

D. Cordon Line Analysis

A cordon line analysis is a general tool to quickly compare total traffic volumes entering or leaving the Gaithersburg West Master Plan area. Over the course of the Master Plan development process, a “subregional” cordon line was established, as indicated in Figure 18, to consider flows into and out of the area surrounding but including the LSC. This cordon line generally reflects the boundary between analysis that applied the TRAVEL/3 system level model and analysis that applied the Local Area Model.

The cordon line has two different types of use. The assessment of forecast traffic volumes based on trip generation and a constant level of through traffic was applied for quick-response sensitivity tests to land use alternatives with a conceptual cordon line volume. These conceptual cordon line volumes are reflected in the bar chart comparisons of land use volumes and may differ slightly from the volumes shown on traffic assignments.

Vehicular Traffic Volumes

Figure 26 presents a comparison of existing and forecast traffic volumes at the studied cordon line. In general, the cordon line serves as the boundary between the LSC area, where land uses are proposed to change as a result of this plan, and the area outside of the cordon, which is subject to other plans and/or is otherwise not forecast to change development densities. As a result, traffic volumes at these locations are substantially higher than in the interior of the Master Plan.

At the cordon line, the total traffic volume will increase by about 43%, from 392,000 vehicles per day to 561,000 vehicles per day. The heaviest volumes will occur on the Major highways where they meet I-270, Sam Eig Highway and Shady Grove, with between 79,900 and 88,000 vehicles per day.

Traffic volumes and volume growth will be slightly lower within the LSC area due to the expanded roadway network. In general, traffic volumes along Key West Avenue today in the Plan area are 52,000 vehicles per day and are forecast to grow to between 56,000 and 65,000 vehicles per day.

Figure 26: Sector Plan Cordon Line Traffic Volumes

**Gaithersburg West Plan
Study Area Cordon Line**

2007 Conditions - Observed Peak Hour Totals

Location	ADT	AM Peak Hour			PM Peak Hour		
		Inbound	Outbound	Total	Inbound	Outbound	Total
10 DIAMONDBACK DR	15100	1000	330	1330	440	800	1240
12 TRAVILAH RD	10700	460	350	810	440	570	1010
13 MUDDY BRANCH/ Darnestown	18200	1230	270	1490	660	940	1600
15 DARNESTOWN RD (MD 28)	35900	2590	580	3170	940	1980	2930
16 GLEN MILL RD	17000	370	1120	1500	840	560	1400
17 MUDDY BRANCH/ Great Seneca	20600	850	670	1520	950	1030	1980
18 WEST MONTGOMERY AVE (MD 28)	52000	2110	2090	4200	2460	2190	4650
20 Shady Grove Road/270 + slip ramp	58700	3470	1520	4990	2010	2990	5000
21 Sam Eig Highway	66600	2160	2890	5040	2840	3440	6280
23 W Gude Drive	32500	1440	1220	2660	1190	1670	2860
24 Shady Grove Road/Traville	11900	610	450	1060	540	430	970
25 GREAT SENECA HWY (MD 119)	53100	3160	1070	4220	1650	3160	4810
TOTAL	392300	19440	12550	31990	14960	19750	34720

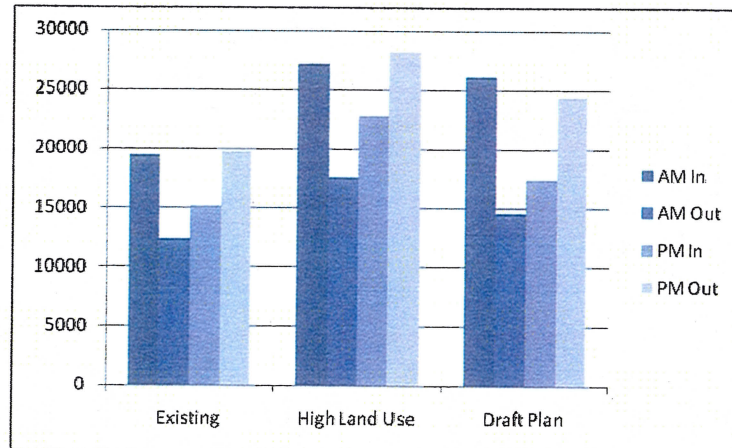
Modeled Draft Plan (High Scenario) Conditions

Location	ADT	AM Peak Hour			PM Peak Hour		
		Inbound	Outbound	Total	Inbound	Outbound	Total
10 DIAMONDBACK DR	18400	1210	380	1590	560	980	1540
12 TRAVILAH RD	16300	770	510	1280	640	860	1500
13 MUDDY BRANCH/ Darnestown	26300	1580	550	2130	1040	1310	2350
15 DARNESTOWN RD (MD 28)	46900	2910	970	3880	1580	2510	4090
16 GLEN MILL RD	25000	690	1320	2000	1300	940	2240
17 MUDDY BRANCH/ Great Seneca	35200	1570	1080	2650	1690	1650	3340
18 WEST MONTGOMERY AVE (MD 28)	76800	3240	2870	6110	3140	3820	6950
20 Shady Grove Road/270 + slip ramp	79900	4230	2630	6870	2660	4050	6710
21 Sam Eig Highway	88000	3570	2890	6460	4190	4310	8500
23 W Gude Drive	49300	2280	1680	3960	1980	2450	4430
24 Shady Grove Road/Traville	31000	1210	1160	2370	1460	1450	2910
25 GREAT SENECA HWY (MD 119)	68000	3620	1780	5400	2380	3790	6170
TOTAL	561100	26860	17830	44690	22610	28110	50720

Draft Plan Trip Comparison

The Recommendations in the Plan for transportation infrastructure and staging are based on the highest land use scenario tested, The High Land Use scenario. However, subsequent to development of the recommendations in the Plan, a slightly lower density was selected for the Draft Plan. A comparison of the High and Draft Plan trip

Figure 27: Draft Plan Trip Generation Comparison



generation characteristics is included to show the difference.

The Existing land uses within the cordon studied generate about 31,700 vehicle trips in the AM peak hour and 34,900 trips in the PM peak hour.

The High Land Use tested generates 44,700 vehicle trips in the AM peak hour and 50,800 trips in the PM peak hour.

Comparatively, the Draft Plan generates 40,600 vehicle trips in the AM peak hour and 41,700 in the PM peak hour, a difference of about 10% between the two land use scenarios.

The Draft Plan also recommends a slightly lower Non-Auto Driver Mode Split (NADMS) of 30%, rather than the “High” Land Use scenario NADMS of 32.5%, resulting in slightly higher per-square foot trip rates per square foot of use modeled.

E. Travel Demand Forecasting Process and Assumptions

The travel demand forecasting process includes three levels of analysis. The Department’s regional travel demand forecasting model, TRAVEL/3, is used to develop forecast travel demand results for weekday travel and PM peak periods. TRAVEL/3 is a four-step model, consisting of:

- Trip generation; the number of person trips that are generated by given types and densities of land uses within each TAZ,
- trip distribution; how many person trips generated by each TAZ will travel to each of the other TAZs within the metropolitan area,
- mode split; which mode of travel the person trips will use, including single-occupant auto, multiple-occupant auto, transit, or a non-motorized mode such as walking or bicycling, and
- traffic assignment; the roadways that will be used for vehicular travel between TAZs.

The TRAVEL/3 model incorporates land use and transportation assumptions for the Metropolitan Washington region, using the same algorithms as applied by the Metropolitan Washington Council of Governments (MWCOG) for air quality conformity analysis. Figure 28 shows the relationship of Montgomery County in the regional travel demand network, featuring the coding of street network characteristics to reflect the general level of adjacent development density.

Figure 28: Travel/3 Model Network Typology



The TRAVEL/3 provides system-level results that are used directly to obtain the Policy Area Mobility Review forecasts for the County's Policy Area Transportation Review. The system-level results are also used as inputs to the finer grain analytic tools described below.

The second level of analysis consists of post processing techniques applied to the TRAVEL/3 forecasts, as described in NCHRP Report 255. These techniques include refinement of the AM and PM peak hour forecasts to reflect a finer grain of land use and network assumptions than included in the regional model, such as the location of local streets and localized travel demand management assumptions. The NCHRP 255 analyses are used to produce the cordon line analyses.

The third level of analysis includes intersection congestion, using the Critical Lane Volume (CLV) methodology described in the Department's Policy Area Mobility Review / Local Area Transportation Review (PAMR / LATR) Guidelines.

Travel/3 Forecasting Assumptions

The Gaithersburg West Master Plan forecasts assumed the following parameters:

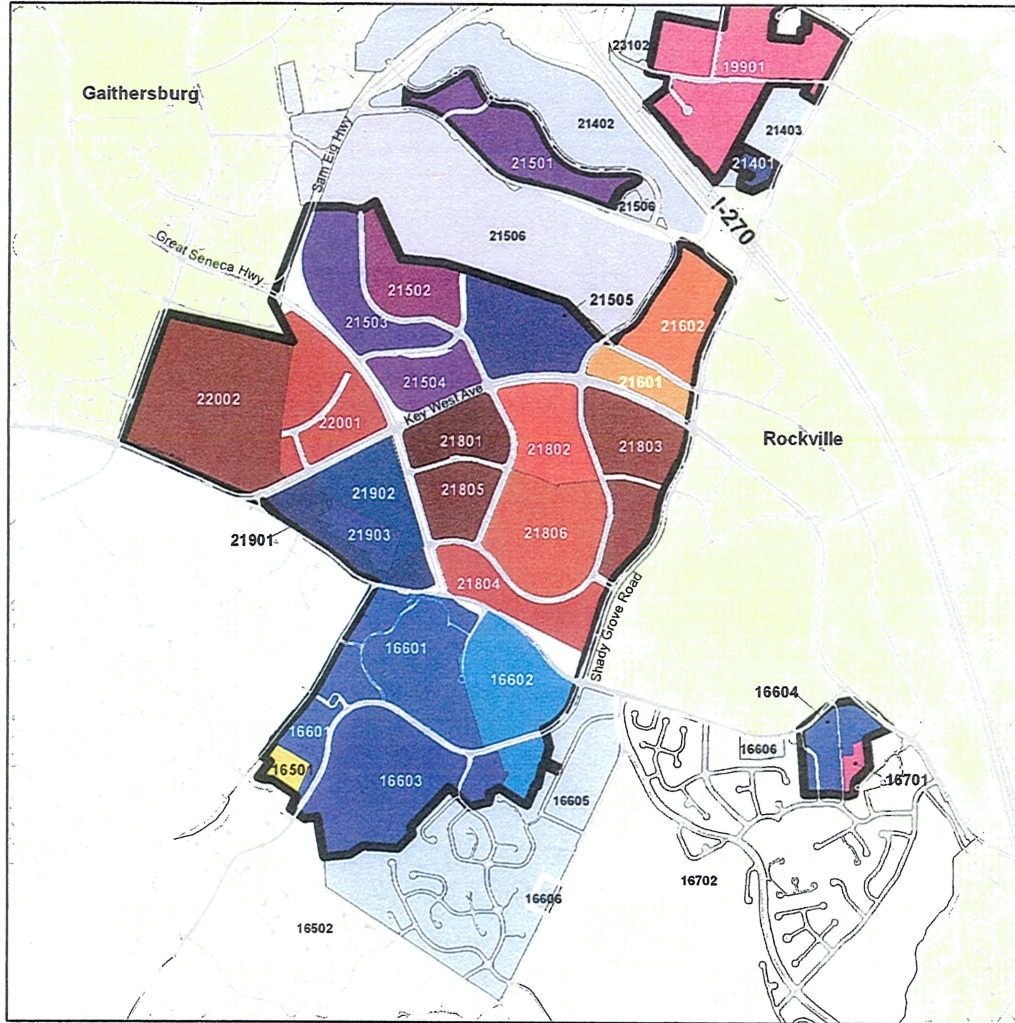
- A 2030 horizon year. This is currently the most distant horizon year for which forecast land use and transportation system development is available.
- Regional growth per the MWCOG Cooperative Forecasting Process. The most current round of Cooperative Forecasts was used.
 - For the Washington region, the Round 7.1 forecasts include an increase from 3.0 million jobs and 1.9 million households in 2005 to 4.2 million jobs and 2.5 million households in 2030.
 - For Montgomery County, the Round 7.1 forecasts include an increase from 500,000 employees and 347,000 households in 2005 to 670,000 employees and 441,300 households in 2030.
 - For the LSC area, the Round 7.1 forecasts include an increase from 6.9M square feet of development and 3,300 households in 2005 to 12.9M square feet of development and 8,000 households in 2030.
- Transportation improvements in the region's Constrained Long Range Plan (CLRP), a fiscally constrained transportation network. Notable projects assumed to be in place for the buildout of the LSC area include:
 - Elimination of the WMATA turnback at Grosvenor
 - The Corridor Cities Transitway (realigned through the LSC) from Shady Grove to Clarksburg
 - The Purple Line between Bethesda and Silver Spring
 - The Montrose Parkway, including an interchange at Rockville Pike
 - The Intercounty Connector
 - Express Toll Lanes on I-270 from I-370 to the city of Frederick

F. Local Area Modeling Process and Assumptions

The Department's Local Area Modeling (LAM) process uses NCHRP Report 255 techniques to both convert the TRAVEL/3 system level forecasts to intersection-level forecasts. The LAM process is then used as a pivot-point technique to reflect changes to the localized land use or transportation network, providing both cordon line and network analysis results.

The TRAVEL/3 model represents the R & D Village Policy Area as six (6) transportation analysis zones (TAZs). The LSC LAM disaggregates these 6 TAZs into twenty three (23) subzones as indicated in Figure 29.

Figure 29: LSC Area Local Area Model Subzones



The LAM process uses trip generation rates that are customized to reflect both existing conditions and future changes, considering both the land use types and changes in travel behavior. Figure 30 shows the trip generation rates used in the LAM.

Figure 30: Local Area Model Peak Hour Trip Generation

Land Use	Units	AM	PM
Office (at 30% NADMS)	1000 Square Feet	1.30	1.20
Retail (at 30% NADMS)	1000 Square Feet	1.00	3.00
Industrial (at 30% NADMS)	1000 Square Feet	1.00	1.00
Other Commercial(at 30% NADMS)	1000 Square Feet	1.00	1.00
Multi-family residential (Garden apartment)	Dwelling unit	0.48	0.83
Multi-family residential (Highrise)	Dwelling unit	0.44	0.48

These trip generation rates reflect a combination of Local Area Transportation Review rates for typical development in Metro Station Policy Areas such as White Flint and were calibrated to match the observed traffic counts, considering the amount of through traffic in the roadway network so that the LAM volumes at the network cordon line are within 2% of observed count data for both AM and PM peak hours.

The trip generation rates shown in Figure 30 are generally lower than those found in the Institute of Transportation Engineers (ITE) Trip Generation report, particularly for commercial land uses. The trip generation rates reflect the fact that ITE rates for most commercial locations do not have the transit availability and usage found in Gaithersburg West with the CCT. The difference for residential uses is not quite as high because ITE trip generation rates for multifamily housing do reflect the fact that most multifamily housing units have, almost by definition, sufficient density to support transit service. Finally, the retail trip generation rates in the LSC zone also incorporate a discount for pass-by and diverted-link trips.

Land Use Alternatives Tested

Figure 31 shows the LSC Policy Area land use alternatives considered for the LAM in the development of the Gaithersburg West Master Plan.

Figure 31: LSC Policy Area Land Use Scenarios Considered During Plan Development (TAZs 218, 219 and 220)

Scenario Title in Presentations	Commercial SF	DU
Existing	3.5M	0
1990 Plan – “Low” Scenario	7.2M	500
“Medium” Scenario	12.4M	4,800
“High” Scenario	16.1M	9,700
“Recommended” Scenario	15.2M	4,525