3 hours per day for the one route that operates all-day due to service to Montgomery General Hospital. The Suburban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the OLY Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the OLY Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for OLY roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the OLY Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the OLY that were shown in the prior graphic. The leftmost bar is itself an average, in this case of 8 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

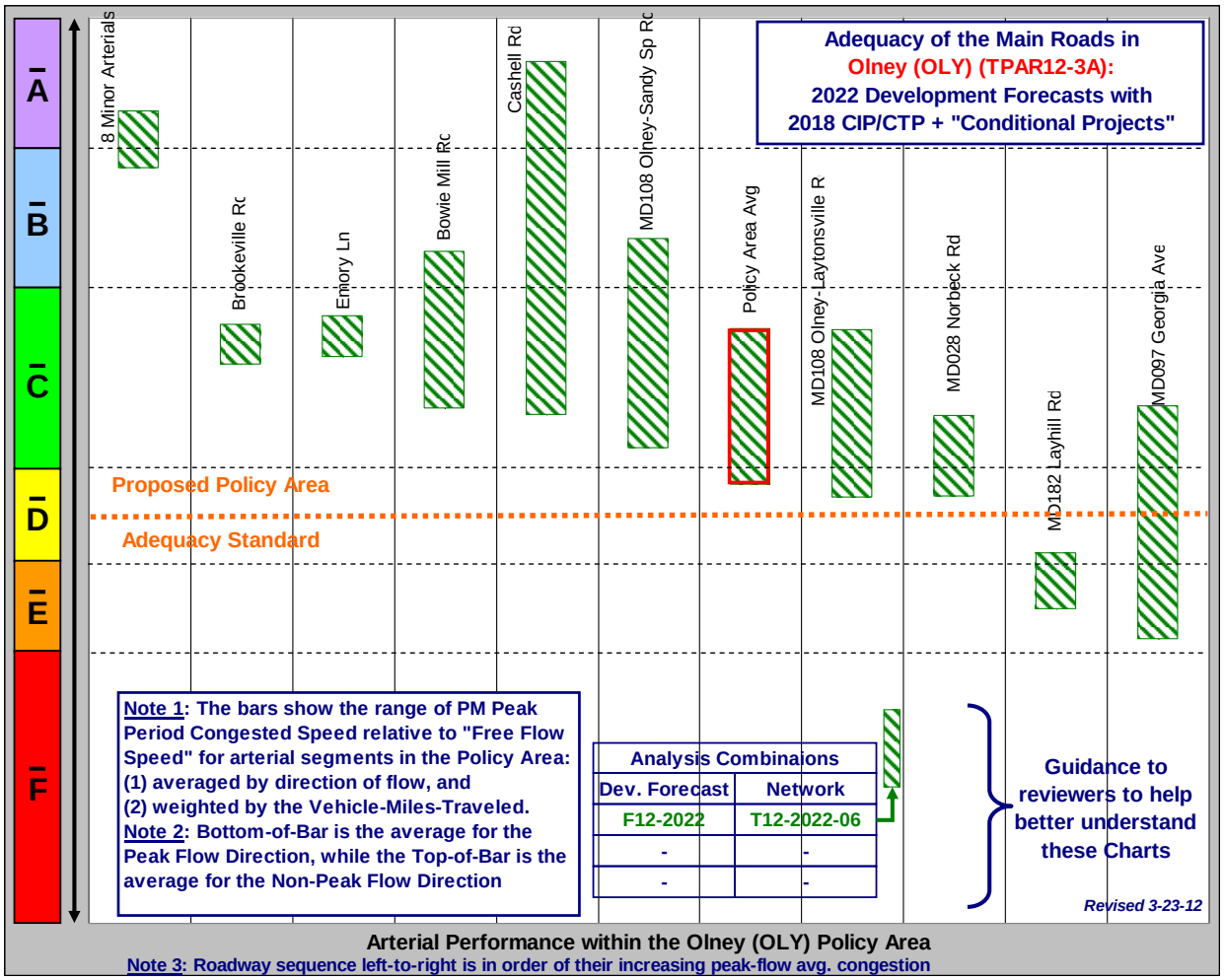
**Assessment of Areawide Roadway Adequacy for the OLY Policy Area**: The overall weighted average for the OLY Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Suburban Policy Areas, such as the OLY area. Therefore, the OLY Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the OLY Policy Area**: The prior graphic shows that six of the depicted left-most arterial roads (and the nine minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for a Suburban Policy Area. Yet the graphic also shows that there are three other roadway link-segments in the OLY

Policy Area that are more congested than the Standard for a Suburban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) MD 97 Georgia Ave, (b) MD 182 Layhill Rd, and (c) MD 28 Norbeck Rd. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

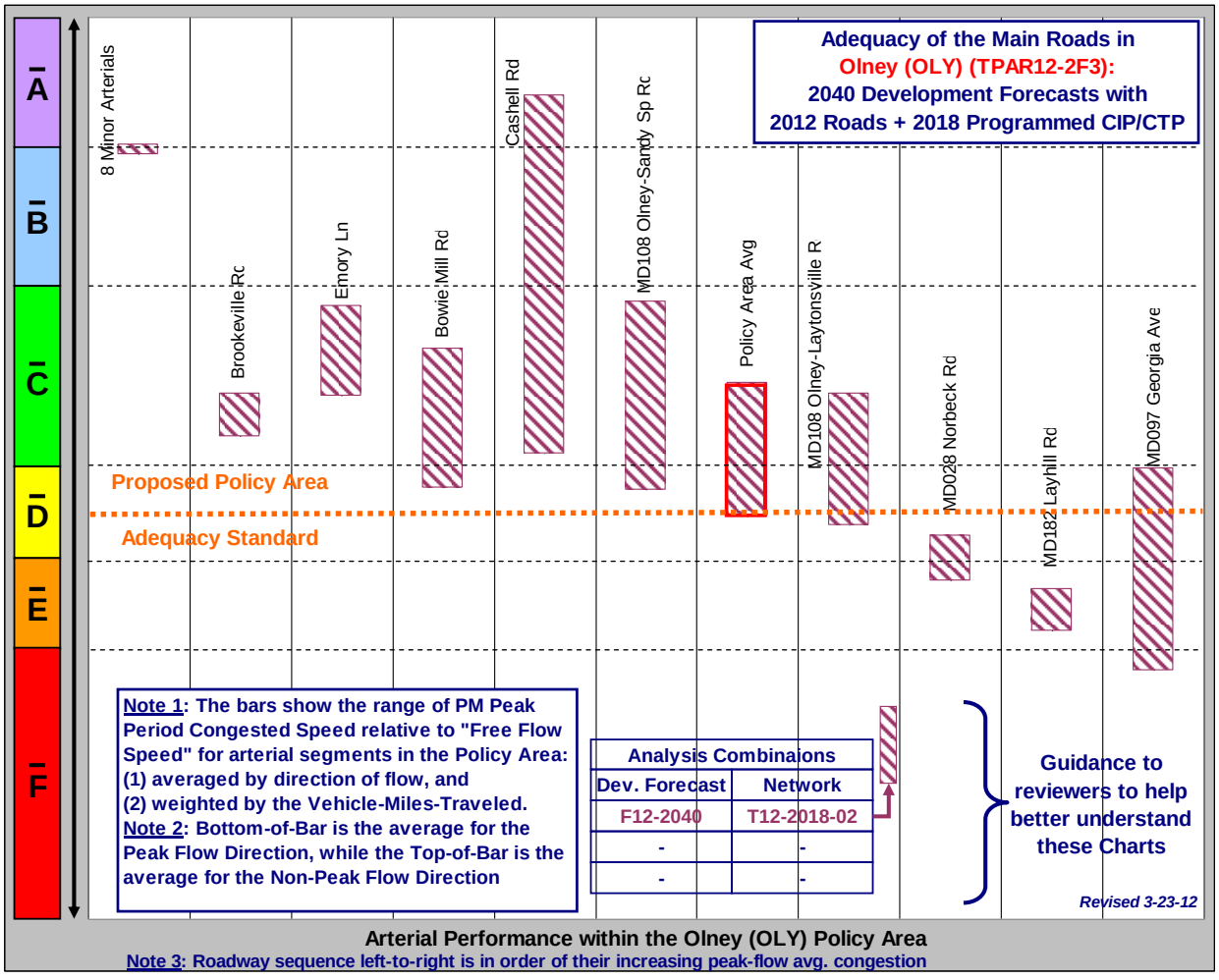
In addition, given the overall moderate to high volumes of traffic throughout many parts of the Olney Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the Olney area may also need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the OLY Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized at this time.



While other options to improve the roadway network over the next 10 years in the Olney Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. In addition, transit improvements and enhancements as well proactive traffic signal improvements could be undertaken to improve the functioning of the roadway network in this Policy Area. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the Olney Policy Area would loose the current regulatory stage overall roadway adequacy by the time period of the long term master plan stage unless various Master Planned projects are implemented. It can also be seen that additional road MD 108 Olney-Laytonsville Road would become congested in the absence of further "conditional projects" from the Master Plan. Other roads would have heavy traffic but still operate at an acceptable level of congestion on average. Given this longer-term outlook, in the nearer term and mid-term emphasis should be given to developing an Olney-specific Traffic Management and Operations program.



## Potomac Policy Area

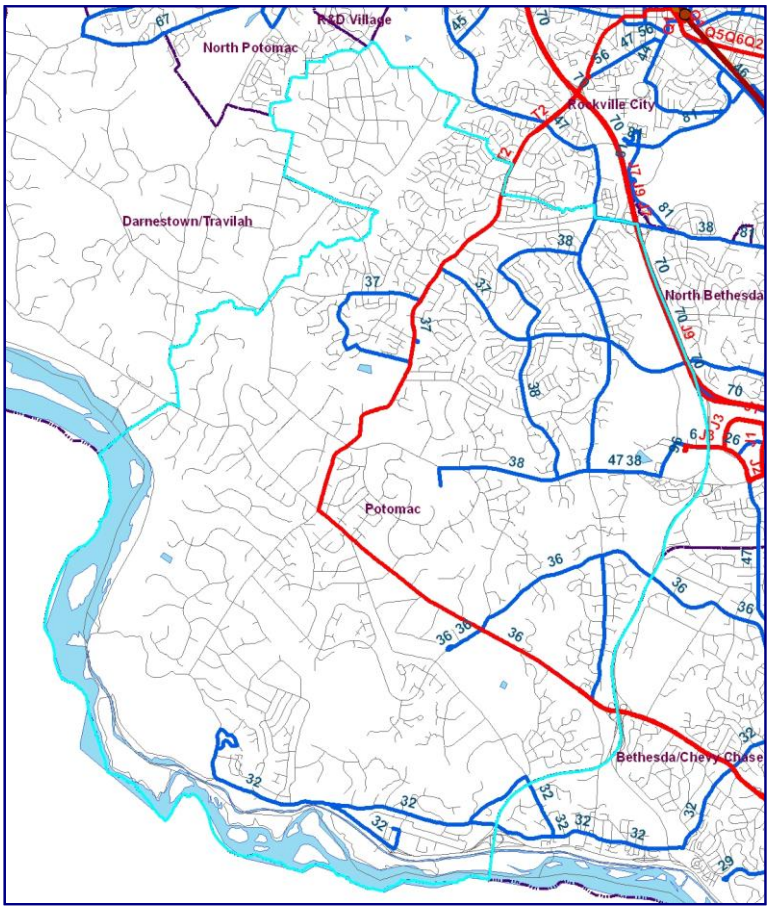
**A. <u>Overview of the Policy Area</u>**: Potomac (POT) is categorized as a Suburban Policy Area, given the transit and development activity features of the area. This area is served by bus transit service, low population and low employment densities, and overall transit coverage of less than 30% of its area. There is no notable growth that recently occurred or is expected to occur in this Policy Area.

**B. <u>Forecast of Development Activity</u>**: The POT Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 746 households and 2,063 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 240 households and 116 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 339 households and 353 jobs. This growth is slow and is a declining share of the total growth in the County.

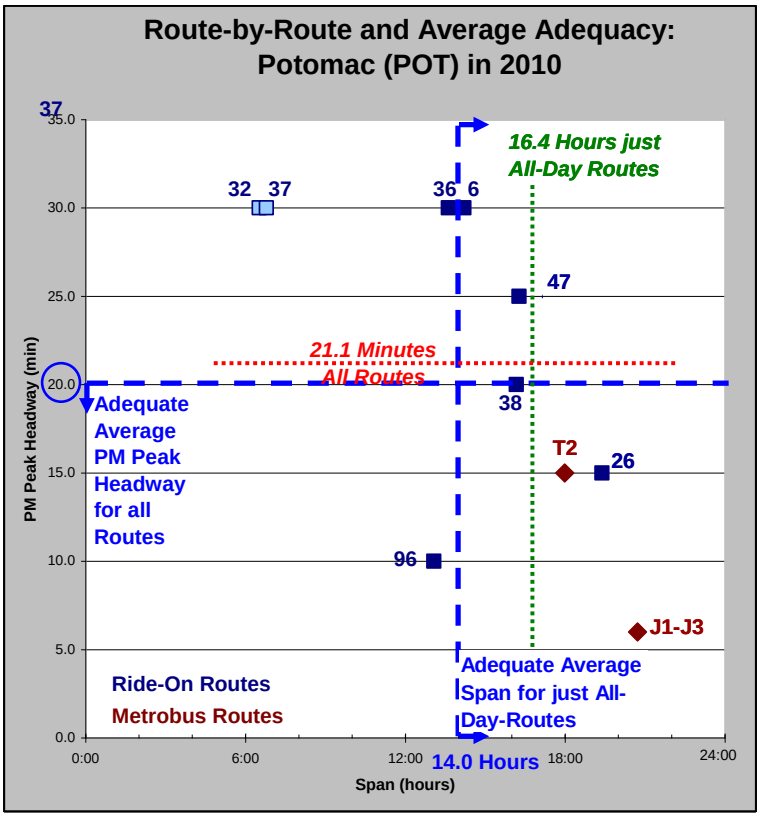
| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Potomac** | 17,131 | | 17,450 | | 17,690 | | 18,029 | 12,296 | | 14,359 | | 14,475 | | 14,828 |
| Growth in the Policy Area | | 746 | | 240 | | 339 | | | 2,063 | | 116 | | 353 | |
| Percent Growth of Area | | 4.4% | | 1.4% | | 1.9% | | | 16.8% | | 0.8% | | 2.4% | |
| Percent of County Growth | | 2.6% | | 1.5% | | 0.6% | | | 3.3% | | 0.3% | | 0.3% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are no programmed projects to improve roadway capacity in the POT. The Potomac Master Plan has a policy that intentionally limits the character and width of roadway for most to be and remain as two-lane roads. There are a few exceptions for additional turn lanes at selected intersections and Appendix E that list Master planned Road Improvements by Policy Area does have a limited number (5) for the POT area. Regarding transit, as also noted in the discussion of other Policy Areas, a "conditional project" has been identified to provide Peak Hour Headway improvements to about a dozen Ride-On routes that currently serve about 8 of the Suburban Policy Areas needing improved Peak Hour Headways to attain the Peak Headway Adequacy Standard. Most of those dozen routes would directly serve more than one Policy Area, as well as indirectly serve a similar number of: (a) other Suburban Policy Areas combined with (b) several of the Urban Policy Areas. Such a "conditional project" could be implemented in a few increments over a few years or all at once. Interim ridership results and travel survey user responses would be monitored over time and refinements could be made along the way.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | Countywide | N | Some | Y |




Ride-On Route and # Metrobus Route and #




**D. <u>Transit Adequacy Analysis</u>**: The POT Policy Area does not yet have adequate transit service in terms of the factors of Peak Headway and it is shy of having adequate Coverage. However, the POT area is adequate in terms of the factor of Span of service

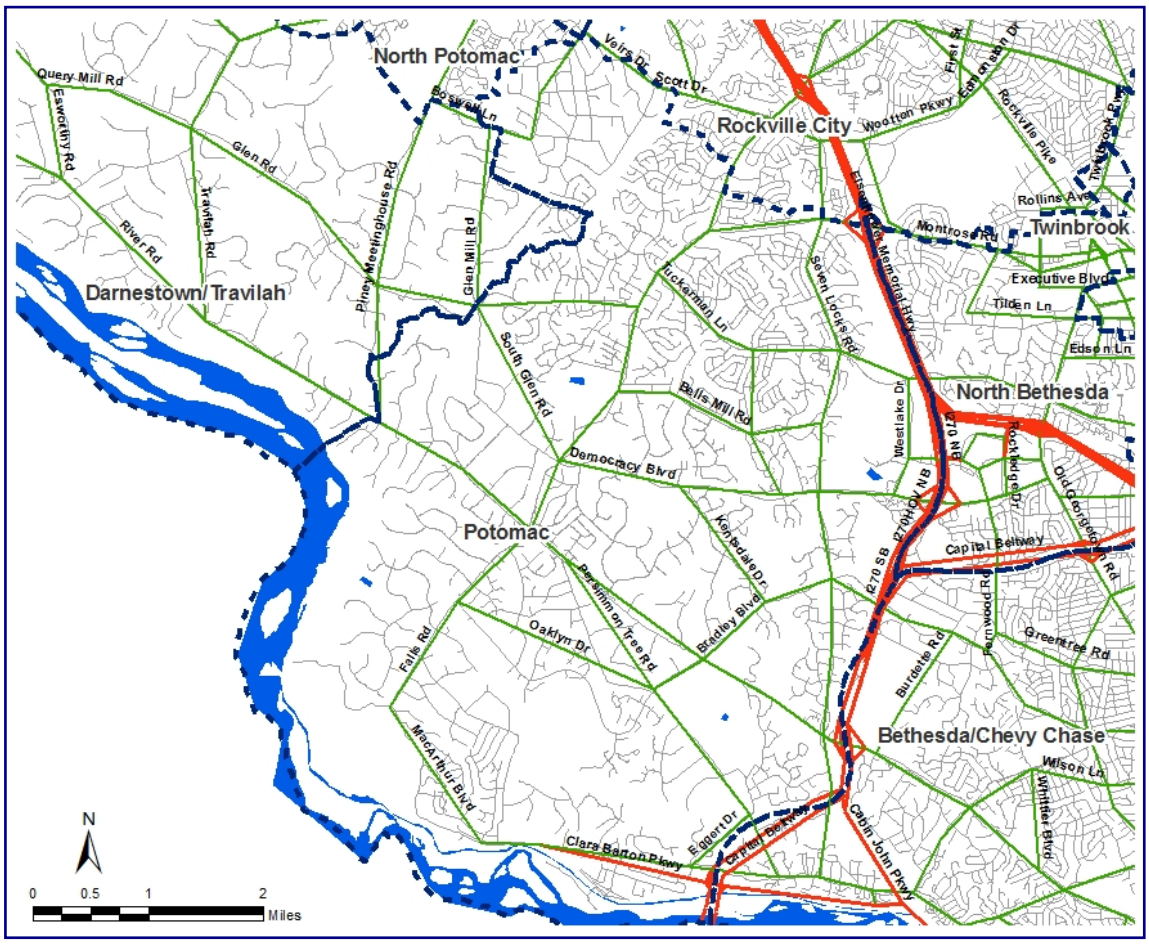
**Coverage of Service:** About 23% of the POT Policy Area is located within 1/3 of a mile of one of the 10 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the POT area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the POT Policy Area is not yet adequate.

**Peak Headways:** All buses on average provide 21.1 minutes between buses during the weekday evening peak period in the POT Policy Area. Some provide very frequent service such as the J1-J3 Metrobuses that goes to the Transit Center adjacent to Montgomery Mall. In areas like POT where Metrorail or future LRT are not provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the POT area is not yet adequate. A "conditional" countywide project could directly improve peak headways in the POT area and the area could attain adequacy within the next 10 year time period.

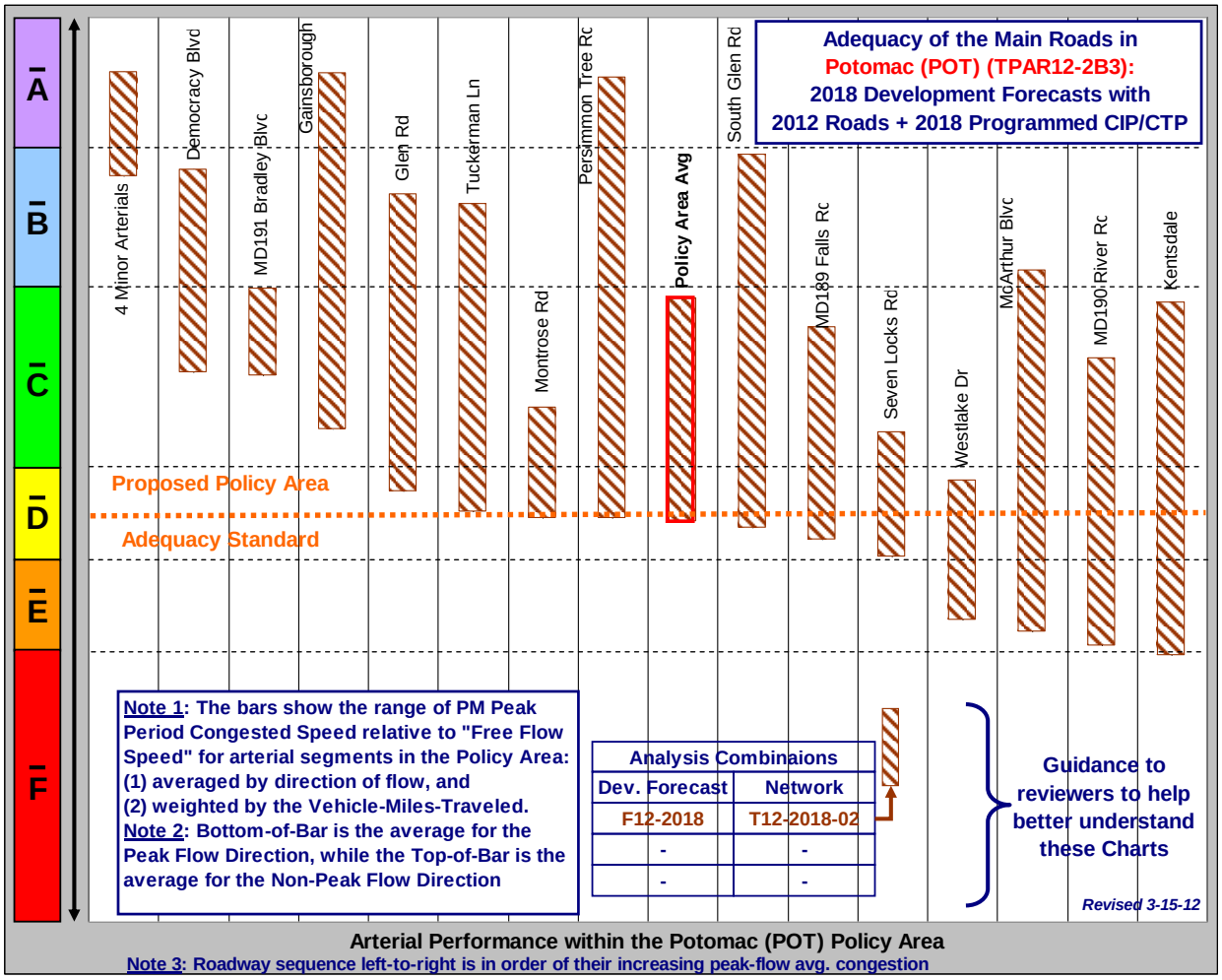
**Span of Service**: The average value of span is 16.4 hours per day for routes that operate all-day. The Suburban standard is 14.0 hours per day on average for all-day routes. Therefore, transit span in the POT Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the POT Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, and even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic for purpose of understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for POT roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the POT Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.



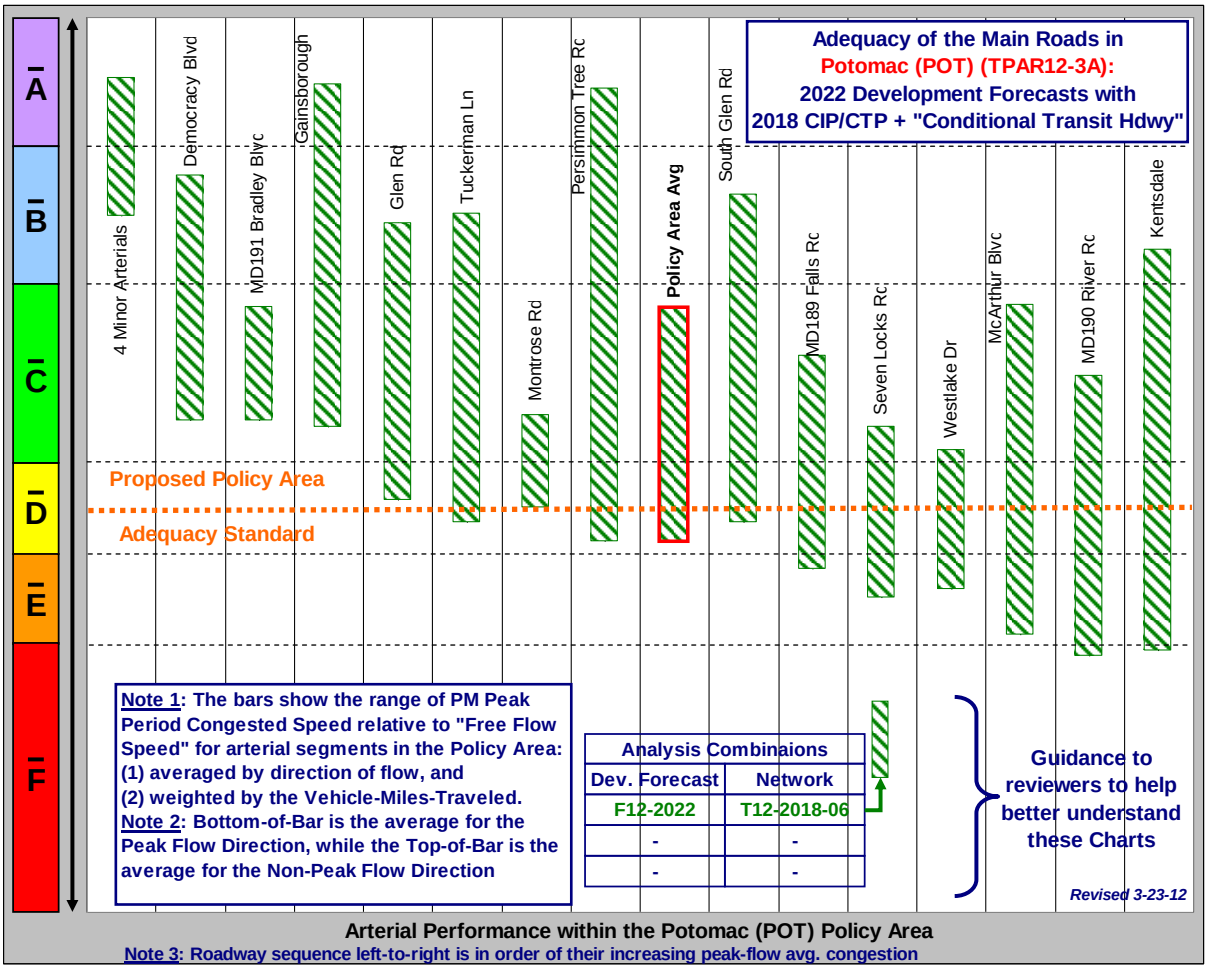

This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the POT that were shown in the prior graphic. The leftmost of the bars is itself an average, in this case of 4 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

**Assessment of Areawide Roadway Adequacy for the POT Policy Area**: The overall weighted average for the POT Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is below the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Suburban Policy Areas, such as the POT area. Therefore, the POT Policy Area overall does not have adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

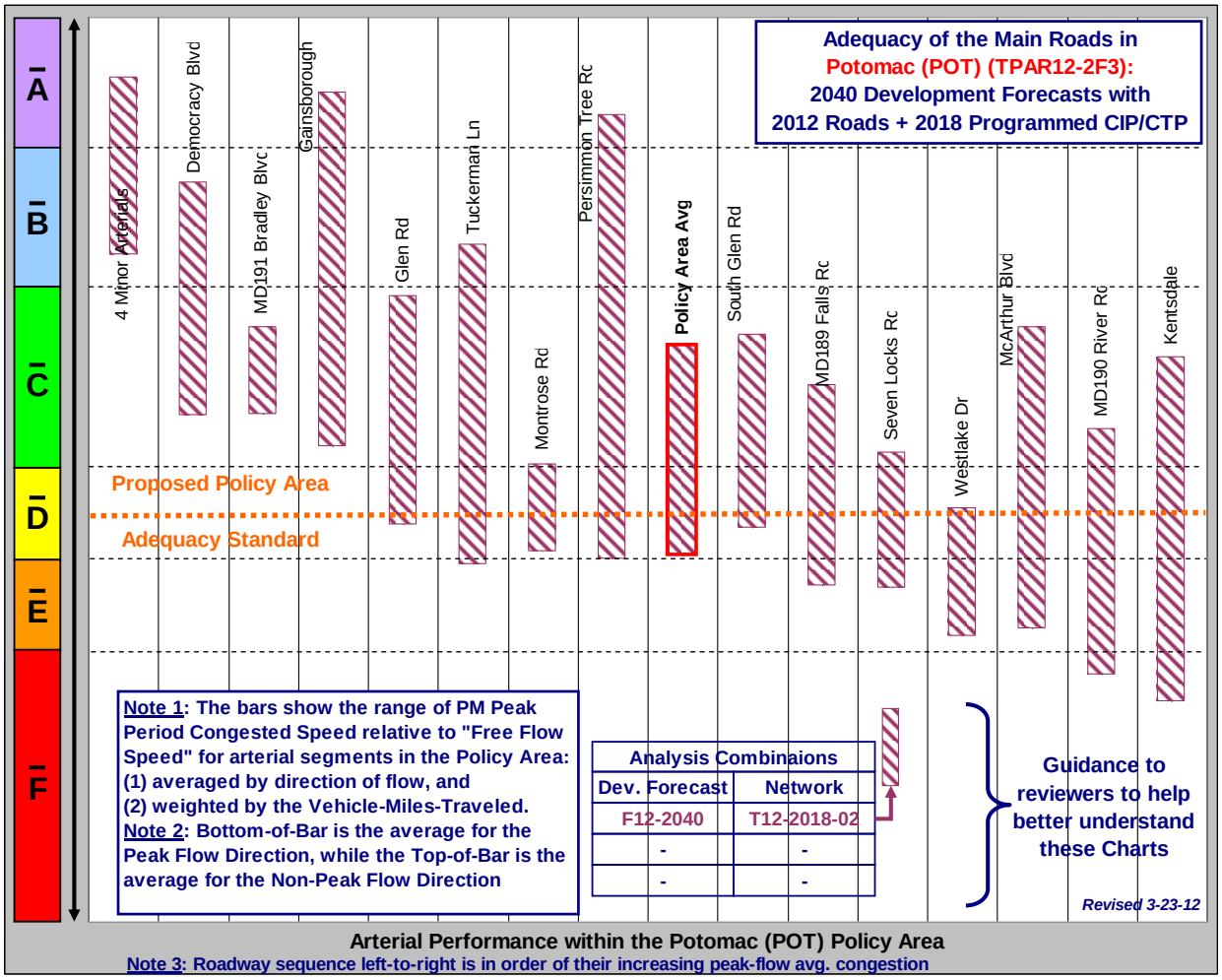
**F. Guidance to Local Area Transportation Review (LATR) in the POT Policy Area**: The prior graphic shows that 7 of the depicted left-most arterial roads (and the 4 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for a Suburban Policy Area. Yet the graphic also shows that there are some 7 other roadway link-segments in the POT Policy

Area that are more congested than the Standard for a Suburban Policy Area. Reading from right to the left in the prior graphic, locally inadequate congested conditions would be more likely found on parts of: (a) Kentsdale Dr, MD 190 River Rd, (c) McArthur Blvd, (d) Westlake Dr, (e) Seven Locks Rd, (f) MD 189 Falls Rd, and (g) South Glen Rd. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site. In most locations the capacity of the roads (a measure of the quantity of possible use per unit of time) is limited, which can result in congested traffic conditions (a measure of the quality experience of using the road per unit time). Given the overall congestion levels of traffic throughout most parts of the POT Policy Area during peak periods in the peak direction of flow, proposed subdivisions that would rely on arterial roads serving the POT area may need to have focused attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, sidewalks, and so on.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, in the POT Policy Area would result in overall congestion becoming somewhat more congested relative to the regulatory planning stage. However, given the Master Plan policy, finding potential "conditional projects" that could be solutions to the congestion were not pursued.



**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the POT Policy Area would have its current regulatory stage overall roadway inadequacy continues into the long term master plan stage. It can also be seen that four additional roads (i.e., Glen Road, Tuckerman Lane, Montrose Road and Persimmon Tree Road) would become very congested in the absence of any "conditional projects" from the Master Plan.



## Clarksburg Policy Area

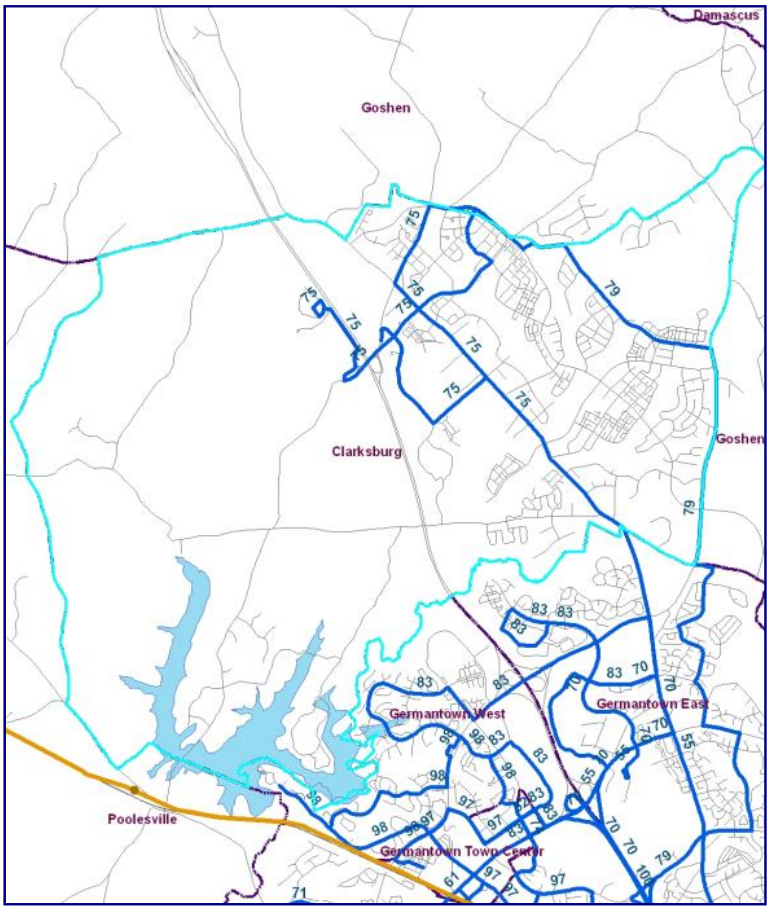
**A. <u>Overview of the Policy Area</u>**: Clarksburg (CLK) is categorized is categorized as a Suburban Policy Area, given the transit and development activity features of the area. There is moderate population and moderate employment densities, and overall transit coverage of less than 30% of its area, considerably less than the standard for a Suburban Policy Area. Notable growth is occurring just on the east side of I-270 at this time, which is in accord with the staging from the Master Plan. If one was to only consider the east side of Clarksburg the transit coverage there would be more than the Suburban standard of 30% -- an exception in the interim is recommended in this instance for this Transit Adequacy factor. More specifics on this are discussed above in Section V.

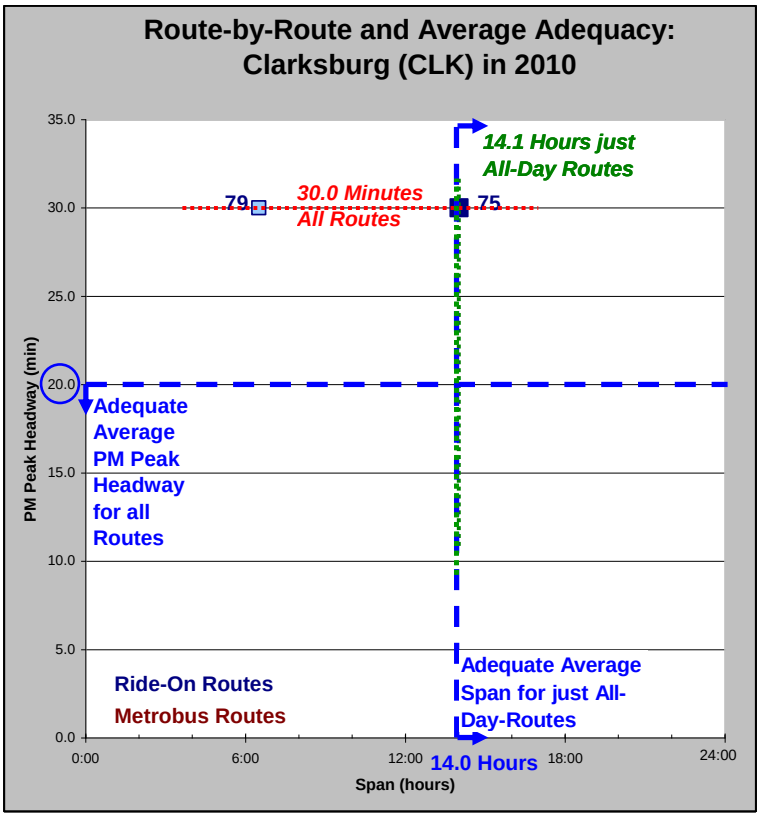
**B. <u>Forecast of Development Activity</u>**: The CLK Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 3,608 households and 1,904 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 2,152 households and 2,395 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 3,737 households and 12,602 jobs. While the household and the job growth is high relatively to the current development activity, it is also a high but declining share of the total household growth in the County but will be a moderate but increasing share of the job growth in the County.

| *Source of the Forecasts*: *Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Clarksburg** | 4,270 | | 7,878 | | 10,030 | | 13,767 | 2,545 | | 4,449 | | 6,844 | | 19,446 |
| Growth in the Policy Area | | 3,608 | | 2,152 | | 3,737 | | | 1,904 | | 2,395 | | 12,602 | |
| Percent Growth of Area | | 84.5% | | 27.3% | | 37.3% | | | 74.8% | | 53.8% | | 184.1% | |
| Percent of County Growth | | 12.4% | | 13.5% | | 6.5% | | | 3.1% | | 6.2% | | 10.2% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

**C. <u>Programmed Transportation Improvements</u>**: There are two programmed projects to improve roadway capacity in the CLK area to address impacts of planned growth, which in this instance are being done in conjunction with private developers with projects in the area. As also noted in the discussion of other selected Policy Areas, a "conditional project" has been identified to provide Peak Hour Headway improvements to about a dozen Ride-On routes that currently serve about 8 of the Suburban Policy Areas needing improved Peak Hour Headways to attain the Peak Headway Adequacy Standard. Most of those dozen routes would directly serve more than one Policy Area, as well as indirectly serve a similar number of: (a) other Suburban Policy Areas combined with (b) several of the Urban Policy Areas. Such a "conditional project" could be implemented in a few increments over a few years or all at once. Interim ridership results and user travel survey responses would be monitored over time and refinements could be made along the way.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| **Private** | Snowden Farm Parkway | MD 355 to MD 27 (4 lanes) | **CLK** | N | **Y** | Y |
| **Private** | Little Seneca Parkway | MD 27 to MD 355 ( 4 lanes) | **CLK** | N | **Y** | Y |
| **CIP** | Ride-On Peak Headway Imprv. | Peak headway improvements: about 12 routes in about 8 Areas | **Countywide** | N | Some | **Y** |




**D. <u>Transit Adequacy Analysis</u>:** The CLK Policy Area does not yet have adequate transit service in terms of the factors of Coverage and Peak Headway although it is just adequate in terms of the factor of Span of service.

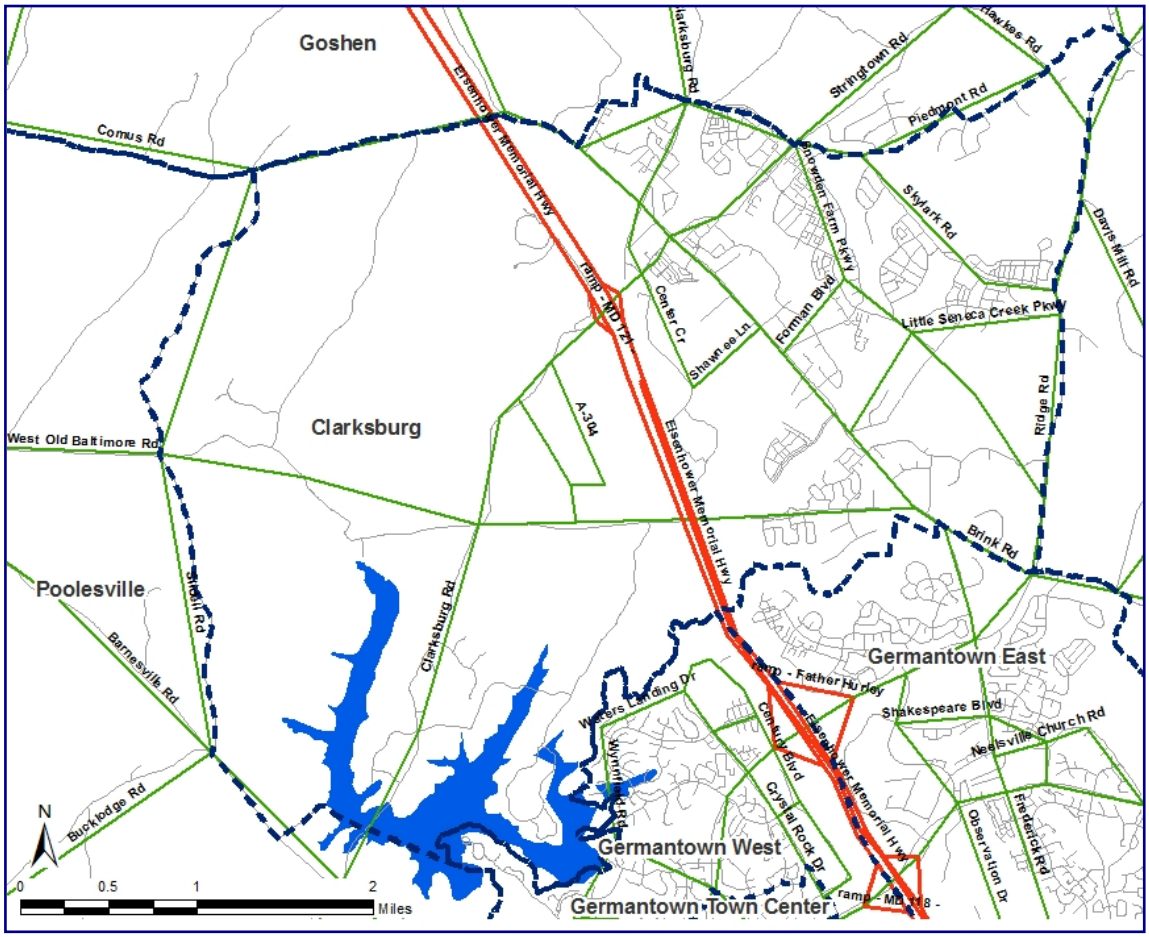
**Coverage of Service:** About 16% of the CLK Policy Area is located within 1/3 of a mile of one of the 2 bus routes currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the CLK area. The standard for Coverage for a Suburban Policy Area is 30%. Therefore transit coverage in the CLK Policy Area is not yet adequate. A temporary 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

**Peak Headways:** Buses on average provide 30.0 minutes between them during the weekday evening peak period in the CLK Policy Area. In areas like CLK where only buses are provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the CLK area is not yet adequate. A "conditional" countywide project to improve peak headways could attain adequacy within the next 10 years.

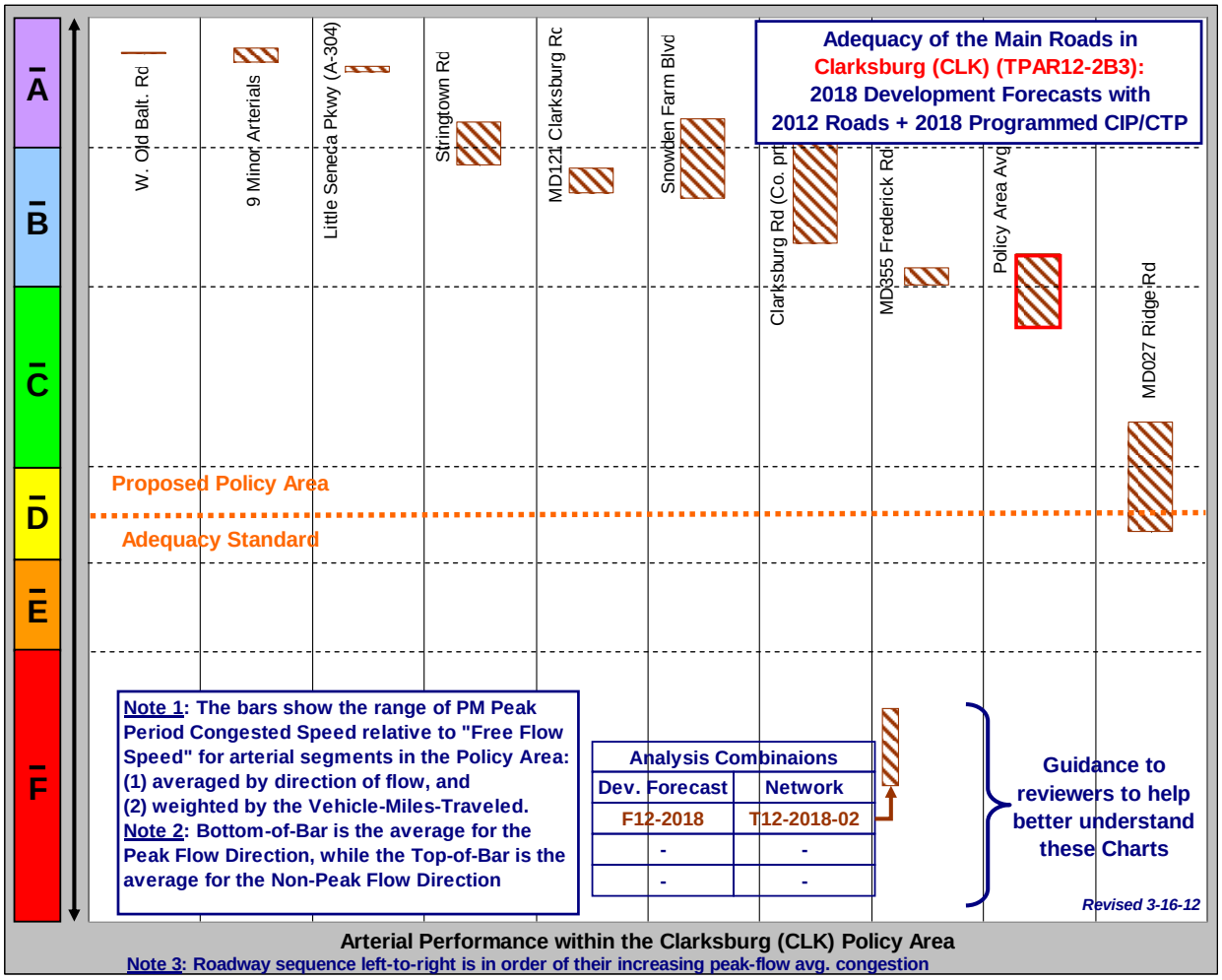
**Span of Service**: The average value of span is 14.1 hours per day for routes that operate all-day. The urban standard is 14.0 hours per day on average for all-day routes. Therefore transit span in the CLK Policy Area is just adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the CLK Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. Nevertheless, the pattern of such local streets is depicted in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for CLK roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the CLK Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.




This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be help. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the CLK that were shown in the prior graphic. Towards the left, one of the bars is itself an average, in this case of 9 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

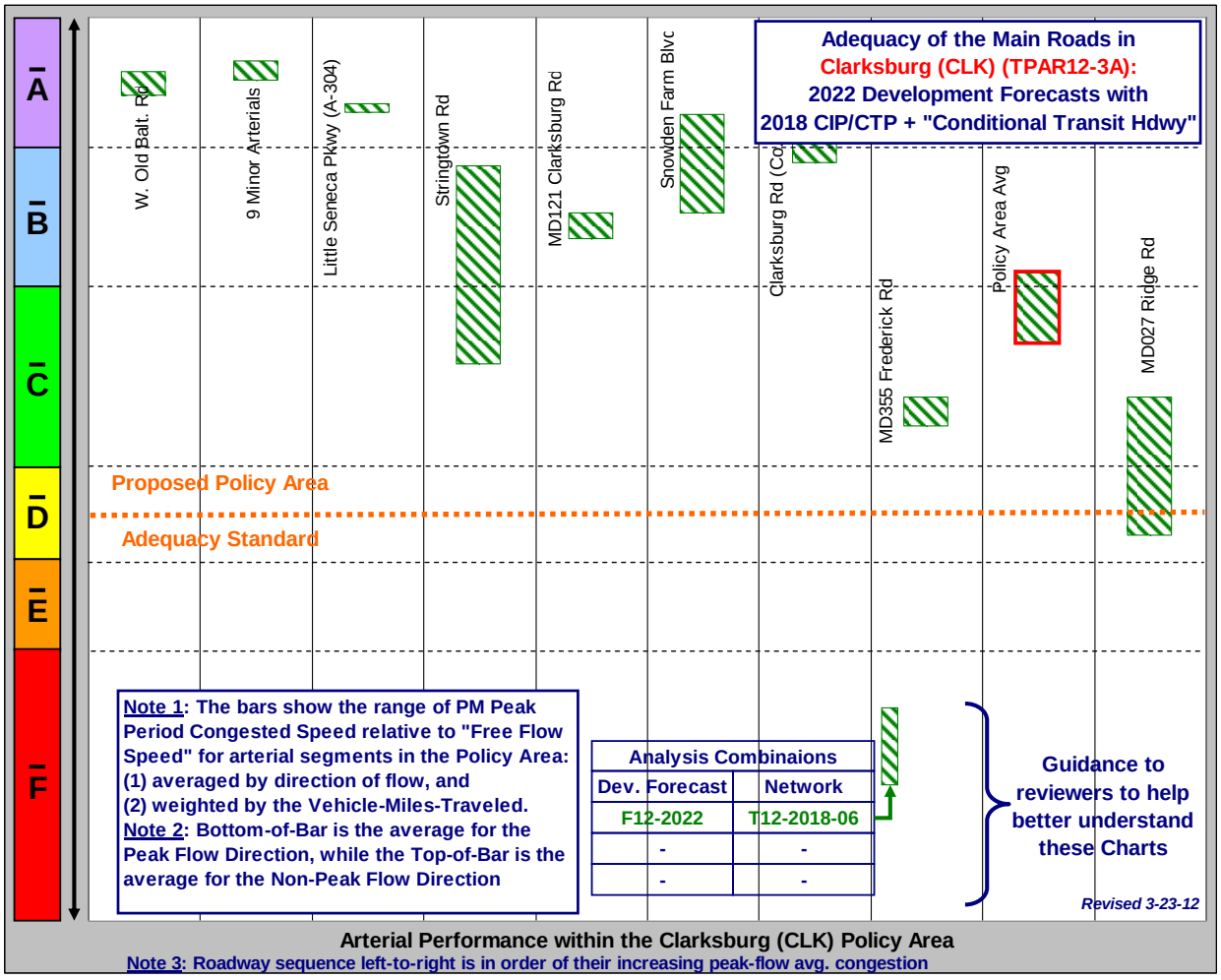
**Assessment of Areawide Roadway Adequacy for the CLK Policy Area**: The overall weighted average for the CLK Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the CLK area. Therefore, the CLK Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

**F. Guidance to Local Area Transportation Review (LATR) in the CLK Policy Area**: The prior graphic shows that 7 of the depicted left-most arterial roads (and the 9 minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Urban Policy Area, often considerably less. Yet the graphic also shows that there is only one roadway link-segment in the

CLK Policy Area that is more congested than the Standard for a Suburban Policy Area, which is that of MD 27 Ridge Road. Particular attention should be given to the LATRs for proposed subdivisions that use those arterial roads for access to their proposed site.

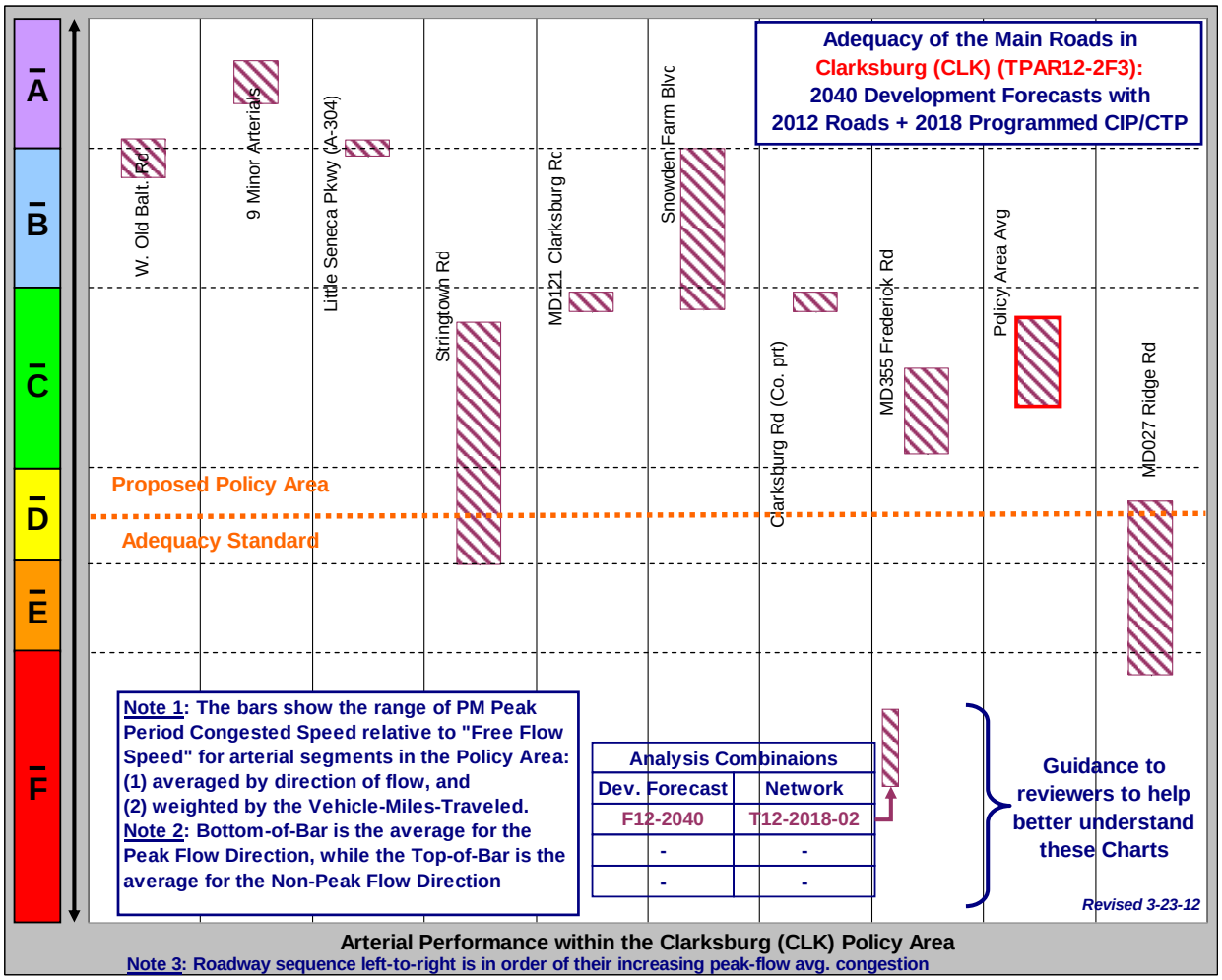
In addition, given the overall the low volumes of traffic throughout many parts of the CLK Policy Area during peak periods, proposed subdivisions that would rely on other arterial roads serving the CLK area may also need to have some attention on their LATR. In particular, such focus would be on the need for smaller-scale, localized, or site-specific improvements such as turn-lanes at nearby intersections, access or local circulation needs, bus stops, and sidewalks.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in households and employment between 2018 and 2022, are estimated not to cause the CLK Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized at this time.



While other options to improve the roadway network over the next 10 years in the CLK Policy Area are not being proposed, some potential future conditional projects can be found in Appendix E, the list of unbuilt Master Plan Projects. The prior graphic can be used as a guide in focusing on which roadways could receive such operational attention.

**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that while the CLK Policy Area would continue to maintain its current regulatory stage overall roadway adequacy into the long term master plan stage. It can also be seen that one additional road would become somewhat congested in the absence of further "conditional projects" from the Master Plan. The analyses done for the Proposed TPAR10 considered parts of MD 355 in Clarksburg for a potential "conditional" project and that project could have some beneficial network effects that could address congestion on the other roadways. Thus, the future TPAR adequacy analyses could consider that further as an optional solution.[EG1]



## Damascus Policy Area

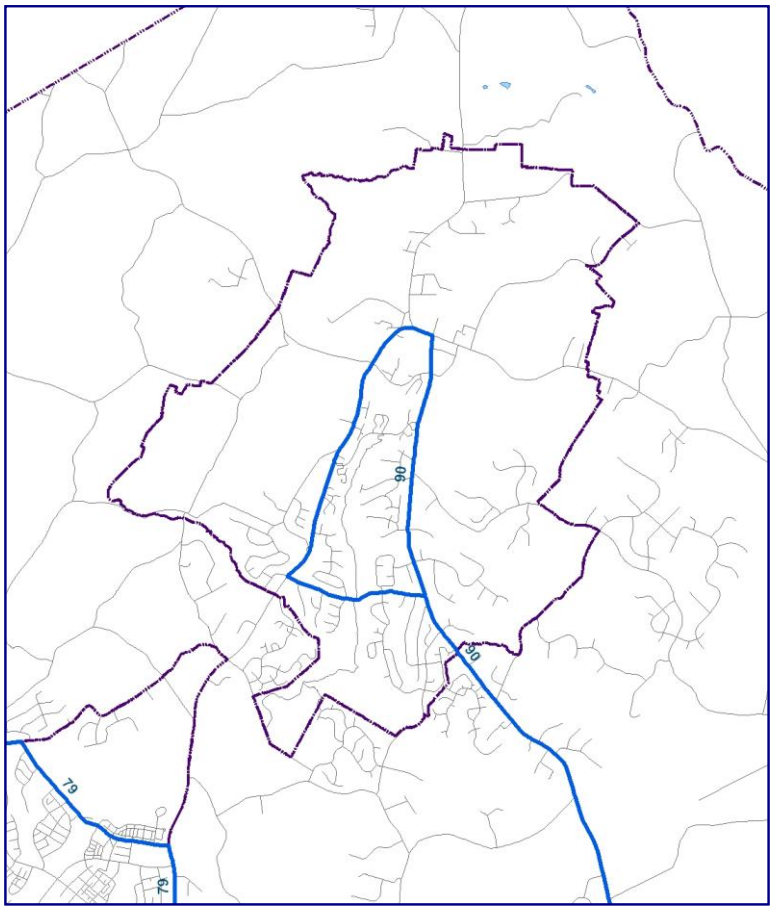
**A. Overview of the Policy Area**: Damascus (DAM) is categorized as a Rural Policy Area, given the transit and development activity features of the area. This area is characterized low population and low employment densities and is served by bus transit service that provides overall transit coverage of slightly more than 5% of its area. There is no notable growth that recently occurred or is expected to occur in this Policy Area.

**B. Forecast of Development Activity**: The Damascus Policy Area is forecast to grow during the regulatory planning stage of TPAR12 between 2010 and 2018 by about 449 households and 9 jobs. During the transportation improvement stage of TPAR12 between 2018 and 2022 growth would be about 38 households and 5 jobs more. During the master plan stage between 2022 and 2040 growth is forecast to be an additional 609 households and 23 jobs. This household growth is moderate to high with respect to previous household development in the area. However, compared to total job growth in the County the household growth is forecast to be a small to low share of the total growth in the County and the job growth is very small.

| *Source of the Forecasts: Round 8.0 (revised) of the Regional Cooperative Forecasts* | Household Forecasts being used by TPAR12 | | | | | | | Employment Forecasts being used by TPAR12 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 | Forecast for 2010 | Growth 2010 to 2018 | Forecast for 2018 | Growth 2018 to 2022 | Forecast for 2022 | Growth 2022 to 2040 | Forecast for 2040 |
| **Damascus** | 3,562 | | 4,011 | | 4,049 | | 4,658 | 2,616 | | 2,625 | | 2,630 | | 2,653 |
| Growth in the Policy Area | | 449 | | 38 | | 609 | | | 9 | | 5 | | 23 | |
| Percent Growth of Area | | 12.6% | | 0.9% | | 15.0% | | | 0.3% | | 0.2% | | 0.9% | |
| Percent of County Growth | | 1.5% | | 0.2% | | 1.1% | | | 0.0% | | 0.0% | | 0.0% | |
| **Montgomery County** | 360,500 | | 389,599 | | 405,597 | | 463,000 | 506,000 | | 568,315 | | 606,679 | | 730,375 |
| Growth in the County | | 29,099 | | 15,998 | | 57,403 | | | 62,315 | | 38,364 | | 123,696 | |

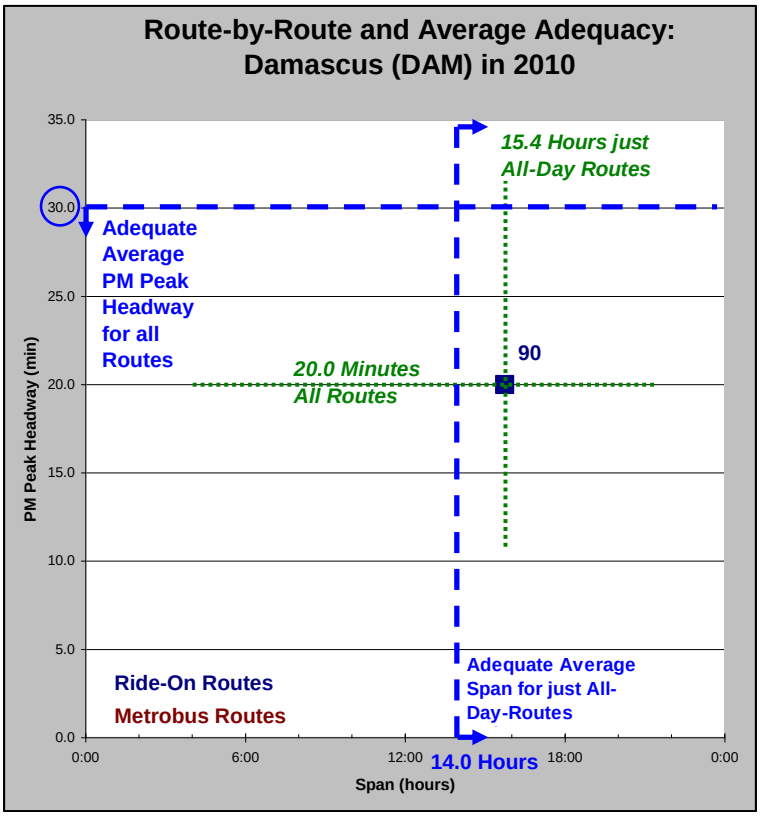
**C. Programmed Transportation Improvements**: There is one programmed project to improve roadway capacity in the Damascus area, which is an extension of Woodfield Road between MD 108 Main Street and MD 27 Ridge Road.

| Program Document | TPAR12 Staging of County CIP and State CTP Projects *(updated to 3-21-12)* | | | | | Cond. Proj. by 2022 |
|---|---|---|---|---|---|---|
| | Project Name | Improvement Type and/or Limits | Policy Area | Open by 2012 | Prog. by 2018 | |
| CIP | Woodfield Rd Extended | North of Main St. (MD 108) to Ridge Rd (Md 27) (2 lanes) | DAM | Y | Y | Y |




**D. Transit Adequacy Analysis**: The Damascus Policy Area has adequate bus transit service in terms of each of the three service factors: Coverage, Peak Headway and Span of Service.

**Coverage of Service:** About 7% of the Damascus Policy Area is located within a 1/3 of a mile of the one bus route currently serving the area. The graphic to the left shows where in particular bus service coverage is provided in the Damascus area. The standard for Coverage for a Rural Policy Area is 5%. Therefore transit coverage in the Damascus Policy Area is adequate.

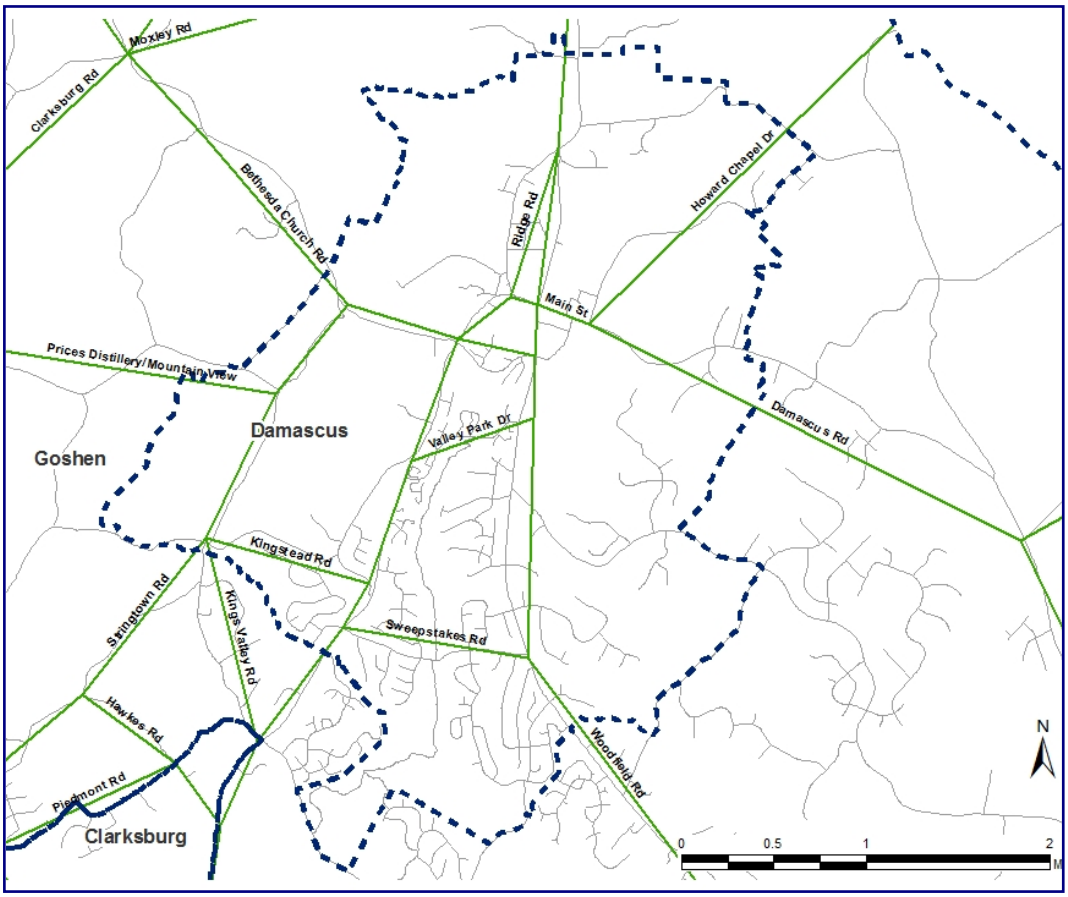



**Peak Headways:** The one bus route operates on a 20 minutes frequency between buses during the weekday evening peak period in the Damascus Policy Area. In Rural areas like Damascus where bus service is provided, the standard for average Peak Headway is 20 minutes or less. Thus, the average peak headway for the Damascus area is adequate.

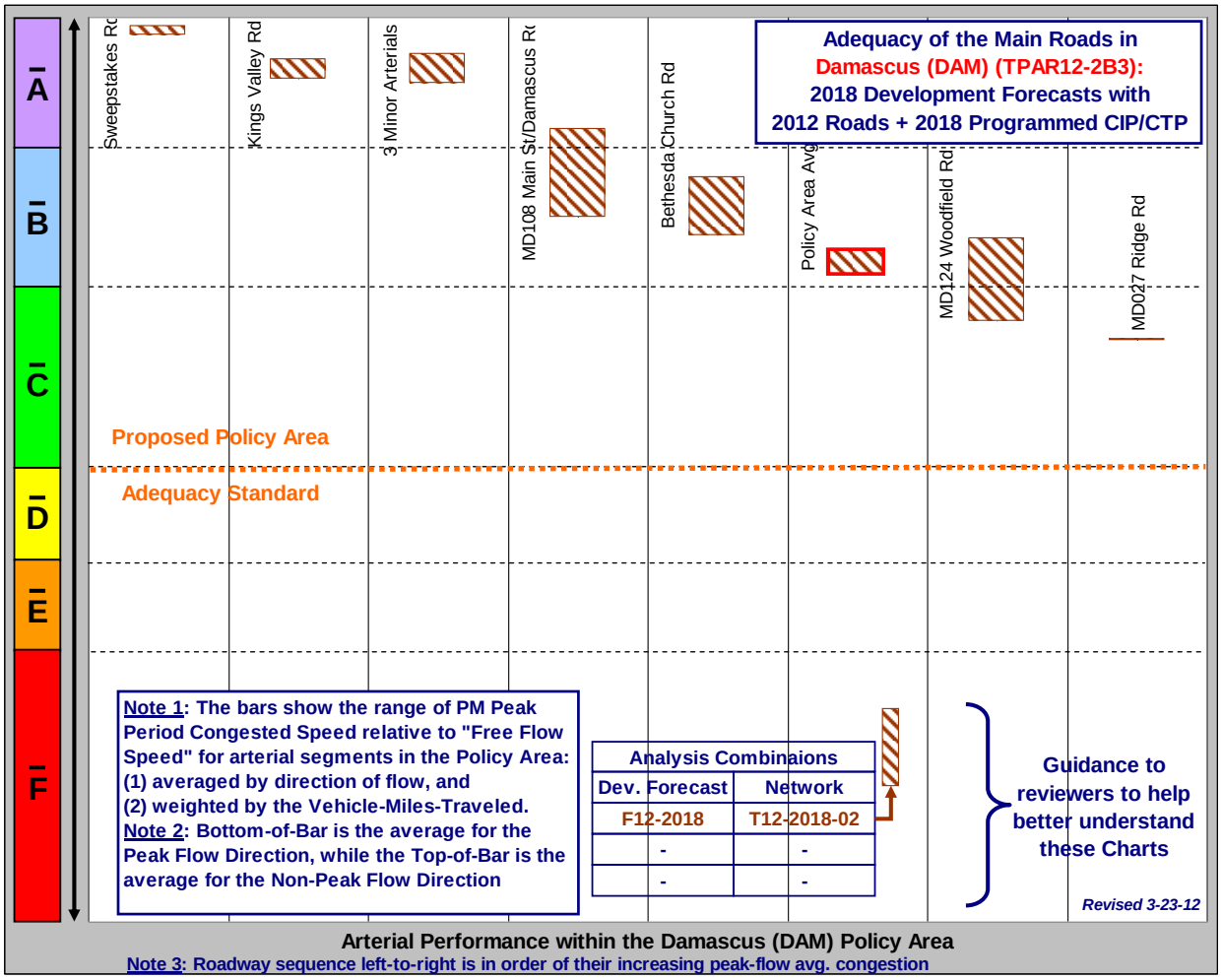
**Span of Service**: The one bus route provides service with a value of span of 15.7 hours per day on weekdays. The Rural standard is more than 6.0 hours per day on average. Therefore transit span in the Damascus Policy Area is adequate.

**E. <u>Roadway Adequacy Analysis</u>**: In the Roadway Adequacy Analysis all of the Policy Areas are analyzed together applying the regional travel demand model to Montgomery County specifics. Combinations consisting of future forecasts of development activity and future roadway and transit networks are analyzed and compared Countywide and within each Policy Area. The modeling results are summarized for each "comparison-combination" using a post-processing spreadsheet process to estimate overall arterial roadway performance for each of the Policy Areas as well as link-by-link performance of major and minor arterials within each area.

**Modeling Network Level of Detail:** Major and minor arterial roads within the Damascus Policy Area were analyzed for their future roadway performance for each of several future Countywide comparison-combinations. The following graphic shows those major and minor arterials used in the analysis. The freeway system of the region was also accounted for in the analysis but these performance results are not summarized. On-the-other-hand, the Roadway Adequacy Analysis does not account for truly local streets, minor roads, or even some of the minor arterials as those very local streets and roads have low amounts of traffic. It is beyond the state-of-the-practice to model the use of such low traffic roads. The pattern of such local streets is shown in the background in the roadway network graphic to provide context and aid understanding.




**Comparing Combinations of Future Development Activity and Transportation Networks:** Results of the Roadway Adequacy Analysis for Damascus roadways are represented by the "brown-hatched" bars shown in the arterial performance graphic, which disaggregates the overall performance of arterials in the Damascus Policy Area to display them on an arterial-by-arterial basis. The comparison-combination used in this graphic is for the regulatory planning stage based on the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.



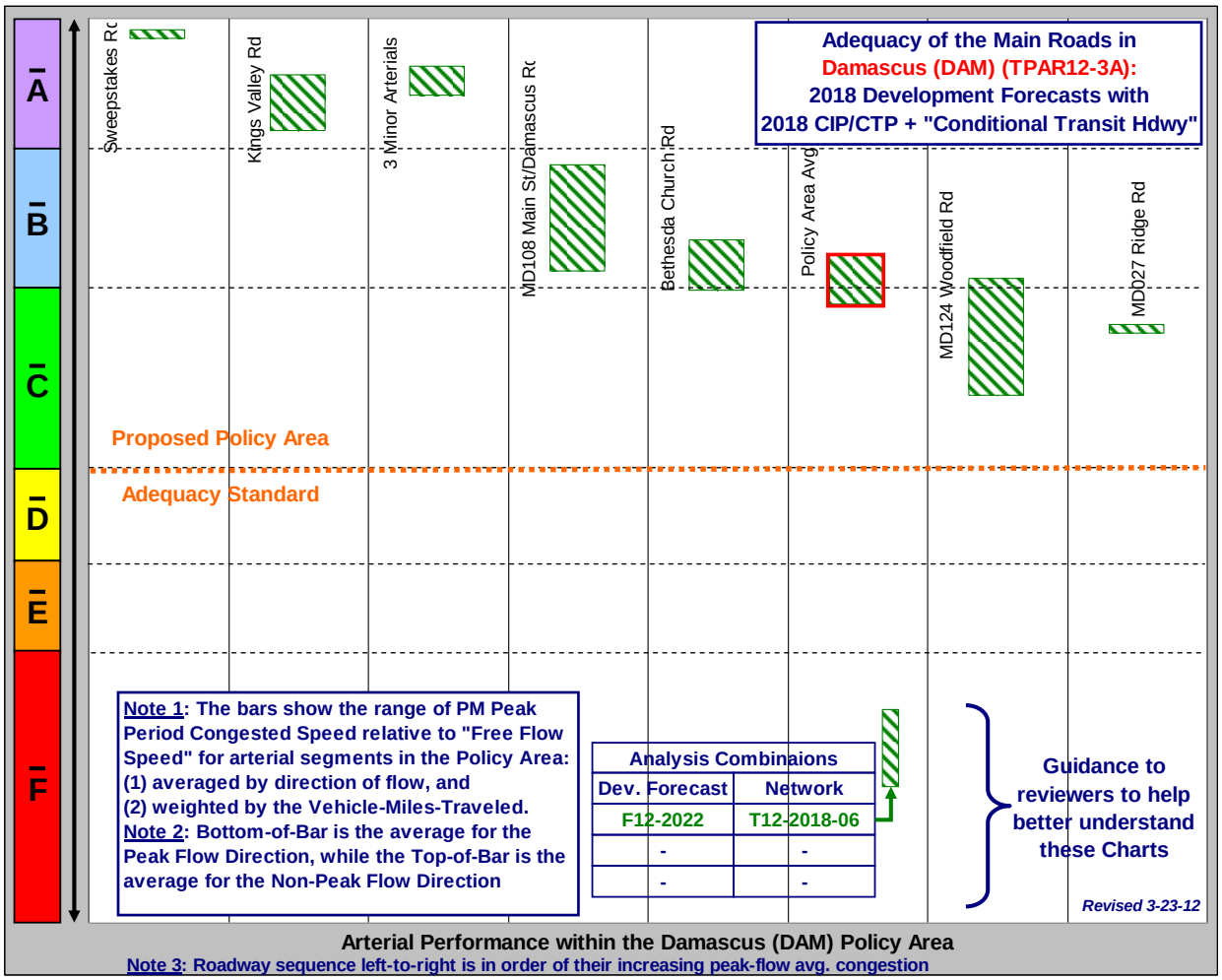

This arterial performance graphic has notes to help readers better understand how to interpret the chart, yet some elaboration can also be helpful. This exhibit displays the average roadway Level of Service for each of the named arterial segments within the Damascus area that were shown in the prior graphic. Towards the left, one of the bars is itself an average, in this case of 3 minor arterials roads. The sequencing of the roadways in this graphic, going from left to right, is in order of increasingly congested conditions in the peak flow direction.

**Assessment of Areawide Roadway Adequacy for the Damascus Policy Area**: The overall weighted average for the Damascus Policy Area is highlighted by the bar bordered in red near the center-right of the bars. The bottom of that highlighted bar for the Policy Area Average is above the dashed and bolded horizontal line. That line represents the proposed Policy Area Adequacy Standard for Urban Policy Areas, such as the Damascus area. Therefore, the Damascus Policy Area overall has adequate future areawide roadway traffic conditions for the combination for the regulatory planning stage, which analyzed the 2018 forecast of Development Activity and the 2018 Programmed CIP and CTP.

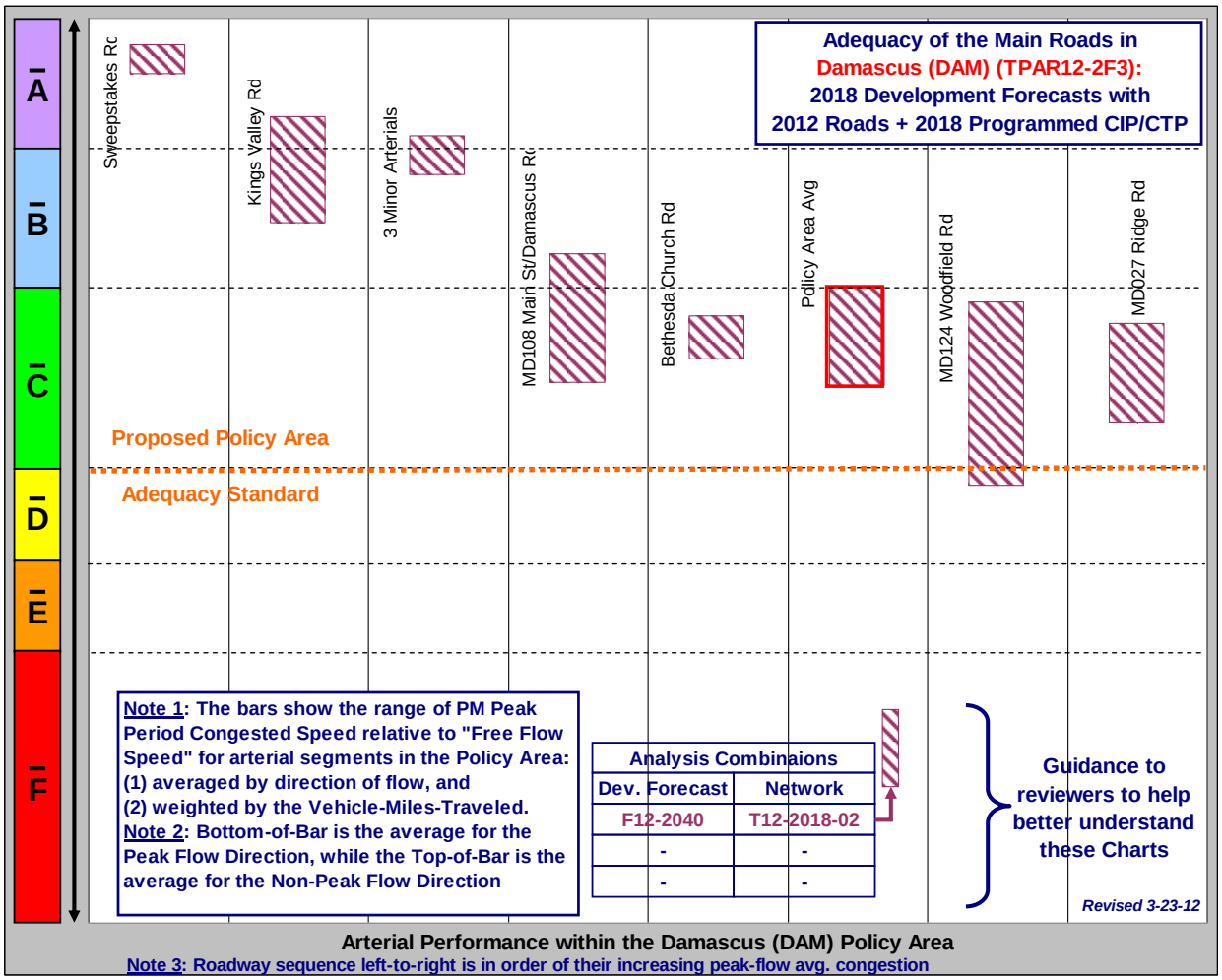
**F. Guidance to Local Area Transportation Review (LATR) in the Damascus Policy Area**: The prior graphic shows that all of the six depicted arterial roads (and the three minor arterials not shown) have link-based peak period Level of Service that on average for the whole link-segment in the peak-flow direction is less congested that the Standard for an Rural Policy Area, often considerably less. The graphic shows that there are no roadway link-segments in the area

that are more congested than the Standard for a Rural Policy Area. Thus no particular guidance needs to be given to the LATRs for proposed subdivisions in the area other than the LATR Guidelines itself.

**G. Guidance for Conditional Transportation Solutions:** The next graphic is similar to the prior one but instead the comparison-combination used in this graphic is for the transportation improvement planning stage that uses the 2022 forecast of Development Activity and the 2018 Programmed CIP and CTP plus selected "conditional projects", which could be implemented by the 10-year time-horizon of 2022.. "Green-hatched" bars are used to better differentiate this set of results from the prior one. The growth in household and employment between 2018 and 2022, are estimated not to cause the Damascus Policy Area to loose the overall areawide adequate roadway conditions associated with the regulatory planning stage – as such, finding additional solutions was not emphasized at this time.



**H. <u>Guidance for the Master Plan Stage</u>:** The following graphic shows that the Damascus Policy Area would continue to maintain its current regulatory stage overall roadway adequacy into the long term master plan stage. However, it can also be seen that one of the area roadways, MD 124 Woodfield Road, is likely to become somewhat congested in the absence of further "conditional projects" from the Master Plan. Future monitoring and modeling forecasting should be carried out to better determine whether such a future situation is likely to happen and what solutions can be implemented to address it.

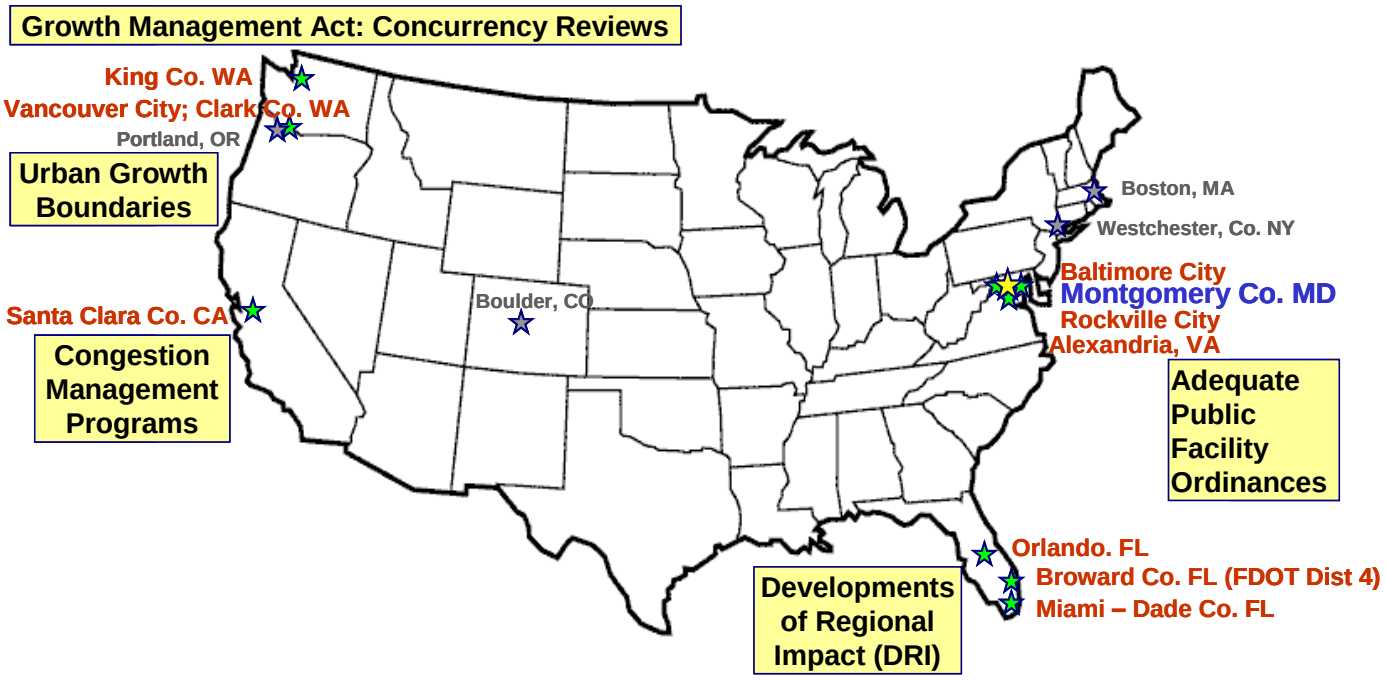


# Appendix A:

## Benchmarking Peer Jurisdictions with Areawide Transportation Review Processes

One of the initial tasks that was done in preparing this report was to conduct a benchmarking review of a sample of peer jurisdictions nationally who are known to thought to have an areawide transportation review process for the impact of proposed development. The graphic below identifies the names of all of the jurisdictions who were contacted. Those whose names are in larger, red font were those who were found to be were found to be closer peers and who have a functioning areawide transportation review process.

In total thirteen jurisdictions were contacted and/or researched on their websites about their process. A questionnaire was developed and in some cases filled in by staff of those jurisdictions and in other cases the pertinent features about their process were filled in by the consultant team. Some of this was done in conjunction with all getting information on their Local Area Transportation Review procedures as well.




Seven main features of Areawide Transportation Reviews are identified and assessed in this peer comparison:

- Cumulative impacts versus Development of Regional Impact
- Jurisdictional coverage and area versus corridor coverage; including corridor-by-corridor summaries
- Time frame of the assessment of areawide impact; as well as the frequency of the adequacy assessment
- When during the development process does adequacy get assessed and what linkages are there to other processes
- Use of public/private funding for transportation programs and projects
- Transit adequacy methods

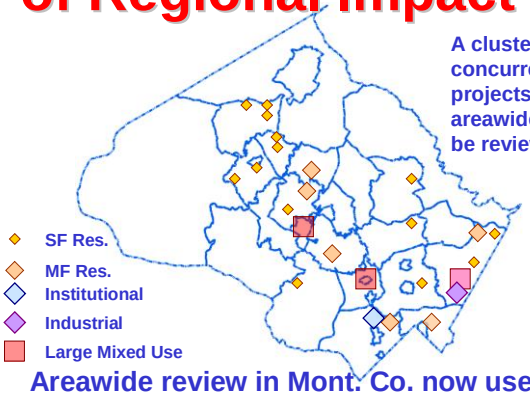
- Increased monitoring of roadway travel times and speeds, as well as monitoringr transit travel times and speeds using an “operations orientation

The responses of the peer jurisdictions about their processes were reviewed and a summary of potential refinements that might be applicable to the TPAR were made. The following are generalizations made from the summary material:

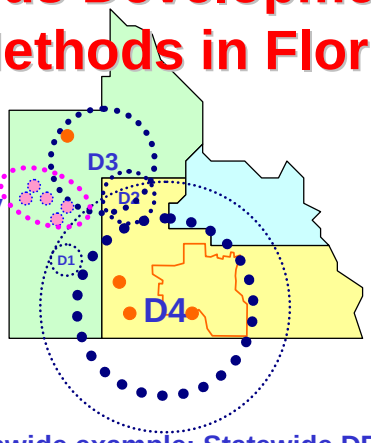
- Using just Forecasts for areawide review, including a 6-year or 10 year time horizon, will give better travel patterns and more realistic transportation needs
- Follow more of an “operations orientation” by
- Have a “Coordination Overlap” element of TPAR that has both a regulatory focus as well as transportation improvement focus
- Refine TPAR so that all PM Peak Period transit routes are used in the measure of “Average Headway”
- Implement the proposed TPAR monitoring idea to use the actual performance of arterials; use the “slowness ratio” to compare to the modeled congestion measure
- Test using Automatic Vehicle Location data to monitor transit speeds,

The following is a set of presentation material that was used to assess the results of benchmarking review of this sample of peer jurisdictions.

## 1. Cumulative Impacts versus Developments of Regional Impact (DRI) Methods in Florida




A cluster of proposed concurrent “non-regional” projects that may have an areawide impact would not be reviewed accumulatively




- Areawide review in Mont. Co. now uses the pipeline of approved development irrespective of project size
- A refinement would be to use the 6-year Forecasts to match the 6-year CIP/CTP
- Cumulative impacts and up-stream and down-stream effects are accounted for
- Residential uses tend to be smaller sized projects but accumulates high; non-residential ones have un-even time stages
- Using just Forecasts for areawide review will give better travel patterns and more realistic transportation needs

*Potential TPAR Refinement #1*

- Areawide example: Statewide DRI methods in Orlando or Broward Co., FL
- Created Reg. Pl. Councils: run models, coordinate reviews, but TIA still local
- DRIs done one-at-a-time *(see D1 to D4)*
- Nearby and/or concurrent DRIs (D2+D3) may be combined if applicants agree
- “Really Big Ones” (D4) may have multi-year staging that gets reassessed later
- Non-DRI-sized approved projects (●) are part of background; but a new cluster of them (●) are not reviewed cumulatively
- Uses 3-year CIP in the analysis

Draft of 1-10-12

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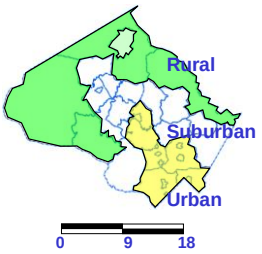
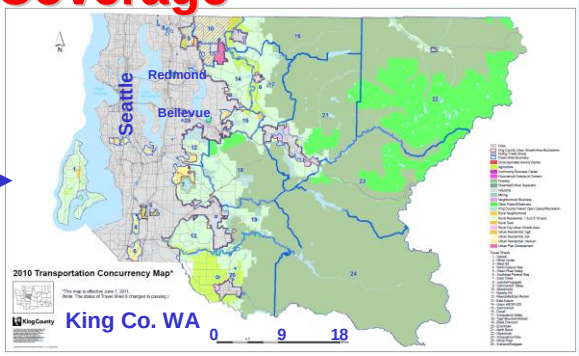
# 2A. Jurisdictional Coverage and Area vs. Corridor Coverage




Maps are shown at the same Scale

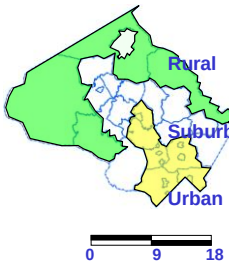



- Areawide review in Mont. Co. accounts for the entire County, although Rockville and Gaithersburg have own methods
- Three Policy Area Types are used in the proposed TPAR: Urban, Suburban, and Rural
- The Policy Area Types are based upon availability of transit facilities & services
- Transportation Adequacy Standards for transit & roads vary by Policy Area Type
- Roadway standards for average speeds based upon modeled travel times; and corridor-by-corridor summaries are used

- Areawide Example: King Co, WA only has Concurrency Reviews in eastern 2/3 of the County; excludes "urban" parts
- Urban cities have their own TIA reviews
- Transit service is concentrated in the western urban parts, thus the King Co. Concurrency is only automobile based
- Relies on Urban Growth Boundaries based on WA State Growth Mgmt. Act
- Concurrency uses standards for average speed based on observed corridor-by-corridor travel time samples (next page)



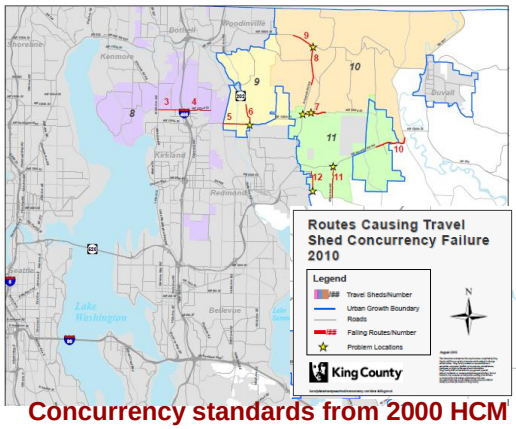
# 2B. Corridor-by-Corridor Summaries





- Areawide review in Vancouver and Clark Co., WA: proposing that corridor con-currency become the focus of the review and not rely on current TIA methods
- Annual monitoring of corridor travel times in the Urban Growth Area within Clark Co.; coordinates reviews with CIP projects
- Council considering a roadway "Built-Out" corridor category; then monitor impacts focus on a Mgmt. Plan with Access Mgmt., Travel Demand Mgmt., & Tran. Sys. Mgmt.
- Removing text on specific way to collect travel time anticipating new data sources
- Follow more of an "operations orientation"

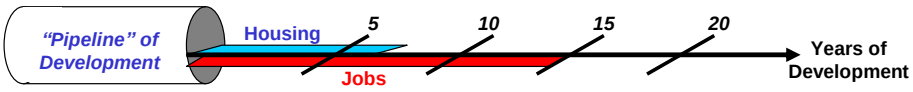
*Potential TPAR Refinement #2*




- Concurrency standards from 2000 HCM for average speed; annual travel time samples for selected set of corridors; averaged to a set of 25 "Travel Sheds"
- Observe more samples than done in the Mont. Co monitoring of arterial corridors
- "Highways of Statewide Significance" are not included in areawide methods
- Corridor Concurrency controls over TIAs
- Sheds with >15% of total miles failing Concurrency are "failing" Travel Sheds
- 39 jurisdictions have local TIA methods

# 3A. Time Frame of the Assessment of Areawide Impact

**Policy Area Mobility Review (PAMR)**




*For many years the housing pipeline equated to about 5 to 10 years of development; while jobs equated to about 10 to 15 years of development*

**Proposed Trans. Policy Area Review (TPAR)**


*Potential TPAR Refinement #3a*

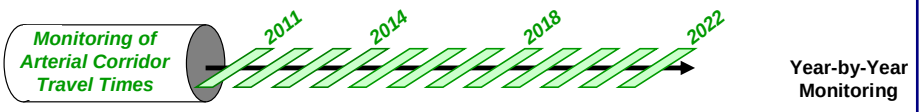
*Subdivision Staging Policy Assessment against 6-year CIP/CTP – a "Regulatory Focus"*

Coord-ination / Over-lap

*Assessment of CIP/CTP "Conditional Deficiencies" plus listing of program and project recommendations; -- a "Transportation Improvement Focus"*

*Master Plan time frame used in Cost Allocation Process*

**"Concurrency Reviews" at King Co., WA; Vancouver, WA**




*Annual Monitoring for Concurrency Assessments of the Roadway Operations of Selected Corridors*

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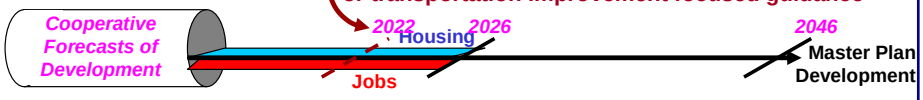
# 3B. TPAR Adequacy Assessment Frequency

- **Subdivision Staging Policy changed to once every 4 years raises the issue of will new policy updates be current enough**
- **Next assessment (2016) would not give current transportation improvement guidance to the intervening CIP and CTP reviews**

**Trans. Policy Area Review (TPAR-2012)**


4-year Gap not sufficient for regulatory focused or transportation improvement focused guidance

**Trans. Policy Area Review (TPAR-2016)**




- **Subdivision Staging Policy should keep but put less emphasis on denial of development if inadequacies; rather put more emphasis on identifying and removing future "Conditional Deficiencies"**
- **Refine TPAR to have it focus on identifying "Conditional Deficiencies" once every 2 years; put more resources into analyzing solutions that attains adequacy more quickly and maintains it**

*Potential TPAR Refinement #3b*

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# 4. When During the Development Process Does Adequacy get Assessed -- Linkages

**Montgomery Co, MD: Planning and Regulatory Review Processes**

*More Comprehensive*

- General Plan
- Master Plan
- Zoning Sectional Map Amendment
- *(Rezoning)*
- Subdivision ← Subdivision Staging Policy
- *(Site Plans)*
- Record Plats

*More Site Specific*

**Northern Virginia Jurisdictions: Planning and Regulatory Review Processes**

*More Comprehensive*

- General Plan
- Master Plan
- Zoning Sectional Map Amendment
- *(Rezoning)* ← "Profers" System
- Subdivision
- *(Site Plans)*
- Record Plats

*More Site Specific*

- Subdivision Staging Policy *(prior APFO)* is dual focused: assess adequacy of facilities including transportation, and guidance to County CIP and State CTP
- Proposed TPAR provides even stronger linkage to transp. decisions and funding
- Many subdivisions take about the same time to develop as the CIP/CTP time horizon of 6 years funded for construction

- Reliance on "Profers" at the time of zoning or rezoning reviews and approvals
- Exactions to have the private sector development pay for public improvements in lieu of raising State transp. revenues
- VDOT: a very strong state agency; no local transportation agencies in most counties to implement trans. improvements; *(Little linkage to transport programs and projects)*

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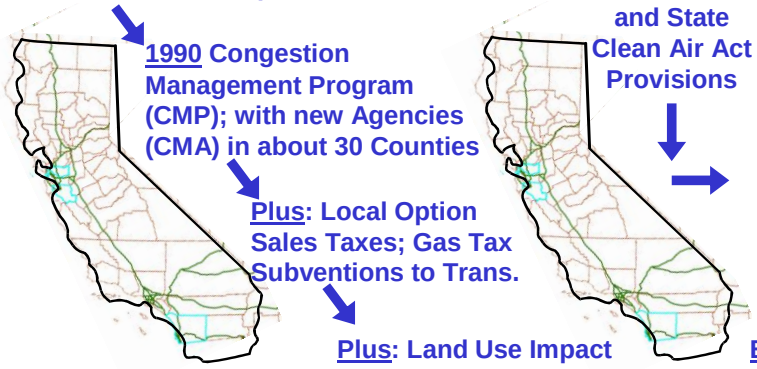
# 5A. Use of Public/Private Funding for Transportation Programs and Projects

1978 Statewide "Proposition 13" Referendum

1990 Congestion Management Program (CMP); with new Agencies (CMA) in about 30 Counties

Plus: Local Option Sales Taxes; Gas Tax Subventions to Trans.

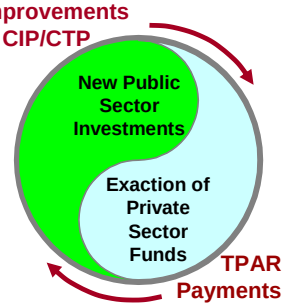
Plus: Land Use Impact Analysis Program with Annual Monitoring and Conformance Element; City TIAs → County



Plus Federal and State Clean Air Act Provisions

*TPAR needs "tops-down" as well as "bootoms-up" funding*

Improvements in CIP/CTP




Example: Santa Clara Co. CMP (every 2 yr.) covers 15 cities (San Jose); CMA is the Valley Trans. Authority; *(see summary on the next page)*

- A "tops-down" approach that focuses more on the adequacy of transportation funding than growth management; has "carrots" of added trans. funding
- Local TIAs are a "bottoms-up" approach; yet if cities and towns do not meet conformance to the countywide CMP; get "stick" of Deficiency Plan + holdback
- Other Example: Contra Costa TMA has raised over $240 million in exactions

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# 5B. Use of Public/Private Funding for Transportation Programs and Projects

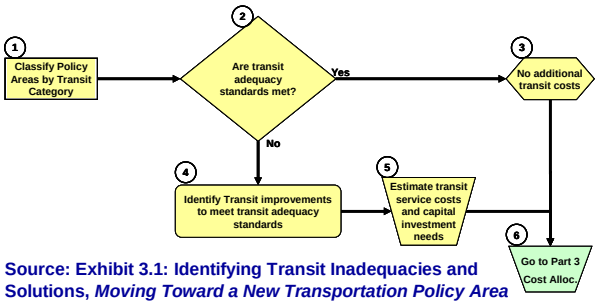
TABLE E.1 | CMP ELEMENTS SUMMARY

| Element # | CMP Element | Requirement | Timing | Responsible AgencY |
|---|---|---|---|---|
| 2. | Traffic Level of Service Element | 1) Annually monitor and submit report on the level of service on CMP roadway network intersections using CMP software and procedures. | Dec 1 | Member Agencies |
| | | 2) Monitor performance of CMP rural highways and freeways | Dec 1 | VTA |
| 3. | Multimodal Performance Measures Element | Collect available transportation performance measurement data for use in land use analysis, deficiency plans and the CIP | Ongoing | VTA |
| 4. | Trip Reduction and Transportation Demand Management Element | No current requirements | | Member Agencies and VTA |
| 5. | Transportation Model and Database Element | 1) Certify that the CMP model is consistent with the regional model | Biennially | MTC |
| | | 2) Certify that Member Agency models are consistent with the CMP model | As Needed | VTA and Member Agencies |
| 6. | Community Form and Impact Analysis Element | 1) Prepare a Transportation Impact Analysis (TIA) for project that generate 100 or more peak hour trips and submit to the CMP according to TIA Guidelines schedule | Ongoing | Member Agencies |
| | | 2) Submit relevant conditions of approval to VTA for projects generating TIAs | Ongoing | Member Agencies |
| | | Prepare monthly report on adopted conditions for VTA Board, CMPP and PAC, TAC, CAC, and BAC | Ongoing | VTA |
| | | 3) Prepare and submit land use monitoring data to the CMP opn all land use projects approved from July 1 to June 30 of the previous year | Oct 1 | Member Agencies |
| | | 4) Submit an annual statement certifying that the Member Agency has complied with the CMP Land Use Impact Analysis Program | Oct 1 | Member Agencies |
| 7. | Annual Monitoring and Conformance Element | 1) Outline the requirements and procedure established for conductin annual traffic LOS and land use monitoring efforts. Support the traffic LOS and Land 2) Use Integration and Impact Analysis Elements | Dec 1 | Member Agencies and VTA |
| 8. | Capital Improvement Program Element | Develop a list of projects intended to maintain or improve the level of service on the designated system and to maintain transit performance standards | Biennially | Member Agencies with VTA |
| 9. | Deficiency Plan Element | 1) Prepare Deficiency Plans for facilities that violate CMP traffic LOS standards or that are project to violate LOS standards using the adopted Requirements for Deficiency Plans | As Needed | All affected Member Agencies |
| | | 2) Submit Deficiency Plan Implemention Status Report as part of annual monitoring | Dec 1 | Member Agencies with Deficiency Plans |

Source: 2009 Congestion Management Program, Santa Clara Valley Trans. Authority; page 10

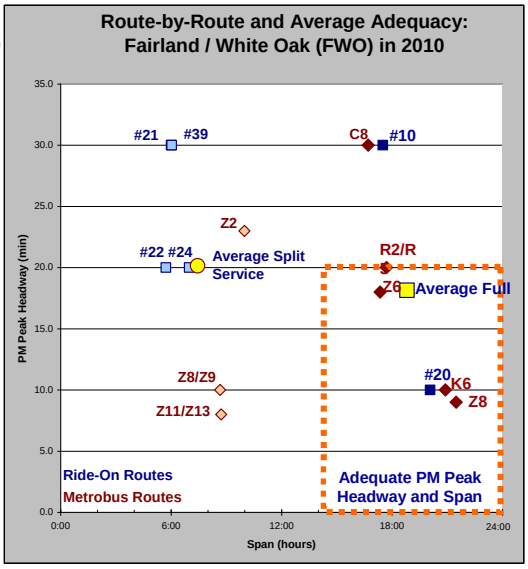


# 6. Transit Adequacy Methods




Source: Exhibit 3.1: Identifying Transit Inadequacies and Solutions, *Moving Toward a New Transportation Policy Area Review,* April 2010, p. 8

- Steps 2 and 4 shown above are from the Proposed TPAR Report and are being developed for the 2012 TPAR Refinement
- Review of potential "Peer Jurisdictions" provides little insight into whether peers may be doing similar work with transit services; <u>exception:</u> Santa Clara, CA using a transit accessibility measure from their modeling
- It is expected that MNCPPC will do Step 2 based upon data from MCDOT and WMATA
- Will also initiate Step 4 while working with MCDOT to assess/refine new transit services
- MCDOT to take lead in Step 5; with MNCPPC documenting the analysis to the MCPB




- Chart above shows 2010 Headway and Span in Fairland White Oak Policy Area
- Agree with MCDOT refinement for Span being measured only for "Full Service"
- However, would refine TPAR so that all PM Peak Period transit routes are used in the measure of "Average Headway"

*Potential TPAR Refinement #4*

# 7A. Increased Monitoring of Roadway Travel Times and Speeds using an "Operations Orientation"

| Montgomery Co., MD: Mobility Assessment Report (MAR), Oct 2011, Congested Roads | King Co., WA: Transportation Concurrency Management (TCM) Program, Sept 2010 |
|---|---|
| • Prior monitoring reports *(2004 to 2009)* did similar GPS-based samples of travel time and speed on arterials in Mont. Co. | • Annually sample 350 miles of arterials for travel time/speed using 8 GPS devices<br>• 3 to 10 runs daily over a 1 to 3 day period to get peak 2-hours between 4:00 to 6:30 PM on T, W, or Th in March, April, May |
| • Proposed TPAR used modeled corridor-by-corridor arterial speed vs. free flow speed (**"slowness ratio"**) as the criterion for future roadway congestion levels | • Percent of sampled roadway miles per "Travel Shed" operating at less than the LOS standard speed is the criterion for Concurrency approvals; Washington State DOT during 2008/09 studied travel times on area freeways |
| • MAR 2011 introduced a new monitoring data source of private sector observed travel time and speed, also used by MDOT, to describe Congested Roadways *(p. 18)* and used the "travel time index" measure<br>• A full set of the new monitoring data source is now available; **meets proposed TPAR monitoring idea to use the actual performance of arterials as a consistency check** | • WA DOT Performance Measurement "Grey Book" annually using operations data sources; **uses "slowness ratio" of observed speed vs. free flow speed, the "inverse" of a "travel time index"**<br>***Potential TPAR Refinement #5a***<br>• MDOT/SHA Planning Office is working on using similar operations data for their monitoring and performance activities |

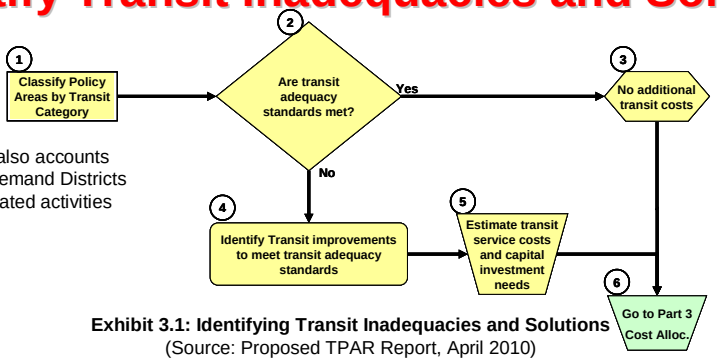


# 7B. New Monitoring for Transit Travel Times and Speeds using an "Operations Orientation"

| Montgomery Co., MD: Mobility Assessment Report (MAR), Oct 2011, Transit Analysis | Monitoring of Transit Performance by "Peer Jurisdictions": Santa Clara Co, CA |
|---|---|
| • Transit monitoring analysis presents route coverage, headways, and ridership for Ride-On and Metrobus for route-by-route<br>• TPAR Refinement testing bus operational data of Automatic Vehicle Location (AVL) from Ride-On and Metrobus to assess monitored bus travel times and speeds<br>• WMATA and MWCOG performing a regional bus "Hot Spot" study of locations where buses operate most slowly, which can be compared to monitored arterial locations of slow travel to better monitor Transit Deficiencies over time<br>• The measure of transit slowness vs. road slowness is also the modeled measure used as one of the two parts of the current Policy Area Mobility Review chart analysis; **test using AVL data to monitor transit service speeds, which may also help in measuring the effect of BRT service in TPAR and the Subdivision Staging Policy** | • There are few examples of the monitoring of actual transit performance in the areawide methods of Peer Jurisdictions<br>• The Santa Clara CO. CMA is also the main transit agency serving the area including operating LRT, BRT, Express, and local bus services; yet even the monitoring element of their CMP is absent information Their Transit Accessibility measure is a derived one from their modeling system and not actually monitored; their Transit Sustainability Policy is based on average boarding per Revenue Hour or station<br>• Monitoring of transit travel time and speed is not part of the Concurrency methods in King Co. or Vancouver, WA; yet nearby Tri-Met of Portland, OR is **using bus AVL data, at finer spatial and temporal scales, to <u>also</u> monitor at the <u>end</u> of each day their bus travel times and speed**<br>***Potential TPAR Refinement #5b*** |

# Appendix B:
## Cooperative Coordination Roles for TPAR

# 1. Identify Transit Inadequacies and Solutions




**Note**: the term "transit" also accounts for the Transportation Demand Districts (TMDs) and their associated activities

**Exhibit 3.1: Identifying Transit Inadequacies and Solutions**
(Source: Proposed TPAR Report, April 2010)

### Main MNCPPC Roles

- **Step 1: Calculates the factors used to set current classification of Policy Areas**
- **Step 2: Assesses adequacy using data from MCDOT, WMATA, and MDOT/MTA**
- **Step 3: no role**
- **Step 4: Initiates in a sketch-fashion what general factors of improved service are needed; works with MCDOT to assess specific transit services they identify**
- **Step 5: Documents the analysis results including area-by-area summaries**

### Main MCDOT Roles

- **Step 1: Reviews classifications**
- **Step 2: Sets standards consistent with the 2008 Strategic Transit Plan**
- **Step 3: Reviews that adequacy is being met in each Policy Area and that no additional costs are needed there**
- **Step 4: Identifies specific service factors needing improvement for future budgeting**
- **Step 5: Estimates the transit service operating costs and capital investment needs**

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# 2. Identify Roadway Inadequacies and Solutions

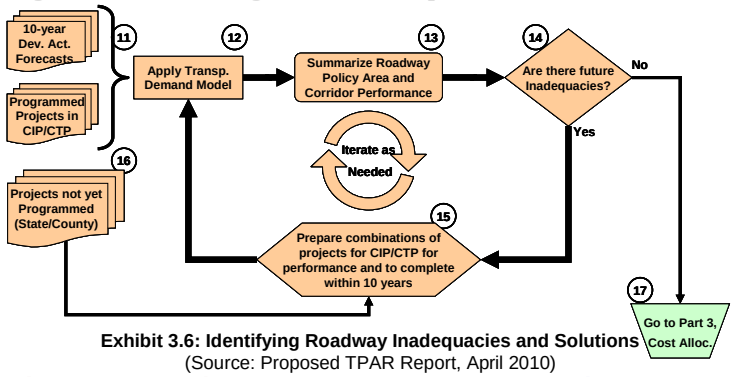


**Exhibit 3.6: Identifying Roadway Inadequacies and Solutions**
(Source: Proposed TPAR Report, April 2010)

### Main MNCPPC Roles

- **Step 11: Prepares and coordinates intra-County allocation; calculate interpolations when needed**
- **Step 12: Applies Model with input from MCDOT re transportation improvements; apply QAQC**
- **Step 13: Converts model results to summaries by Policy Area and corridor within Policy Area**
- **Step 14: Identifies Policy Areas with conditional deficiencies for Subdivision Staging Policy need**
- **Step 15: Iterates model application combinations to assess the potential projects from MCDOT**
- **Step 16: Keeps a list of Master Plan possible projects for MCDOT, MDOT, and cities to consider**

### Main MCDOT Roles

- **Step 11: Prepares-coordinates proposed CIP; coordinates with CTP of MDOT; maintains a list**
- **Step 12: Suggests improvements to address conditional deficiencies, edits for networks**
- **Step 13: Reviews modeling results**
- **Step 14: Assess conditional deficiencies and identifies potential CIP/CTP projects to test**
- **Step 15: Further reviews modeling results**
- **Step 16: Selects potential additional projects from Master Plan list**

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# 3. Allocate Costs

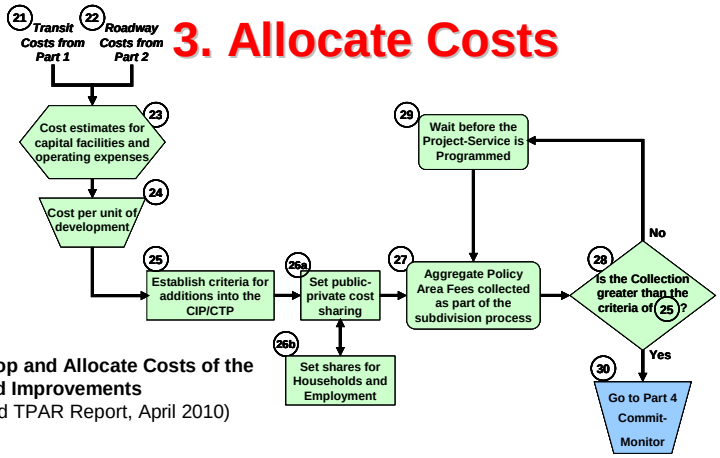


**Exhibit 3.10: Develop and Allocate Costs of the Needed Improvements**
(Source: Proposed TPAR Report, April 2010)

## Main MNCPPC Roles

- **Step 23: Assist MCDOT when requested**
- **Step 24: Develops methods and calculates proposed cost per unit of development**
- **Step 25: Reviews criteria from Executive; coordinates with the draft CTP**
- **Step 26a: Reviews proposed cost sharing re Subdivision Staging and Master Plans**
- **Step 26b: Assist MCDOT in the setting of proposed shares by development type**
- **Step 27-29: Monitor and support**

## Main MCDOT Roles

- **Step 23: prepares cost estimates**
- **Step 24: Reviews proposed cost per unit of development; suggests refinements**
- **Step 25: Recommends criteria to the Executive re CIP; coord. re draft CTP**
- **Step 26a: Sets proposed cost sharing percentages by Policy Area for CC review**
- **Step 26b: Set proposed shares**
- **Step 27-29: Monitor TPAR fees relative to proposed criteria**

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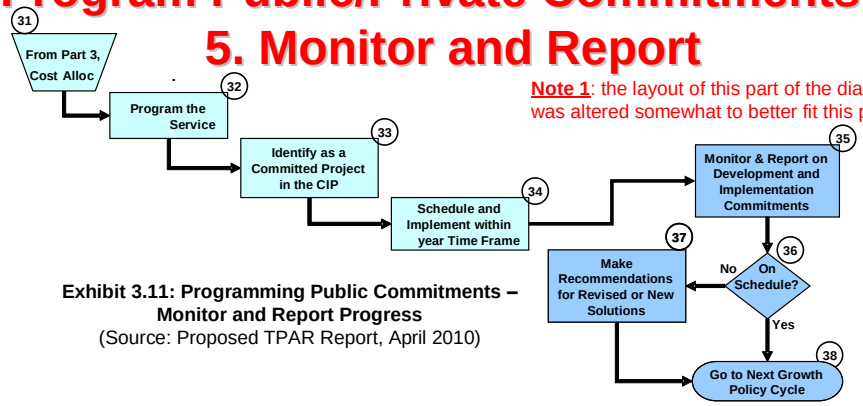
# 4. Program Public/Private Commitments and 5. Monitor and Report




**Note 1**: the layout of this part of the diagram was altered somewhat to better fit this page

**Note 2**: See a relevant excerpt from the Proposed TPAR Report (p. 24) on the next slide here

**Exhibit 3.11: Programming Public Commitments – Monitor and Report Progress**
(Source: Proposed TPAR Report, April 2010)

## Main MNCPPC Roles

- **Step 31-32: no role other than review**
- **Step 33: Clearly indicate to MCDOT and officials that a particular CIP/CTP project is being used for development approval**
- **Step 34: Provide administrative flexibility such as that on p. 23 Proposed TPAR re TPAR payments and their scheduling**
- **Step 35: Provide periodic reports on development approval's CIP/CTP reliance**
- **Step 36-38: Foster cooperative approach with MCDOT for new solutions**

## Main MCDOT Roles

- **Step 31-32: Responsible to program CIP projects and budget services; Coordinates with MDOT who programs CTP projects**
- **Step 33: Assures that elected officials are explicitly making a firm commitment to specific projects relied on for approvals**
- **Step 34: Schedule and implement within the commitment time frame**
- **Step 35: Provide periodic reports on CIP/CTP implementation commitments**
- **Step 36-38: Foster cooperative approach with MNCPPC for new solutions**

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# Appendix C: List of Unbuilt Master Plan Projects

**Menu of Master Planned Transportation Improvements -- Sorted by Policy Area, Mode, and Improvement Type -- Not Programmed by 2018**

| Policy Area(s) | Project Name | Implementation | Limits | Improvement Type | Facility Type |
|---|---|---|---|---|---|
| CLK,GTE,GTW,GBG,RDV,DER,RKV | Corridor Cities Transitway (Proposed) | State | Shady Grove to Clarksburg | T | LRT |
| BCC,SSTP | Purple Line Transitway (Proposed) | State | Bethesda to New Carrollton | T | LRT |
| NB,POT | North Bethesda Transitway (Proposed) | State | Grosvenor Metro to Montgomery Mall | T | LRT |
| OLY,AH,KW | Georgia Avenue Busway (Proposed) | State | Glenmont to Olney | T | BRT |
| POT,BCC,NB,KW,SSTP,FWO | Capital Beltway | State | American Legion Bridge to Woodrow Wilson Bridge | R | 1 |
| GTE,MVA,GBG | Midcounty Hwy (Proposed) | County | Montgomery Village Av to MD 27 | R | 2 |
| AH | MD097 Georgia Ave & MD028 Norbeck Rd | State | Interchange | R | 1 |
| AH | MD028 Norbeck Rd | State | MD 97 to MD 182 | R | 2 |
| AH | MD182 Layhill Rd | State | ICC to Norwood Rd | R | 2 |
| AH | Aspen Hill Rd | County | MD 586 to MD 185 | R | 3 |
| BCC | MD 355 & Cedar Ln | State | Interchange | R | 1 |
| BCC | River Rd | State | DC Line to I-495 | R | 2 |
| BCC | Bradley Blv | State | MD 614 to I-495 | R | 3 |
| BCC | Goldsboro Rd | State | MD 396 to MD 191 | R | 3 |
| BCC | Massachusetts Ave | State | Sangamore Rd to MD 614 | R | 3 |
| CLK | I 270 & New Cut Rd | State | Interchange | R | 1 |
| CLK | MD027 Ridge Rd | State/Dev | MD 355 - Brink Rd to Skylark Rd | R | 2 |
| CLK | MD121 Clarksburg Rd | State/Dev | Top Tidge Dr to Chrisman Hill Dr (Broadway Av to I-270) | R | 2 |
| CLK | MD121 Clarksburg Rd Relocated | State/Dev | West Old Baltimore Rd to Broadway Ave | R | 2 |
| CLK | MD355 Frederick Rd | State/Dev | Brink Rd to Cool Brook Ln | R | 2 |
| CLK | MD355 Frederick Rd Relocated | State | Cool Brook Ln to Snowden Farm Pkwy | R | 2 |
| CLK | A-304 (Proposed) | County/Dev | MD 121 to Newcut Rd Ex) | R | 3 |
| CLK | A-307 (Proposed) | County/Dev | | R | 3 |
| CLK | Observation Dr Extended | County/Dev | Little Seneca Cr to Roberts Tavern Dr | R | 2 |
| CLK | Hyattstown Bypass (Proposed) | State | MD 355 to MD 355 | R | 3 |

## Menu of Master Planned Transportation Improvements -- Sorted by Policy Area, Mode, and Improvement Type -- Not Programmed by 2018

| Policy Area(s) | Project Name | Implementation | Limits | Improvement Type | Facility Type |
|---|---|---|---|---|---|
| CLK | New Cut Rd Extended | County/Dev | West Old Baltimore Rd; Broadway Ave. to MD 27 | R | 2 |
| CLK | Snowden Farm Pkwy (Proposed) | County/Dev | MD 27 to Clarksburg Rd | R | 2 |
| CLK | Snowden Farm Pkwy (Proposed) | County/Dev | Clarksburg Rd to MD 355 | R | 2 |
| CLK | Brink Rd | County/Dev | MD 355 to MD 27 | R | 3 |
| CLK | Shawnee La | County/Dev | Gateway Center Dr to MD 355 | R | 3 |
| CLK | Stringtown Rd | County/Dev | Overlook Crossing Dr to Snowden Farm Pkwy | R | 3 |
| CLV | Norwood Rd | County | MD 650 to MD 182 | R | 3 |
| CLV | MD 028 Norbeck Rd | State | MD182 to Peach Orchard Rd | R | 2 |
| CLV | Thompson Rd Extended | County | Rainbow Dr to Thompson Dr | R | 3 |
| DAM | NONE | | | | |
| DER | MD355 Frederick Rd & Gude Dr | State | Interchange | R | 1 |
| DER | ICC & Mid-County Hwy | State | Interchange | R | 1 |
| DER | Metro Access Crabbs Branch Wy | County/Dev | Interchange | R | 1 |
| DER | Crabbs Branch Way Extended | County/Dev | Shady Grove Rd to Amity Dr | R | 3 |
| FWO | US 29 & Blackburn Dr | State | Interchange | R | 1 |
| FWO | US 29 & Fairland | State | Interchange | R | 1 |
| FWO | US 29 & Greencastle Rd | State | Interchange | R | 1 |
| FWO | US 29 & Musgrove Rd | State | Interchange | R | 1 |
| FWO | US 29 & Stewart Dr | State | Interchange | R | 1 |
| FWO | US 29 & Tech Rd | State | Interchange | R | 1 |
| FWO | MD 028 Norbeck Rd | State | Peach Orchard Rd to PG Line | R | 2 |
| FWO | Briggs Chaney Rd | County | ICC to PG Line | R | 3 |
| FWO | Burtonsville Blv | State/Dev | MD 198 to Dustin Rd | R | 3 |
| FWO | Calverton Blv | County | Cherry Hill Rd to PG Line | R | 3 |
| FWO | Fairland Rd | County | MD 650 to PG Line | R | 3 |
| FWO | Greencastle Rd | County | Robey Rd to PG Line | R | 3 |

## Menu of Master Planned Transportation Improvements -- Sorted by Policy Area, Mode, and Improvement Type -- Not Programmed by 2018

| Policy Area(s) | Project Name | Implementation | Limits | Improvement Type | Facility Type |
|---|---|---|---|---|---|
| GBG | I 270 and Watkins Mill Rd | County/State/Dev | Interchange | R | 1 |
| GBG,NP | MD117 West Diamond Ave | State | Seneca Creek St Pk to Muddy Branch Rd | R | 2 |
| GBG,NP | MD124 Montgomery Village Ave | State | MD 28 to Longdraft Rd | R | 2 |
| GBG,NP | Muddy Branch Rd | County | MD 28 to MD 117 | R | 2 |
| GBG,NP | Longdraft Rd | County | MD 124 to MD 117 | R | 3 |
| GBG | Oakmont Ave Extended | County | Oakmont Av to Washington Grove Ln | R | 3 |
| GBG | Oden'hal Ave | County | Lost Knife Rd to Summit Av | R | 3 |
| GTE | MD027 & MD355 | State | Interchange | R | 1 |
| GTE | MD027 & Observation Dr | State | Interchange | R | 1 |
| GTE | MD118 & MD355 | State | Interchange | R | 1 |
| GTE | MD118 & Mid County Hwy | State | Interchange | R | 1 |
| GTE | MD355 & Middlebrook Rd | State | Interchange | R | 1 |
| GTE | Shakespeare Dr | County/Dev | Watkins Mill Rd to MD 355 | R | 3 |
| GTE | Watkins Mill Rd | County | Midcounty Hwy to Midcounty Hwy | R | 3 |
| GTE | Dorsey Mill Rd | County | Bridge over I-270 | R | 3 |
| GTW | MD117 Clopper Rd | State | Seneca Creek St Pk to east of MD 121 | R | 2 |
| GTW | MD119 Great Seneca Hwy | State | Longdraft Rd to Middlebrook Rd | R | 2 |
| GTW | Father Hurley Blv | County | Wisteria Dr to Crystal Rock Dr | R | 2 |
| GTW | Crystal Rock Dr Extended | Dev (Kinster Dr to Dorsey Mill | Kinster Dr to Dorsey Mill Rd | R | 3 |
| GTW | Dorsey Mill Rd | County/Dev | Bridge over I-270 | R | 3 |
| GTW | Observation Dr Extended | County | Waters Discovery Ln to Little Seneca Cr | R | 3 |
| KW | MD586 Veirs Mill Rd & Randolph Rd | State | Interchange | R | 1 |
| KW | MD586 Veirs Mill Rd | State | Twinbrook Pkwy to Randolph Rd | R | 2 |
| KW | Capitol View Ave Relocated | State/Dev | Edgewood Rd to Stoneybrook Dr | R | 3 |
| MVA | MD115 Muncaster Mill Rd | State | Redland Rd to MD 124 | R | 2 |
| MVA | MD124 Woodfield Rd | State | Emory Grove Rd to Warfield Rd | R | 2 |
| MVA | MD124 Montgomery Village Av | State | Russell Av to Midcounty Hwy | R | 2 |

## Menu of Master Planned Transportation Improvements -- Sorted by Policy Area, Mode, and Improvement Type -- Not Programmed by 2018

| Policy Area(s) | Project Name | Implementation | Limits | Improvement Type | Facility Type |
|---|---|---|---|---|---|
| MVA | Goshen Rd Widening | County | Oden'hal Rd to Warfield Rd | R | 2 |
| MVA | Snouffer School Rd | County/Dev | MD 124 to Goshen Rd | R | 3 |
| MVA | Wightman Rd | County | Goshen Rd to Brink Rd | R | 3 |
| NB | Montrose Pkw (Proposed) | State | Maple Av to Parklawn Dr | R | 2 |
| NB | Montrose Pkw (Proposed) | County | Parklawn Dr to MD 586 | R | 2 |
| NB | Old Georgetown Rd | County | MD 355 to Nebel St | R | 2 |
| NB | Twinbrook Pkw | County | Chapman Av to Ardennes Av | R | 3 |
| NB | Woodglen Dr Extended | County/Dev | Nicholson Ln to Marinelli Rd | R | 3 |
| OLY | MD097 Brookeville Byp (Proposed) | State | Goldmine Rd to Georgia Av | R | 2 |
| OLY | MD097 Georgia Ave | State | MD 108 to Prince Phillip Dr | R | 2 |
| OLY | MD028 Norbeck Rd | State | MD 97 to MD 182 | R | 2 |
| OLY | MD108 Olney-Laytonsville Rd | State | Muncaster Rd to Olney Mill Rd | R | 2 |
| POT | MD189 Falls Rd Relocated | State | Democracy Blvd to Rockville Line | R | 2 |
| POT | MD190 River Rd Relocated | State | Riverwood Dr To River Oaks Ln | R | 2 |
| POT | Montrose Rd Extended | County | MD 189 to Falls Rd Relocated | R | 3 |
| POT | Montrose Rd | County | Seven Locks Rd to I-270 | R | 3 |
| POT | Westlake Dr | County | Westlake Ter to Tuckerman Ln | R | 3 |
| RDV | MD028 Key West Ave & MD119 Great Seneca Hwy | State | Interchange | R | 1 |
| RDV | Sam Eig Hwy & Fields/Diamondback Dr | State/County | Interchange | R | 1 |
| RDV | Sam Eig Hwy & MD119 Great Seneca Hwy | State | Interchange | R | 1 |
| RDV | Shady Grove Rd & MD028 Darnestown Rd | State | Interchange | R | 1 |
| RDV | Darnestown Rd Relocated | County | Darnestown Rd to Great Seneca Hwy | R | 2 |
| RDV | MD119 Great Seneca Hwy Relocated | County/State | Darnestown Rd to Sam Eig Hwy | R | 2 |
| SSTP | Lyttonsville Rd | County | Grubb Rd to Lyttonsville Pl | R | 3 |
| SSTP | Seminary Rd | County/Dev | MD 192 to MD 97 | R | 3 |
| RKV,GBG,GTE,GTE,CLK | I-270 (HOV and Widening) | State | I-370 to Frederick Co Line | R | 1 |
| RURW | MD118 Germantown Rd | State | MD 28 to MD 117 | R | 2 |
| RURW | Whites Ferry Rd Relocated | County | Partnership Rd to west of Partnership Rd | R | 3 |