Ten Mile Creek Amendment
Appendix 6

Transportation Analysis
Updated October 2013

Transportation Analysis

Introduction

This Transportation Appendix presents an analysis of the existing roadway and transit networks and offers recommendations on approaches for improving both in the context of the land use alternatives considered in the development of the Plan.

The Appendix consists of a technical memorandum on the analysis of the road network developed by the Planning Department's transportation consultant and an analysis by the Department staff of the existing transit service and the presentation of a framework for enhancing the service over the long term.

Transportation
Land Development
Environmental
Services

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Memorandum

To: Eric Graye, AICP, PTP
Montgomery County Department of Planning

Date: August 4, 2012

Project No.: 38102.01

From: Dan Goldfarb, P.E.

Re: Clarksburg Traffic Analysis Summary

Introduction

The purpose of this memorandum is to provide a brief preliminary summary of the traffic analysis for the Clarksburg Sector Plan. The analysis focused on seven intersections that represent gateways into the study area, as well as key internal junctions. The intersections include:

- Interchange ramp terminals for I-270 and Clarksburg Road (MD 121) for both the eastern and western side of the interchange;
- Clarksburg Road (MD 121) & Frederick Road (MD 355);
- Shawnee Lane & Frederick Road (MD 355);
- Stringtown Road (MD 121A) & Frederick Road (MD 355);
- Gateway Center Drive & Clarksburg Road (MD 121)/Stringtown Road;
- New By-pass Road/Observation Drive & Stringtown Road (MD 121A).

There was no data collection effort associated with this analysis effort. The County supplied two lists of intersections to be reviewed. The above intersections are the only intersections that we were able to obtain existing count data. The interchange of I-270 and MD 121 represents a gateway into the study area, as well as the intersection of Shawnee Lane and Frederick Road. The list of intersections requested by the County included Clarksburg Road and Old Baltimore Road as well as West Baltimore and Frederick Road. There were no counts available from SHA for these intersections, but the two gateway intersections above capture traffic just upstream to the intersections on Old Baltimore Road.

The year 2040 forecast were developed using the County's TRAVEL/3 travel demand forecast model and land use supplied by the County for a high land use scenario, denoted as "HI" on the CLV sheets. The Cooperative Land Use totals at the regional level were held

constant for the HI scenario with balancing done in neighboring jurisdictions. A no-build and build alternatives were run with both land use scenarios. Given the localized highway improvement the trip tables were developed using the full TRAVEL/3 model run for both land use scenarios and then assigned to the alternative specific networks. The trip tables were not changed for the different network configurations since the addition of the by-pass was determined to have minimal impact on the trip distribution and mode choice. A subarea for the Clarksburg area was developed from the regional highway network and trips were assigned to the subarea network. The resulting ADT traffic volumes were post-processed using techniques outlined in NCHRP 255. Peak hour volumes were derived from the existing peak to daily and directional ratios for both morning and evening weekday.

Preliminary Traffic Assessment findings:

- With the added development by the year 2040 there will be a need for added capacity for travel north and south in the Clarksburg area.
- Frederick Road (MD 355) with a two lane cross section provides limited capacity for trips traveling north and south.
- The additional by-pass facility provides added capacity for north and south travel along the corridor.
- Even with the new facility there is a need for additional capacity improvements. These could include improved intersection geometrics, added lanes on the by-pass and MD 355, new facilities to the east of MD 355.

The Table 1 provides a summary of the critical lane volume analysis. The critical lane volume worksheets are attached.

Table 1 - Summary of Preliminary Intersection Analysis Level of Service and Critical Lane Volumes

Intersection	Existing				2040 No-Build				2040 Build				2040 HI No-Build				2040 HI Build			
	AM		PM		AM		PM		AM		PM		AM		PM		AM		PM	
MD 121 & I-270 Western Intersection	A	365	A	250	B	1125	A	675	B	1125	A	675	B	1125	A	675	B	1125	A	700
I-270 & MD 121 Eastern Intersection	A	609	A	480	C	1213	D	1325	C	1200	D	1325	D	1306	D	1325	D	1306	D	1350
MD 355 & MD 121	C	1225	C	1150	D	1425	**F**	**1850**	A	875	**F**	**1800**	E	1525	**F**	**1850**	A	950	**F**	**1800**
MD 355 & Shawnee Lane	A	750	A	875	B	1083	B	1117	B	1096	B	1142	C	1183	B	1100	C	1196	C	1225
MD 355 & Stringtown Road	A	914	B	1068	**F**	**1719**	**F**	**2431**	B	1073	E	1522	**F**	**1970**	**F**	**2431**	C	1210	**F**	**1657**
Gateway Center Dr. & Stringtown Road	A	667	A	846	D	1397	D	1325	E	1540	E	1468	**F**	**1721**	D	1325	**F**	**1802**	**F**	**1870**
Observation Drive & Stringtown Road									D	1386	**F**	**1616**					D	1445	**F**	**1801**

A secondary analysis effort was done to supplement the preliminary analysis. The objective was to determine what network improvements would be needed in order to accommodate the additional traffic generated from the future development without constructing the new MD 355 by-pass facility. This exercise included intersection level improvements and was performed at a sketch planning level. The modified network with the improved intersection lane configurations was evaluated using the critical lane methodology.

The following list provides an overview of the intersection improvements. Intersection Improvements:

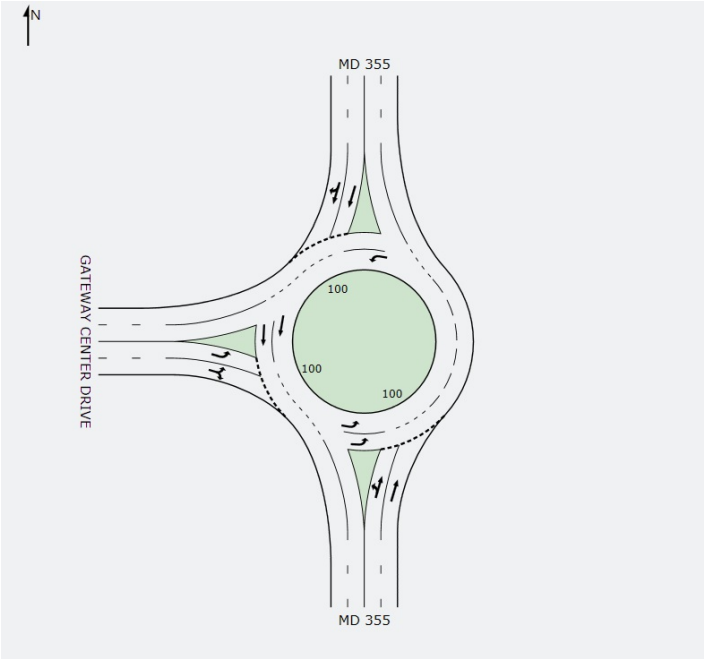
- MD 355 & MD 121 – Addition of a northbound and southbound through lane.
- MD 355 & Stringtown Road – Addition of a northbound and southbound through lane; the addition of an eastbound and westbound through lane as well as an additional eastbound left turn lane to northbound MD 355 and a southbound left turn lane to westbound Stringtown Road.
- Gateway Center Drive & Stringtown Road – Addition of an eastbound and westbound through lane; a dedicated eastbound free flow right turn to southbound Gateway Center Drive; the addition of a free flow right turn lane from northbound Gateway Center Drive to eastbound Stringtown Road.

Summary secondary analysis findings:

- Overall improvements could be made at the key intersections that would address the traffic and result in acceptable levels of service.
- The key intersections included those with LOS "F" which included the intersections along MD 355 as well as the intersection of Gateway Center Drive and Stringtown Road.
- The improvements resulted in LOS "D" or better compared to the previous LOS "F" at those key intersection.
- With the intersection improvements, in order for the roadways to function at acceptable levels MD 355 would have to be increased to a possible three lane section between Stringtown Road and Clarksburg Road (MD 121). The middle lane would have to serve as a contraflow lane during peak periods. At the key intersections along MD 355 there would be a need to include two lanes in each direction making it a four lane cross section. This would be required to address the addition through lanes at the intersections on MD 355.
- The four lane section on MD 355 would have to be tapered down to a three lane cross section. The ability to taper down would present a challenge given the short distance between the two key intersections on MD 355.
- It was determined that the tapering is not very feasible and the by-pass would be required if MD 355 is to remain in the current right of way and not impact the historical district of Clarksburg.
- The ability to build the new by-pass would provide an opportunity to construct a more complete street including the ability to serve non-motorized travel modes. It

would be a hard to construct these types of facilities on MD 355 given the restrictions in the historical district.

As part of this analysis the termini for where the MD 355 by-pass rejoins MD 355 north of Clarksburg was evaluate using a roundabout. The following figure provides a schematic for a typical roundabout that would fit this location.



The roundabout would have two circulation lanes and the approaches would all need to have four lane cross sections. Although forecast volumes were not prepared as part of this analysis, a series of test volumes were analyzed using this configuration. This configuration is able to serve the volumes adequately. The roundabout configuration would provide for a more efficient transition for vehicles using the by-pass to enter back onto MD 355 north of Clarksburg. If the demand is too high then a signalized intersection would be required. With a demand based on the surrounding intersection the LOS would be approximately "C" or "D" given different sensitivity tests. The PM peak hour volumes were determined to be the critical volumes, with the northbound through volumes on MD 355 and the eastbound left turning volumes showing the highest demand. The roundabout did function and there is the ability to add an additional lane going northbound around the roundabout, creating a three lane section where the majority of the traffic is staying in those lanes and continuing northbound.

Table 2 provides a summary of the critical lane volume analysis for the secondary analysis. The critical lane volume worksheets follow the tables. Table 3 provides a summary of intersections improvements with the By-pass facility to bring all of the intersections to an acceptable level of service. In table 3 there are two intersections, MD 355 & Stringtown Road and Observation Road/New By-pass & Stringtown Road where improvements were made to bring the intersections to acceptable levels of service. These improvements included additional east-west through lanes, free-flow right turn lanes, and double left turn lanes. The CLV sheets are attached to this memorandum.

Additional analysis was done for the Clarksburg plan update using an alternative methodology and performance measure. The preliminary and secondary traffic analysis for the Clarksburg plan update used the Critical Lane Volume (CLV) methodology. At the request of the Planning Department an alternative analysis methodology was used. This methodology was based on the procedures and performance measures outlined in the Highway Capacity Manual. Synchro software was used to do this analysis. There were Synchro files for areas south of Clarksburg, but the County was unable to provide Synchro files that covered the defined study area that this analysis is focused on. Therefore VHB developed a network in Synchro for the defined study area. The signal times as well as optimization and coordination were based on patterns observed in the Synchro files provided for areas south of our study area.

The original intent of the preliminary traffic analysis was to develop a traffic forecast for year 2040 for both the planned development and a potential higher development plan. Two network scenarios were evaluated – with and without the MD 355 By-pass. The original effort included a preliminary review of the intersection operations in order to evaluate if the by-pass was required given the available network capacity. The approach used for the CLV based analysis was very basic and did no evaluate any complex type of signal phasing. It focused on two phases at each signal. This was determined to be adequate for the purpose of understanding the capacity constraints on the study area network. The HCM based analysis involved a level of greater complexity given the need for signal timings and coordination.

CLV is a planning tool focusing on the lane capacity supplied and the capacity consumed. The CLV analysis tool functions at a high level of coarseness. Earlier applications of the procedure would categorize results as under-capacity, near-capacity, and over-capacity as compared to providing a discrete level of service grade. The 1985 Highway Capacity Manual used such categories with the CLV procedures. Given the need for comparing results many planning and transportation departments, as well as other agencies, have developed level of service standards similar to the Highway Capacity Manual operational analysis. In this framework levels of service are described in terms of a grade, “A” through “F”.

Table 4 shows the results comparing the two methodologies. There were some differences, but overall the results were compatible. The greatest difference between the two methodologies was with the interchange terminal intersections. The HCM based analysis incorporates a greater number of attributes and requires more input data. The ramps provide an example of how the HCM based analysis has a greater sensitivity to how the intersection functions. For the interchange ramps the saturation flow rate was increased to reflect the higher speeds. The CLV analysis did not differentiate between entering saturation flows or receiving saturation flows, it only focuses on a capacity of the intersections as a functions of the number of lanes approaching the intersection.

Overall the two methodologies would tend to lead to the same conclusion that there needs to be added capacity in the defined study area. The MD 355 By-pass is important addition to the capacity in the defined study area. The HCM analysis is probably more accurate given the additional data demands.

Table 2 - Summary of Secondary Intersection Analysis Level of Service and Critical Lane Volumes

Intersection	Existing				2040 No-Build With Improvements				2040 HI No-Build With Improvements			
	AM		PM		**AM**		**PM**		**AM**		**PM**	
MD 121 & I-270 Western Intersection	A	365	A	250	B	1125	A	675	B	1125	A	675
I-270 & MD 121 Eastern Intersection	A	609	A	480	C	1213	D	1325	D	1306	D	1325
MD 355 & MD 121	C	1225	C	1150	A	955	C	1157	B	1090	C	1157
MD 355 & Shawnee Lane	A	750	A	875	B	1083	B	1117	C	1183	B	1100
MD 355 & Stringtown Road	A	914	B	1068	B	1125	C	1299	D	1394	D	1416
Gateway Center Dr. & Stringtown Road	A	667	A	846	D	1397	D	1325	C	1204	C	1202
Observation Drive & Stringtown Road												

Intersection Improvement

Table 3 - Summary of Intersection Analysis Level of Service and Critical Lane Volumes with Improvements

Intersection	Existing				2040 Build				2040 Build With Improvements			
	AM		PM		**AM**		**PM**		**AM**		**PM**	
MD 121 & I-270 Western Intersection	A	365	A	250	B	1125	A	675	B	1125	A	675
I-270 & MD 121 Eastern Intersection	A	609	A	480	C	1200	D	1325	C	1200	D	1325
MD 355 & MD 121	C	1225	C	1150	A	875	**F**	**1800**	A	875	**D**	**1409**
MD 355 & Shawnee Lane	A	750	A	875	B	1096	B	1142	B	1096	B	1142
MD 355 & Stringtown Road	A	914	B	1068	B	1073	E	1522	B	1073	E	1522
Gateway Center Dr. & Stringtown Road	A	667	A	846	E	1540	E	1468	E	1540	E	1468
Observation Drive & Stringtown Road					D	1386	**F**	**1616**	D	1386	**D**	**1430**

Intersection Improvement

Table 4 Level of Service Summary and Comparison

Intersection	2040 No-Build								2040 Build							
	AM Peak				PM Peak				AM Peak				PM Peak			
	Synchro/HCM		CLV		Synchro/HCM		CLV		Synchro/HCM		CLV		Synchro/HCM		CLV	
	Delay	LOS	V/C	LOS	Delay	LOS	V/C	LOS	Delay	LOS	V/C	LOS	Delay	LOS	V/C	LOS
MD 121 & I-270 SB Ramp	14.2	B	0.70	B	16.2	B	0.42	A	11.0	B	0.70	B	15.1	B	0.42	A
MD 121 & I-270 NB Ramp	3.6	A	0.76	C	10.4	B	0.83	D	2.8	A	0.75	C	8.9	A	0.83	D
Clarksburg Rd & Gateway Center	25.8	C	0.87	D	28.1	C	0.83	D	45.2	D	0.96	E	37.0	D	0.92	E
MD 355 & Stringtown Road	198.4	F	1.07	F	201.1	F	1.52	F	27.9	C	0.67	B	78.7	E	0.95	E
MD 355 & MD 121	46.3	D	0.89	D	152.1	F	1.16	F	22.6	C	0.55	A	93.6	F	1.13	F
MD 355 & Shawnee Lane	20.3	C	0.68	B	29.2	C	0.70	B	17.6	B	0.68	B	29.2	C	0.71	B
New Road/Observation Drive & Stringtown Road	--	--	--	--	--	--	--	--	35.0	D	0.87	D	90.9	F	1.01	F

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Western Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	Existing
Analyst:	DSG/VHB

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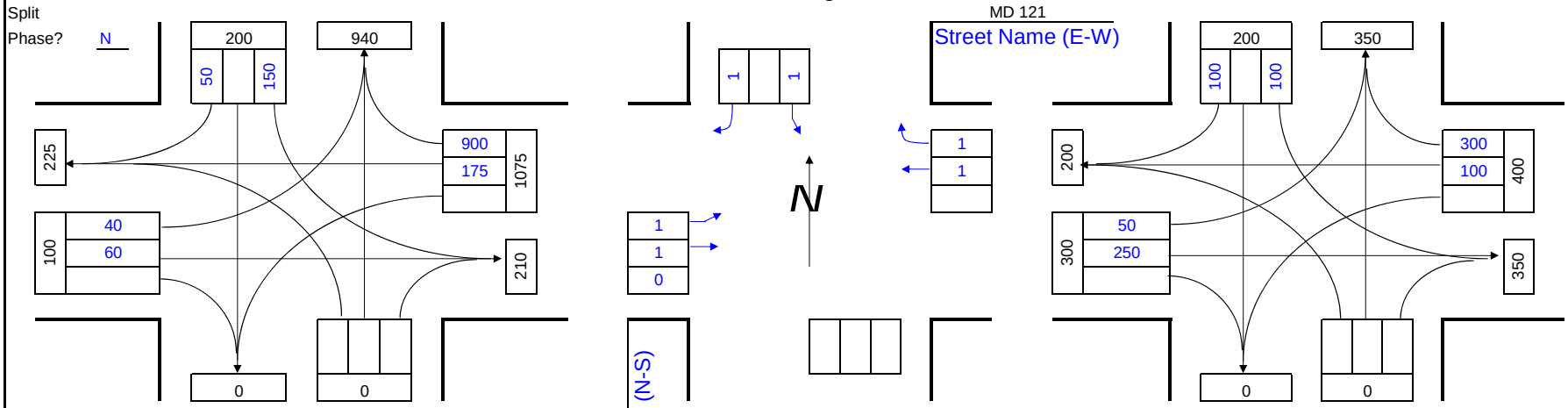
Morning Peak Hour

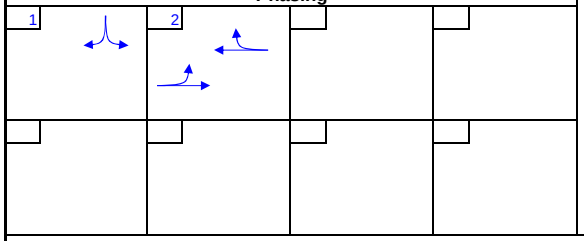
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL	0	1.00	0	150	1.00	150	150	C
2	EB	60	1.00	60	0	1.00	0	60	
2	WB	175	1.00	175	40	1.00	40	215	C

C: Critical Volume — Total 365; V/C 0.23; LOS A

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL		1.00	0	100	1.00	100	100	C
2	EB	250	1.00	250	0	1.00	0	250	
2	WB	100	1.00	100	50	1.00	50	150	C

C: Critical Volume — Total 250; V/C 0.16; LOS A

Critical Lane Volume
Level of Service Worksheet

Intersection	I-270 & MD 121 Eastern Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	Existing
Analyst:	DSG/VHB

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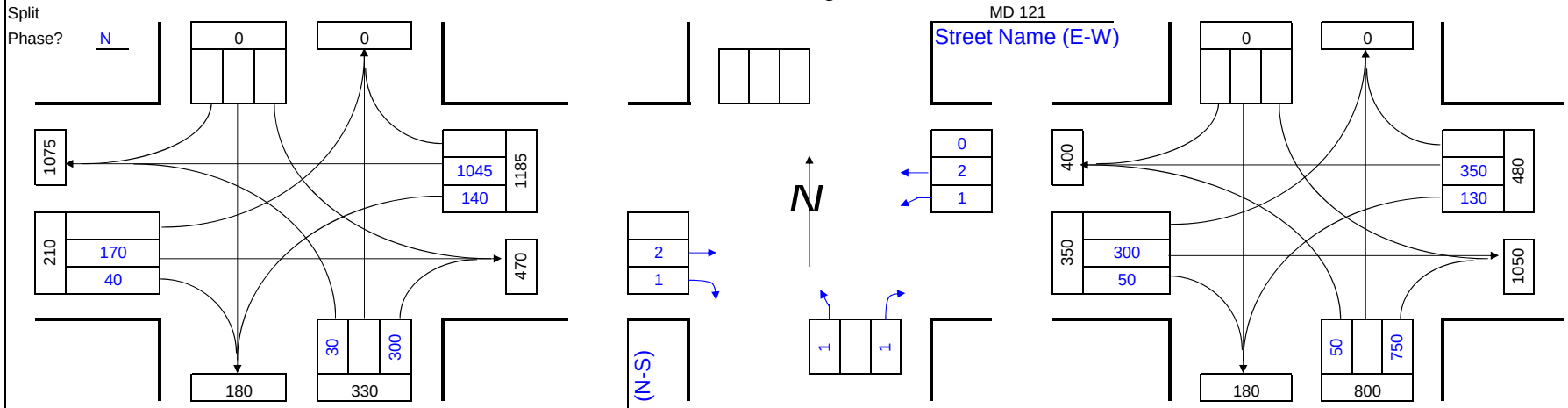
Morning Peak Hour

Lane Configuration

Evening Peak Hour

Split Phase? N



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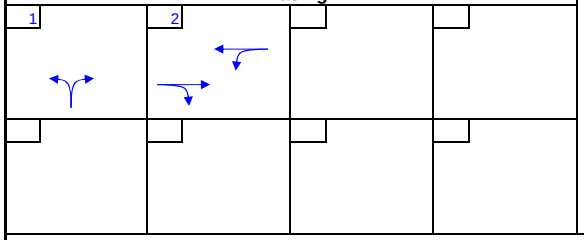

No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	30	1.00	30	25	1.00	25	55	C
2	EB	170	0.53	90	140	1.00	140	230	
2	WB	1045	0.53	554		1.00	0	554	C
		C: Critical Volume				Total		609	
						V/C		0.38	
						LOS		A	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	50	1.00	50	0	1.00	0	50	C
2	EB	350	1.00	350	0	1.00	0	350	
2	WB	300	1.00	300	130	1.00	130	430	C
		C: Critical Volume				Total		480	
						V/C		0.30	
						LOS		A	

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & MD 121
Major Approach:	MD 355
Minor Approach:	Clarksburg Road (MD 121)
County/State:	Montgomery County/Maryland
Scenario:	Existing
Analyst:	DSG/VHB

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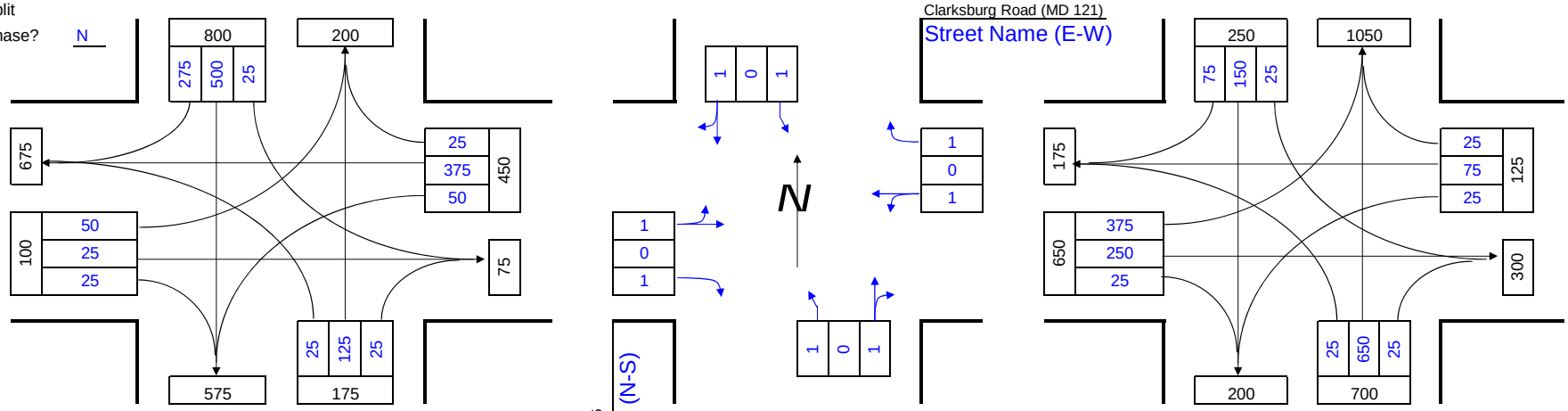
Morning Peak Hour

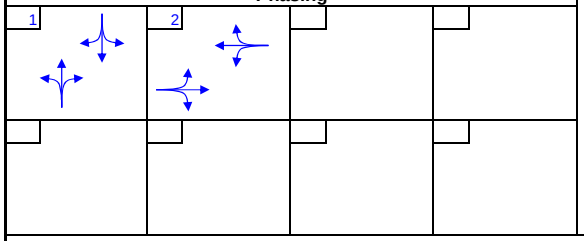
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



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1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	150	1.00	150	25	1.00	25	175	
1	SB	775	1.00	775	25	1.00	25	800	C
2	EB	375	1.00	375	50	1.00	50	425	C
2	WB	25	1.00	25	50	1.00	50	75	

C: Critical Volume — Total 1225; V/C 0.77; LOS C

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	675	1.00	675	25	1.00	25	700	C
1	SB	225	1.00	225	25	1.00	25	250	
2	EB	250	1.00	250	25	1.00	25	275	
2	WB	75	1.00	75	375	1.00	375	450	C

C: Critical Volume — Total 1150; V/C 0.72; LOS C

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Shawnee Lane
Major Approach:	MD 355
Minor Approach:	Shawnee Lane
County/State:	Montgomery County/Maryland
Scenario:	Existing
Analyst:	DSG/VHB

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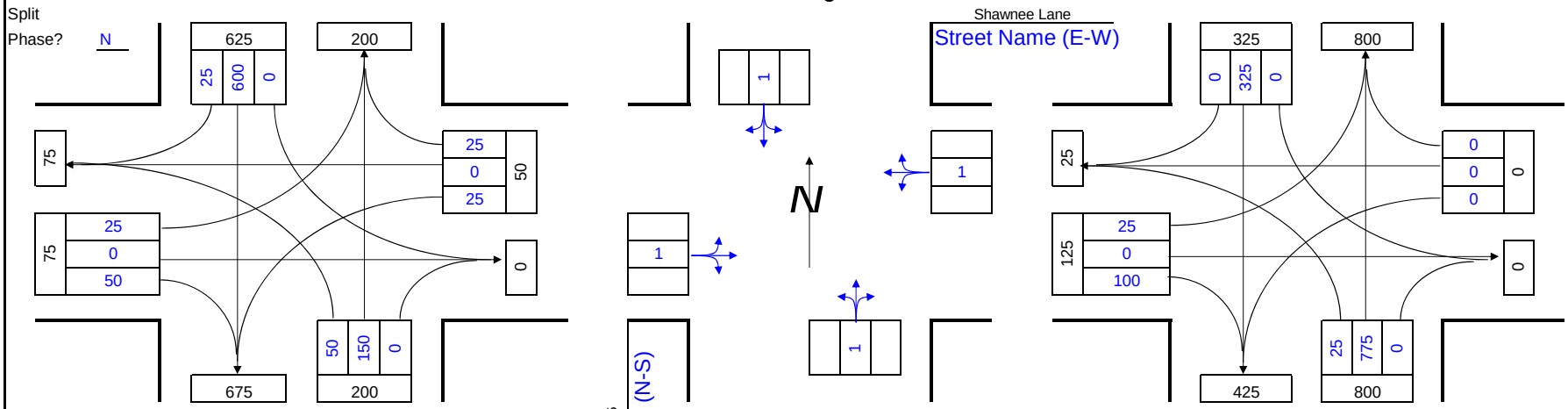
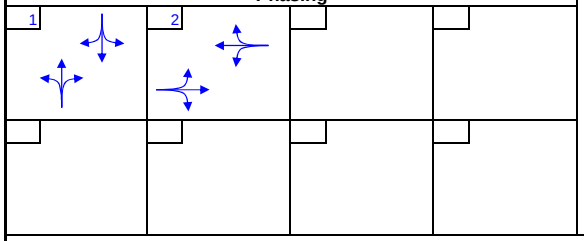
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
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3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	150	1.00	150	0	1.00	0	150	
1	SB	625	1.00	625	50	1.00	50	675	C
2	EB	50	1.00	50	25	1.00	25	75	C
2	WB	25	1.00	25	25	1.00	25	50	

C: Critical Volume — Total 750; V/C 0.47; LOS A

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	775	1.00	775	0	1.00	0	775	C
1	SB	325	1.00	325	25	1.00	25	350	
2	EB	100	1.00	100	0	1.00	0	100	C
2	WB	0	1.00	0	25	1.00	25	25	

C: Critical Volume — Total 875; V/C 0.55; LOS A

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Stringtown Road
Major Approach:	MD 355
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	Existing
Analyst:	DSG/VHB

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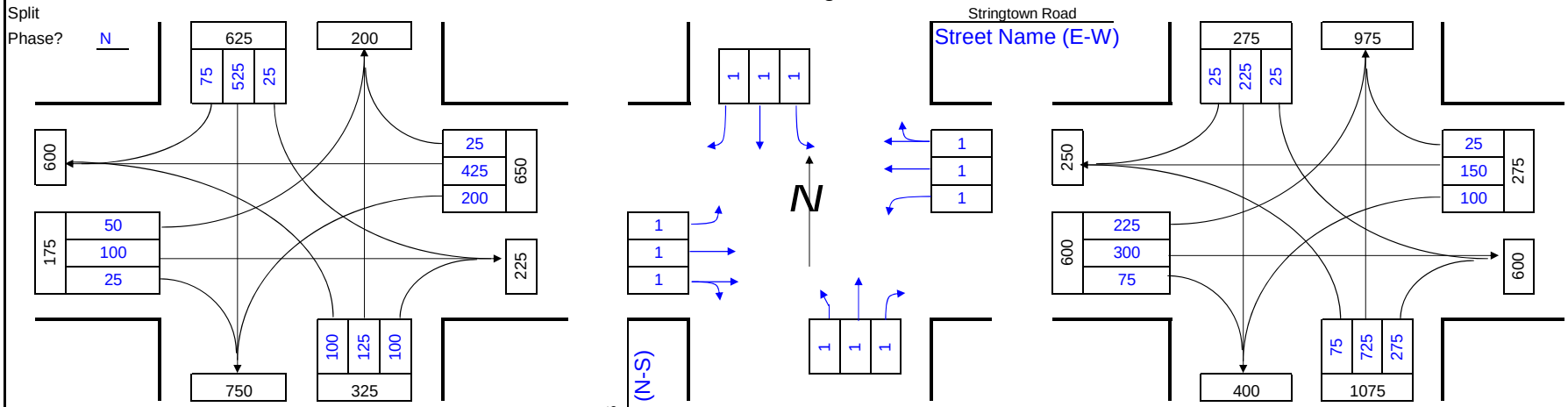
Morning Peak Hour

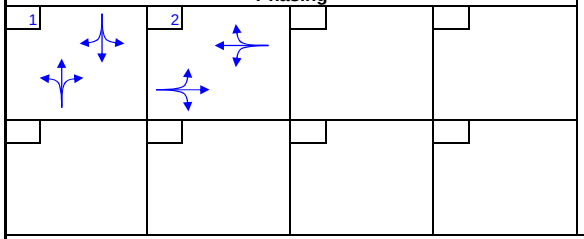
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	125	1.00	125	25	1.00	25	150	
1	SB	525	1.00	525	100	1.00	100	625	C
2	EB	125	0.53	66	200	1.00	200	266	
2	WB	450	0.53	239	50	1.00	50	289	C

C: Critical Volume — Total 914; V/C 0.57; LOS A

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	725	1.00	725	25	1.00	25	750	C
1	SB	225	1.00	225	75	1.00	75	300	
2	EB	375	0.53	199	100	1.00	100	299	
2	WB	175	0.53	93	225	1.00	225	318	C

C: Critical Volume — Total 1068; V/C 0.67; LOS B

Critical Lane Volume
Level of Service Worksheet

Intersection	Gateway Center Dr. & Stringtown Road
Major Approach:	Gateway Center Dr
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	Existing
Analyst:	DSG/VHB

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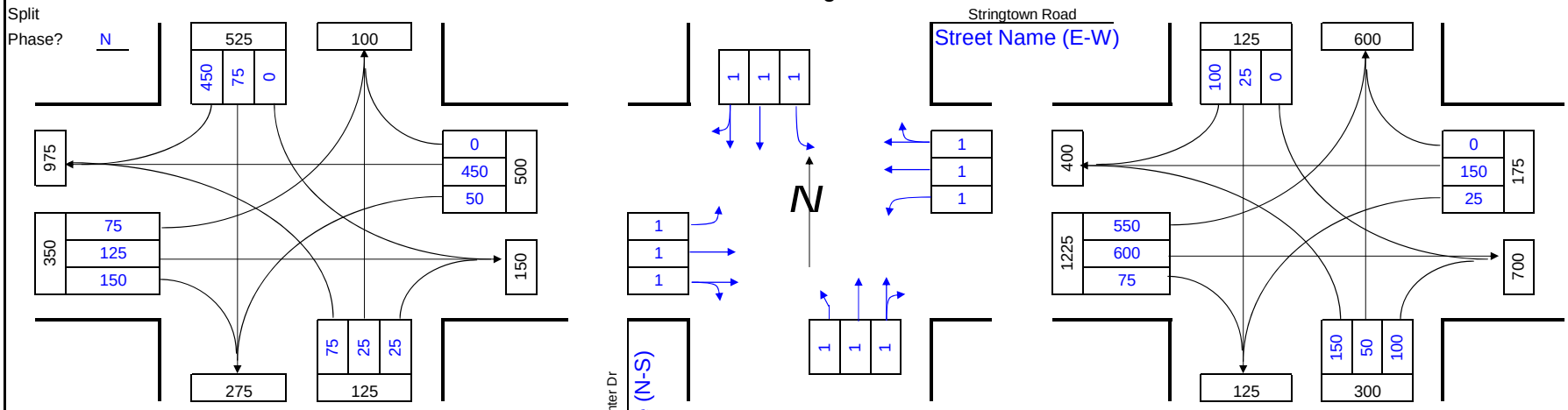
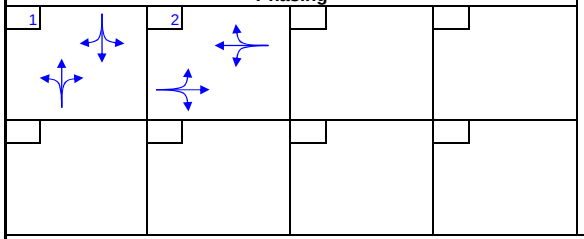
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	50	0.53	27	0	1.00	0	27	
1	SB	525	0.53	278	75	1.00	75	353	C
2	EB	275	0.53	146	50	1.00	50	196	
2	WB	450	0.53	239	75	1.00	75	314	C

C: Critical Volume — Total 667; V/C 0.42; LOS A

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	150	0.53	80	0	1.00	0	80	
1	SB	125	0.53	66	150	1.00	150	216	C
2	EB	675	0.53	358	25	1.00	25	383	
2	WB	150	0.53	80	550	1.00	550	630	C

C: Critical Volume — Total 846; V/C 0.53; LOS A

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Western Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	2040 No-Build
Analyst:	DSG/VHB

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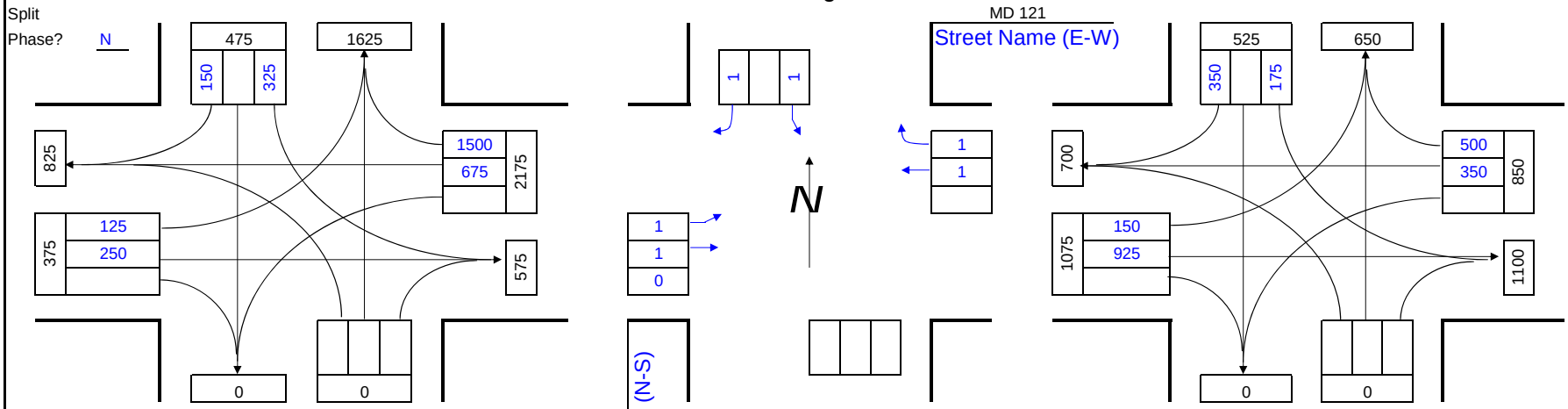
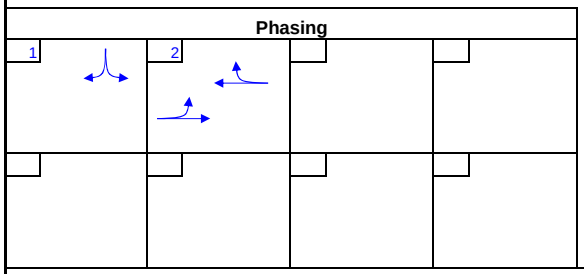
Morning Peak Hour

Lane Configuration

Evening Peak Hour





No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL	0	1.00	0	325	1.00	325	325	C
2	EB	250	1.00	250	0	1.00	0	250	
2	WB	675	1.00	675	125	1.00	125	800	C

C: Critical Volume — Total 1125; V/C 0.70; LOS B

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL		1.00	0	175	1.00	175	175	C
2	EB	925	1.00	925	0	1.00	0	925	
2	WB	350	1.00	350	150	1.00	150	500	C

C: Critical Volume — Total 675; V/C 0.42; LOS A

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Eastern Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	2040 No-Build
Analyst:	DSG/VHB

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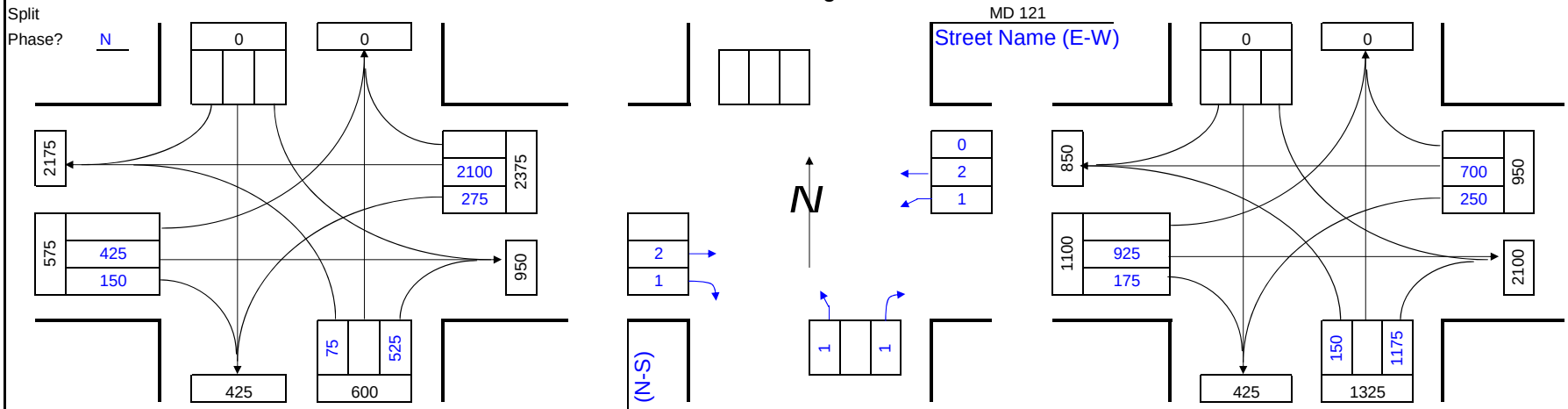
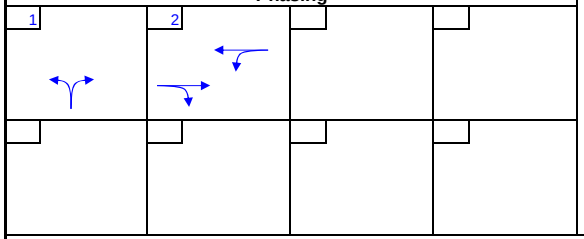
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2)Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	75	1.00	75	25	1.00	25	100	C
2	EB	425	0.53	225	275	1.00	275	500	
2	WB	2100	0.53	1113		1.00	0	1113	C
	C: Critical Volume					Total		1213	
						V/C		0.76	
						LOS		C	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	150	1.00	150	0	1.00	0	150	C
2	EB	700	1.00	700	0	1.00	0	700	
2	WB	925	1.00	925	250	1.00	250	1175	C
	C: Critical Volume					Total		1325	
						V/C		0.83	
						LOS		D	

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & MD 121
Major Approach:	MD 355
Minor Approach:	Clarksburg Road (MD 121)
County/State:	Montgomery County/Maryland
Scenario:	2040 No-Build
Analyst:	DSG/VHB

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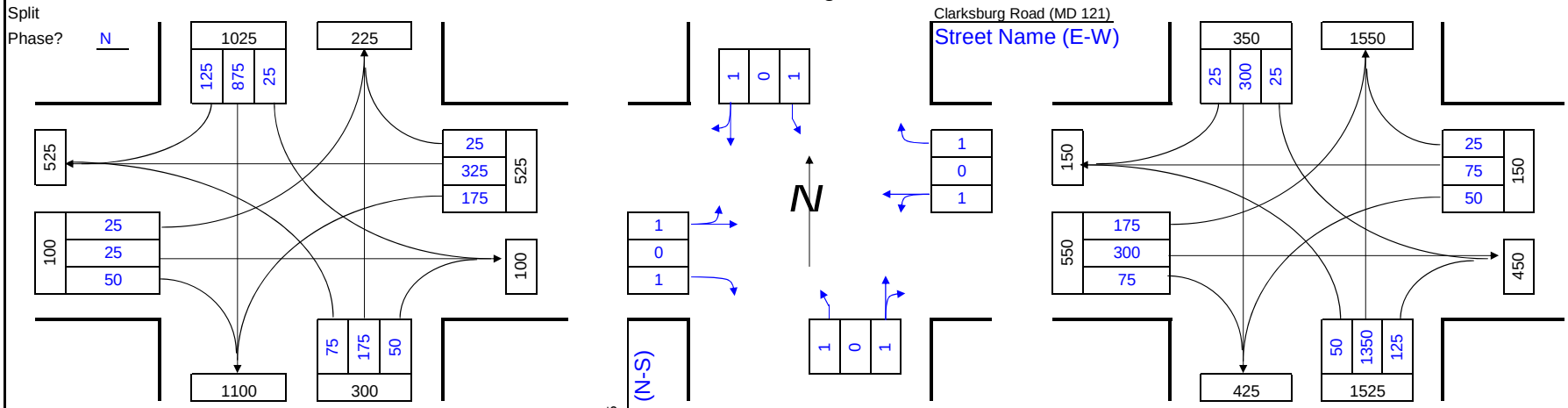
Morning Peak Hour

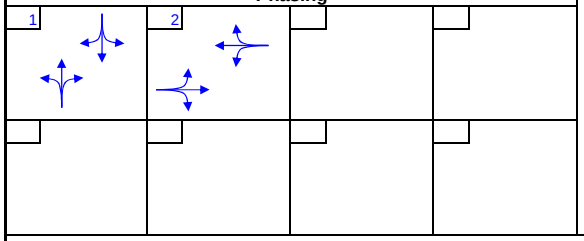
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	225	1.00	225	25	1.00	25	250	
1	SB	1000	1.00	1000	75	1.00	75	1075	C
2	EB	325	1.00	325	25	1.00	25	350	C
2	WB	25	1.00	25	175	1.00	175	200	

C: Critical Volume

Total	1425
V/C	0.89
LOS	D

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1475	1.00	1475	25	1.00	25	1500	C
1	SB	325	1.00	325	50	1.00	50	375	
2	EB	300	1.00	300	50	1.00	50	350	C
2	WB	75	1.00	75	175	1.00	175	250	

C: Critical Volume

Total	1850
V/C	1.16
LOS	F

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Shawnee Lane
Major Approach:	MD 355
Minor Approach:	Shawnee Lane
County/State:	Montgomery County/Maryland
Scenario:	2040 No-Build
Analyst:	DSG/VHB

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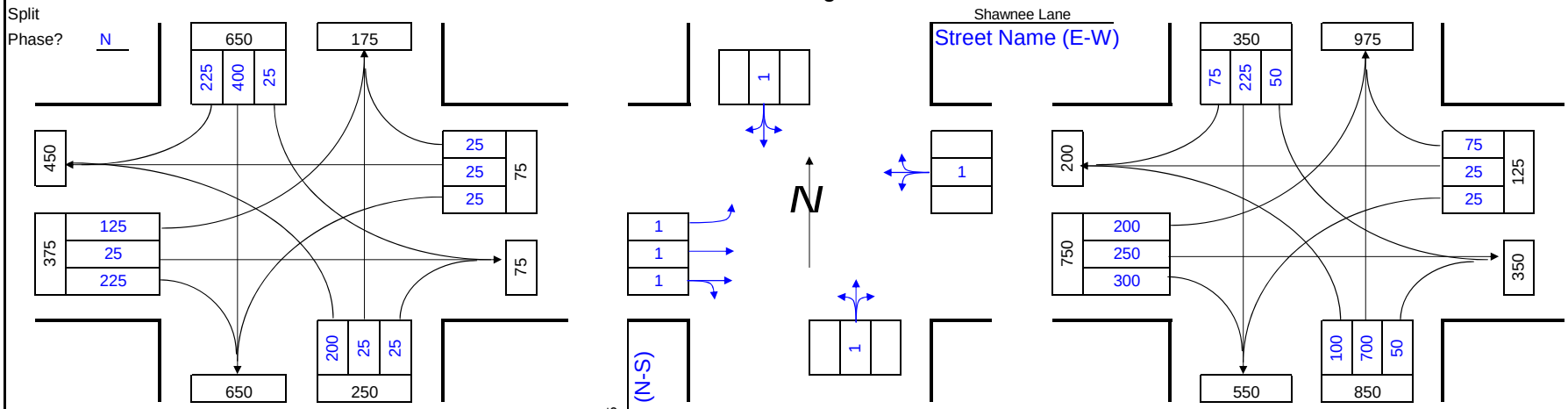
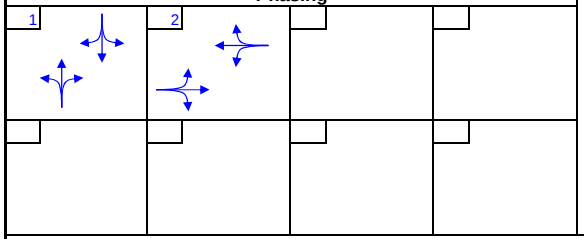
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	50	1.00	50	25	1.00	25	75	
1	SB	625	1.00	625	200	1.00	200	825	C
2	EB	250	0.53	133	125	1.00	125	258	C
2	WB	50	1.00	50	25	1.00	25	75	

C: Critical Volume

Total	1083
V/C	0.68
LOS	B

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	750	1.00	750	50	1.00	50	800	C
1	SB	300	1.00	300	100	1.00	100	400	
2	EB	550	0.53	292	25	1.00	25	317	C
2	WB	100	1.00	100	200	1.00	200	300	

C: Critical Volume

Total	1117
V/C	0.70
LOS	B

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Stringtown Road
Major Approach:	MD 355
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 No-Build
Analyst:	DSG/VHB

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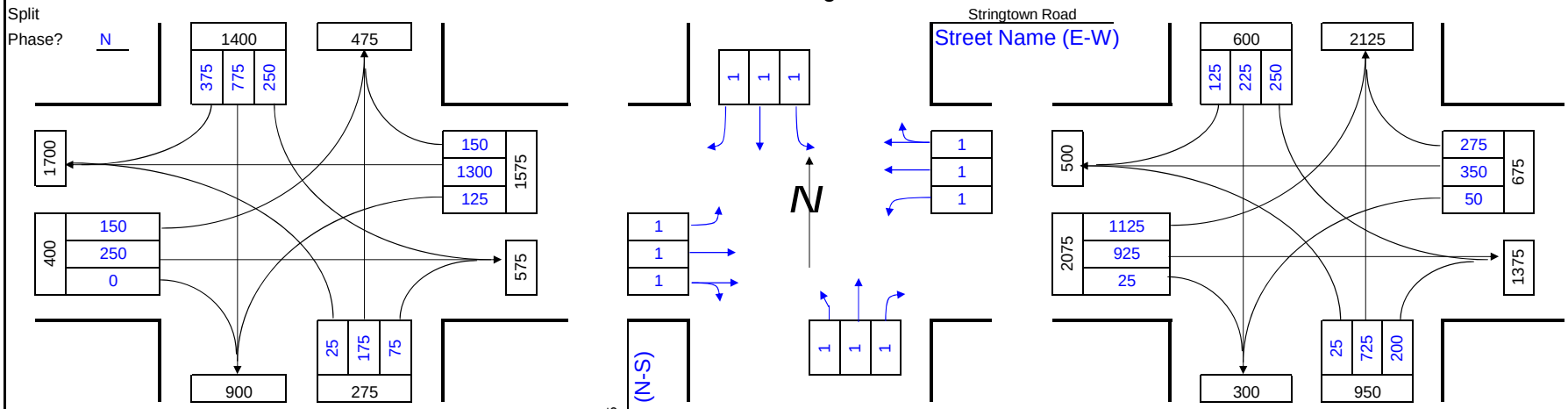
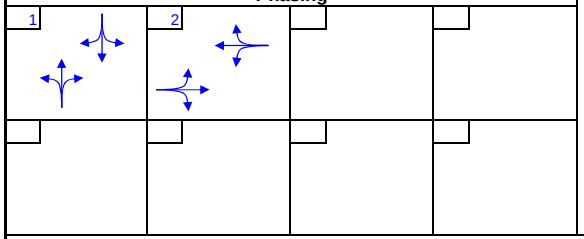
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	175	1.00	175	250	1.00	250	425	
1	SB	775	1.00	775	25	1.00	25	800	C
2	EB	250	0.53	133	125	1.00	125	258	
2	WB	1450	0.53	769	150	1.00	150	919	C

C: Critical Volume — Total 1719; V/C 1.07; LOS F

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	725	1.00	725	250	1.00	250	975	C
1	SB	225	1.00	225	25	1.00	25	250	
2	EB	950	0.53	504	50	1.00	50	554	
2	WB	625	0.53	331	1125	1.00	1125	1456	C

C: Critical Volume — Total 2431; V/C 1.52; LOS F

Critical Lane Volume
Level of Service Worksheet

Intersection	Gateway Center Dr & Stringtown Rd
Major Approach:	Gateway Center Dr
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 No-Build
Analyst:	DSG/VHB

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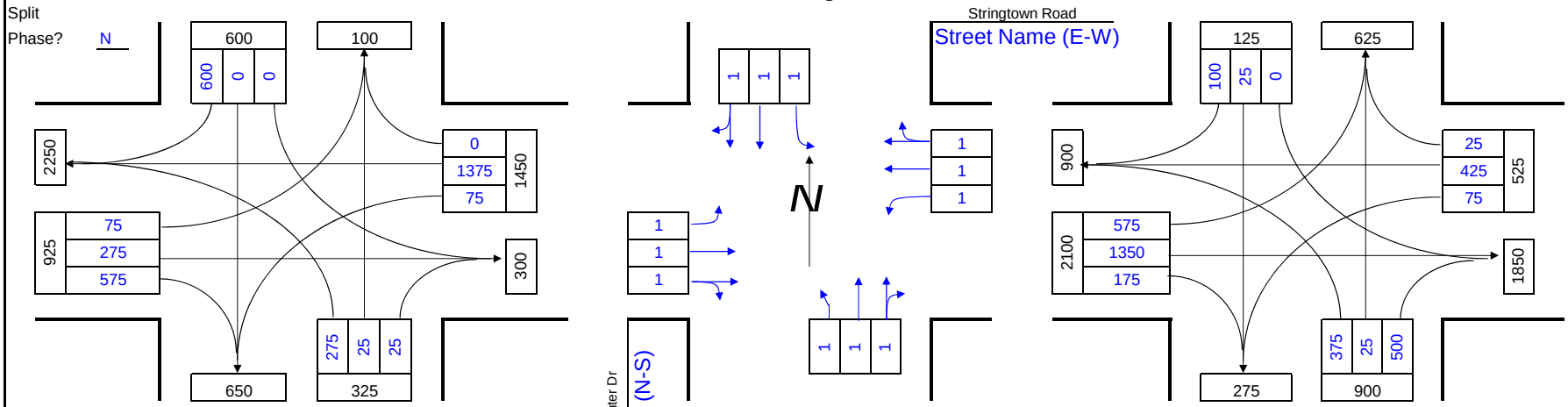
Morning Peak Hour

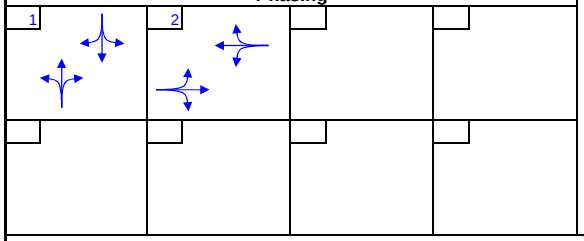
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	50	0.53	27	0	1.00	0	27	
1	SB	600	0.53	318	275	1.00	275	593	C
2	EB	850	0.53	451	75	1.00	75	526	
2	WB	1375	0.53	729	75	1.00	75	804	C

C: Critical Volume — Total 1397; V/C 0.87; LOS D

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	525	0.53	278	0	1.00	0	278	
1	SB	125	0.53	66	375	1.00	375	441	C
2	EB	1525	0.53	808	75	1.00	75	883	C
2	WB	450	0.53	239	575	1.00	575	814	

C: Critical Volume — Total 1325; V/C 0.83; LOS D

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Western Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	2040 Build
Analyst:	DSG/VHB

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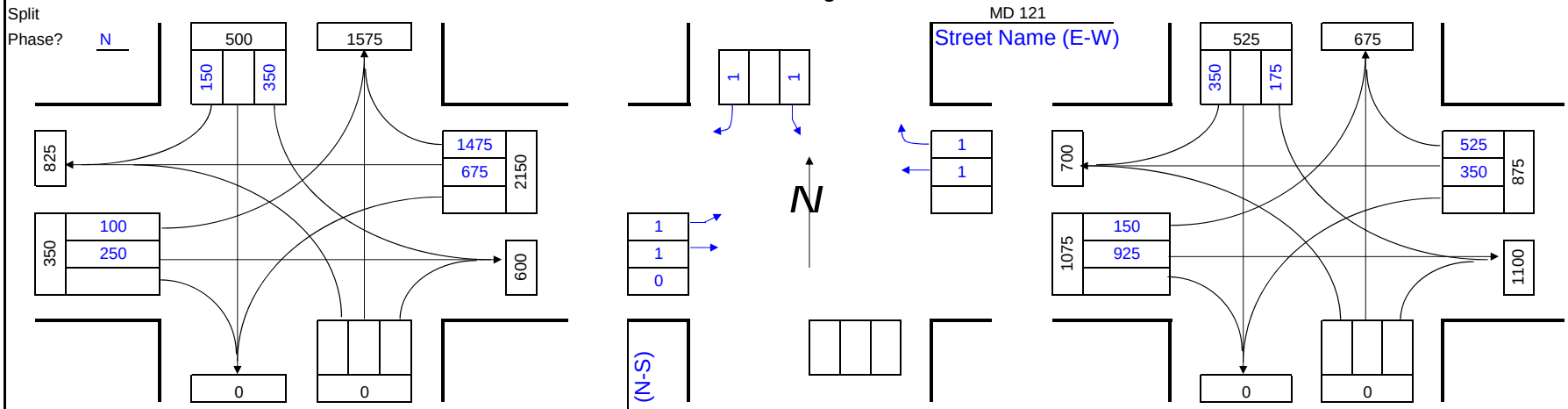
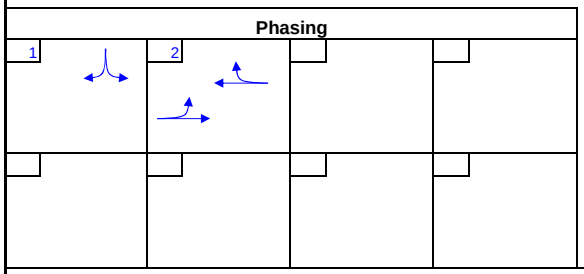
Morning Peak Hour

Lane Configuration

Evening Peak Hour





No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL	0	1.00	0	350	1.00	350	350	C
2	EB	250	1.00	250	0	1.00	0	250	
2	WB	675	1.00	675	100	1.00	100	775	C

C: Critical Volume — Total 1125; V/C 0.70; LOS B

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL		1.00	0	175	1.00	175	175	C
2	EB	925	1.00	925	0	1.00	0	925	
2	WB	350	1.00	350	150	1.00	150	500	C

C: Critical Volume — Total 675; V/C 0.42; LOS A

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Eastern Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	2040 Build
Analyst:	DSG/VHB

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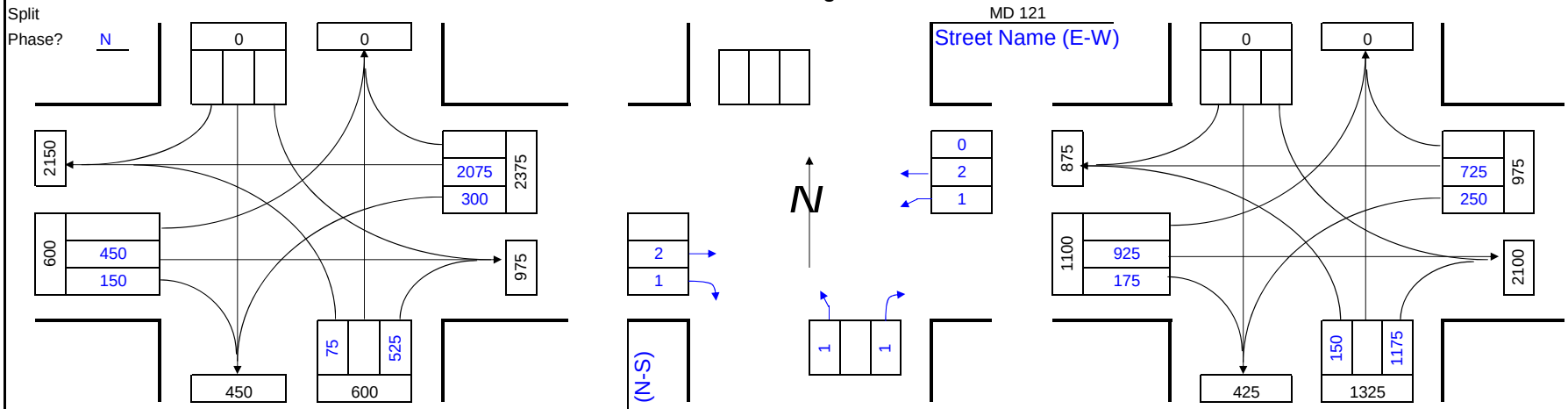
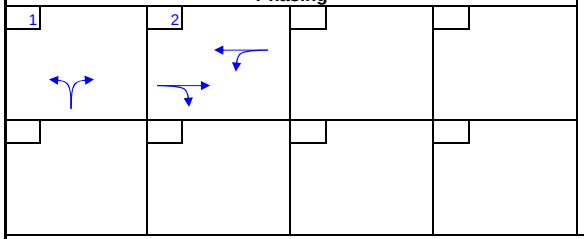
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	75	1.00	75	25	1.00	25	100	C
2	EB	450	0.53	239	300	1.00	300	539	
2	WB	2075	0.53	1100		1.00	0	1100	C
	C: Critical Volume					Total		1200	
						V/C		0.75	
						LOS		C	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	150	1.00	150	0	1.00	0	150	C
2	EB	725	1.00	725	0	1.00	0	725	
2	WB	925	1.00	925	250	1.00	250	1175	C
	C: Critical Volume					Total		1325	
						V/C		0.83	
						LOS		D	

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & MD 121
Major Approach:	MD 355
Minor Approach:	Clarksburg Road (MD 121)
County/State:	Montgomery County/Maryland
Scenario:	2040 Build
Analyst:	DSG/VHB

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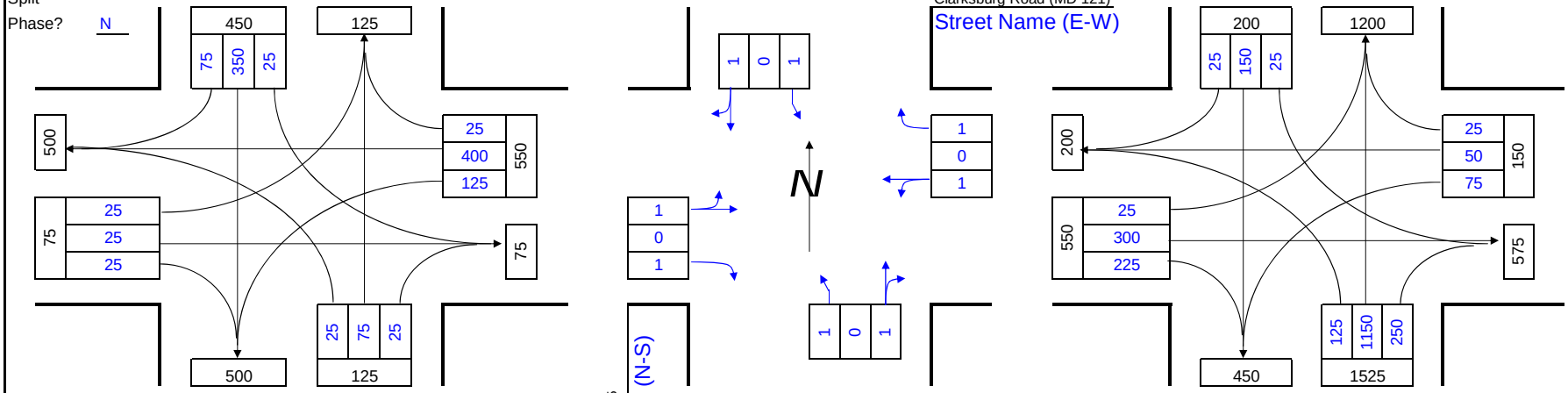
Morning Peak Hour

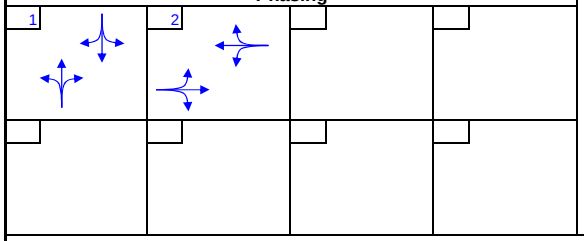
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	100	1.00	100	25	1.00	25	125	
1	SB	425	1.00	425	25	1.00	25	450	C
2	EB	400	1.00	400	25	1.00	25	425	C
2	WB	25	1.00	25	125	1.00	125	150	

C: Critical Volume

Total	875
V/C	0.55
LOS	A

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1400	1.00	1400	25	1.00	25	1425	C
1	SB	175	1.00	175	125	1.00	125	300	
2	EB	300	1.00	300	75	1.00	75	375	C
2	WB	50	1.00	50	25	1.00	25	75	

C: Critical Volume

Total	1800
V/C	1.13
LOS	F

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Shawnee Lane
Major Approach:	MD 355
Minor Approach:	Shawnee Lane
County/State:	Montgomery County/Maryland
Scenario:	2040 Build
Analyst:	DSG/VHB

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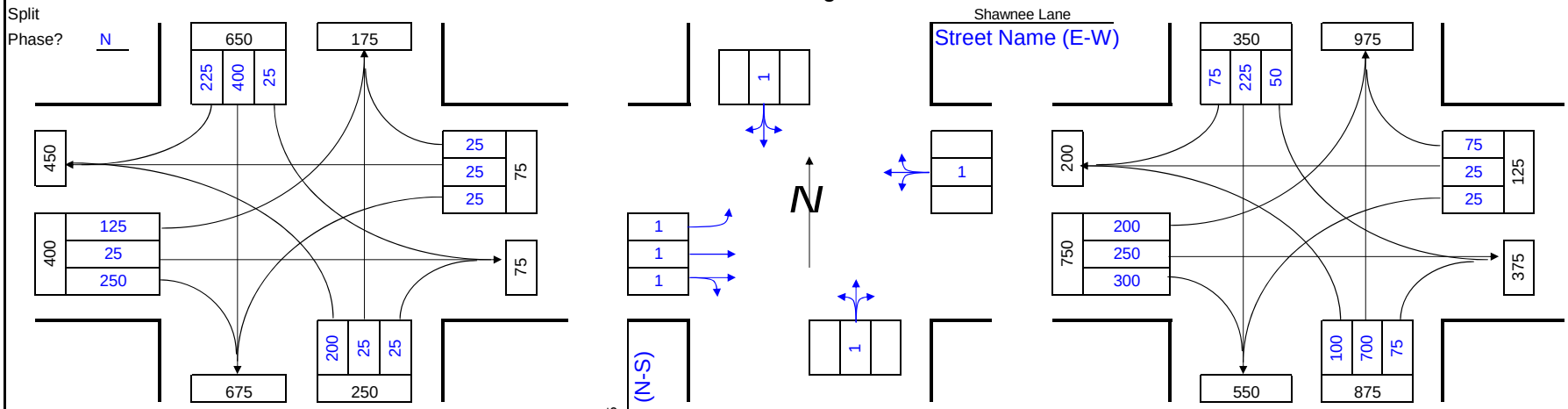
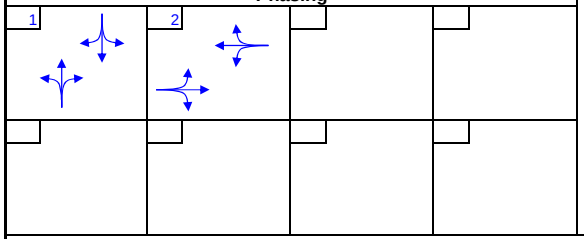
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	50	1.00	50	25	1.00	25	75	
1	SB	625	1.00	625	200	1.00	200	825	C
2	EB	275	0.53	146	125	1.00	125	271	C
2	WB	50	1.00	50	25	1.00	25	75	

C: Critical Volume

Total	1096
V/C	0.68
LOS	B

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	775	1.00	775	50	1.00	50	825	C
1	SB	300	1.00	300	100	1.00	100	400	
2	EB	550	0.53	292	25	1.00	25	317	C
2	WB	100	1.00	100	200	1.00	200	300	

C: Critical Volume

Total	1142
V/C	0.71
LOS	B

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Stringtown Road
Major Approach:	MD 355
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 Build
Analyst:	DSG/VHB

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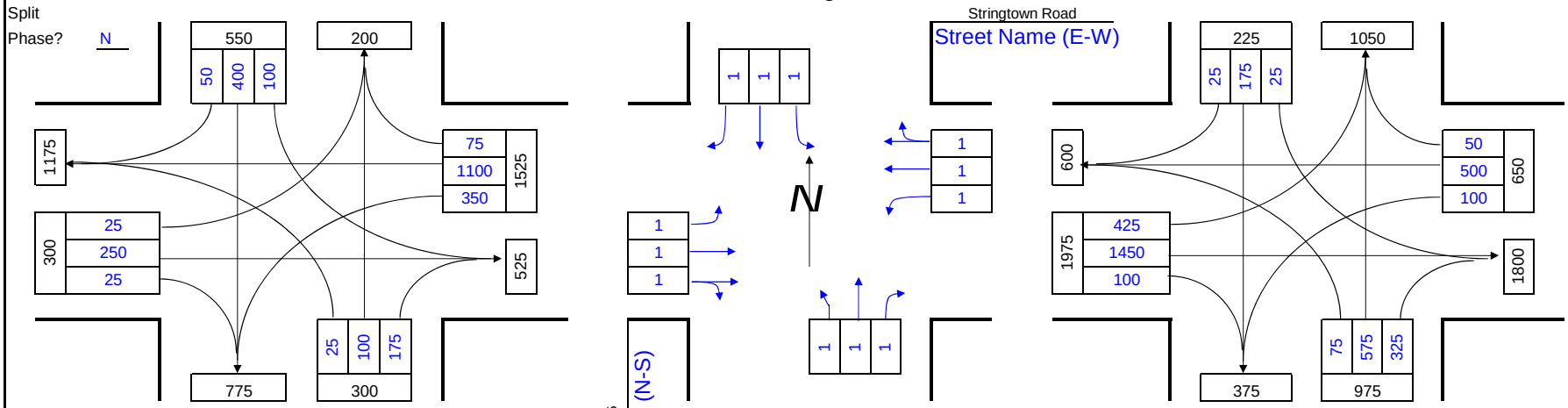
Morning Peak Hour

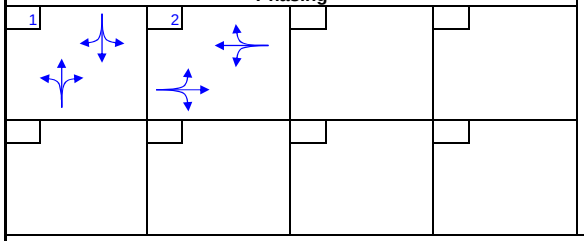
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	100	1.00	100	100	1.00	100	200	
1	SB	400	1.00	400	25	1.00	25	425	C
2	EB	275	0.53	146	350	1.00	350	496	
2	WB	1175	0.53	623	25	1.00	25	648	C
C: Critical Volume							Total	1073	
							V/C	0.67	
							LOS	B	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	575	1.00	575	25	1.00	25	600	C
1	SB	175	1.00	175	75	1.00	75	250	
2	EB	1550	0.53	822	100	1.00	100	922	C
2	WB	550	0.53	292	425	1.00	425	717	
C: Critical Volume							Total	1522	
							V/C	0.95	
							LOS	E	

Critical Lane Volume
Level of Service Worksheet

Intersection	Gateway Center Dr & Stringtown Road
Major Approach:	Gateway Center Dr
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 Build
Analyst:	DSG/VHB

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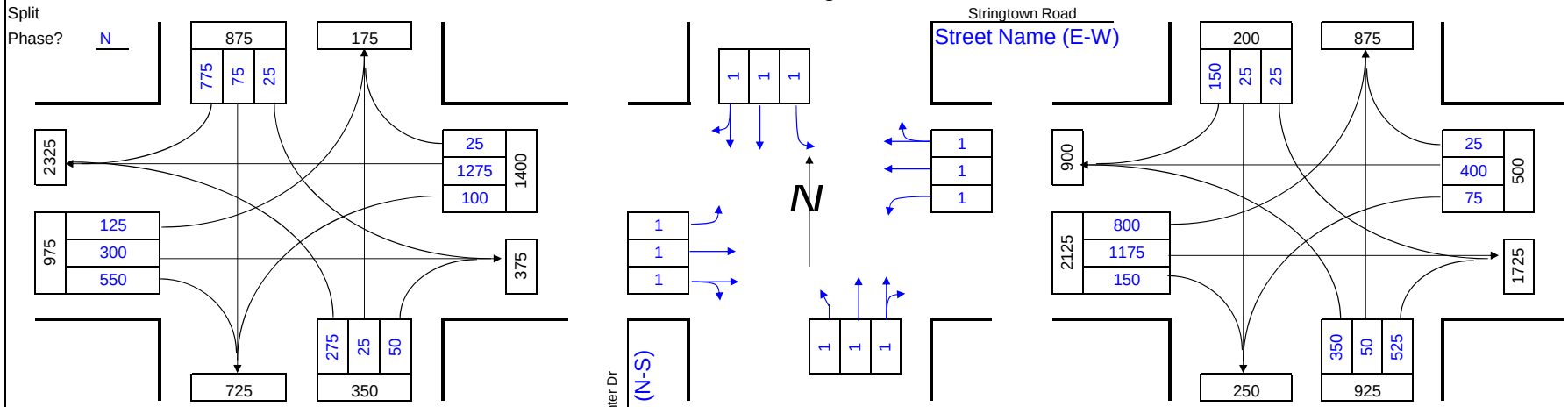
Morning Peak Hour

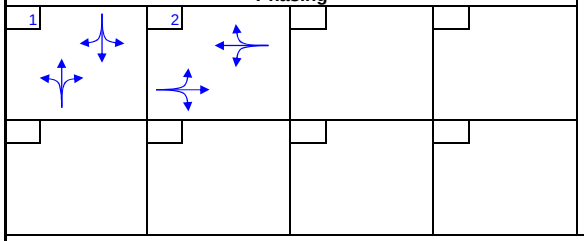
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	75	0.53	40	25	1.00	25	65	
1	SB	850	0.53	451	275	1.00	275	726	C
2	EB	850	0.53	451	100	1.00	100	551	
2	WB	1300	0.53	689	125	1.00	125	814	C

C: Critical Volume — Total 1540; V/C 0.96; LOS E

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	575	0.53	305	25	1.00	25	330	
1	SB	175	0.53	93	350	1.00	350	443	C
2	EB	1325	0.53	702	75	1.00	75	777	
2	WB	425	0.53	225	800	1.00	800	1025	C

C: Critical Volume — Total 1468; V/C 0.92; LOS E

Critical Lane Volume
Level of Service Worksheet

Intersection	New Road & Stringtown Road
Major Approach:	New Road
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 Build
Analyst:	DSG/VHB

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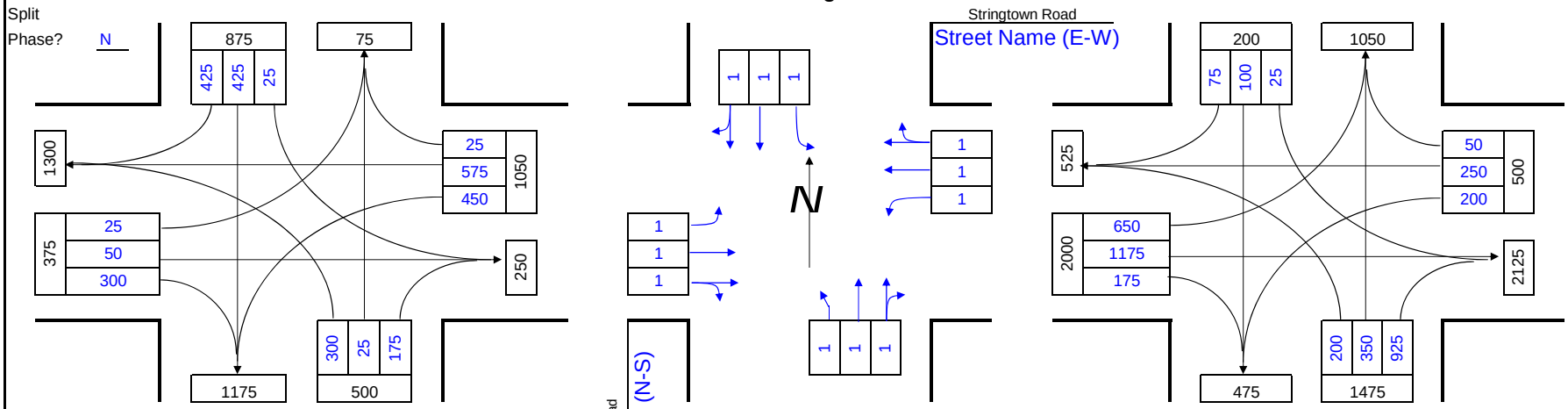
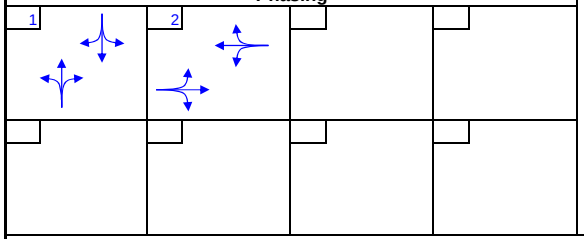
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	200	0.53	106	25	1.00	25	131	
1	SB	850	0.53	451	300	1.00	300	751	C
2	EB	350	0.53	186	450	1.00	450	636	C
2	WB	600	0.53	318	25	1.00	25	343	

C: Critical Volume

Total	1386
V/C	0.87
LOS	D

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1275	0.53	676	25	1.00	25	701	C
1	SB	175	0.53	93	200	1.00	200	293	
2	EB	1350	0.53	716	200	1.00	200	916	C
2	WB	300	0.53	159	650	1.00	650	809	

C: Critical Volume

Total	1616
V/C	1.01
LOS	F

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Western Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	2040 HI Build
Analyst:	DSG/VHB

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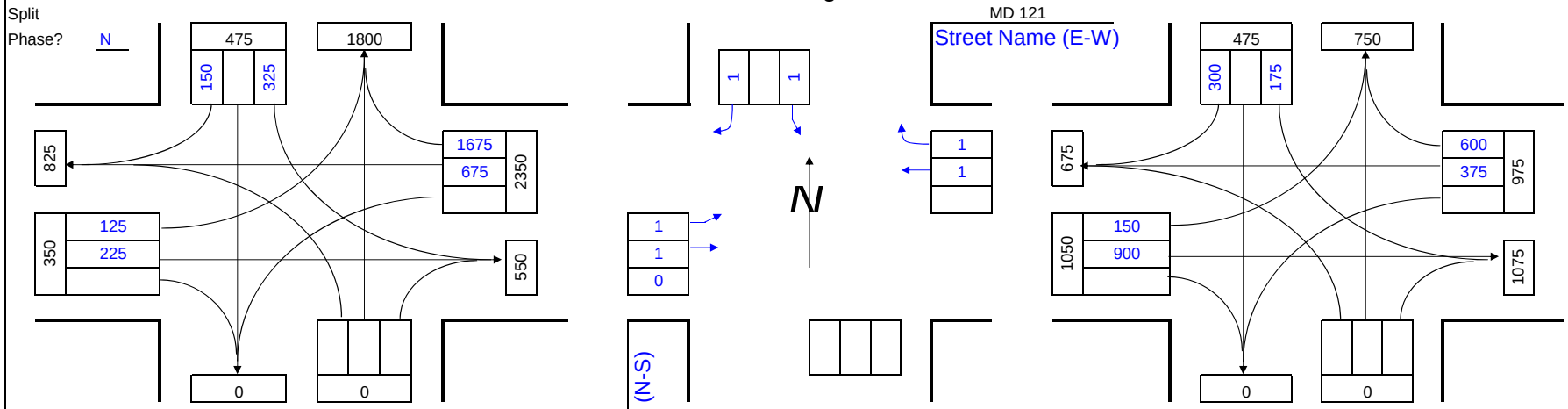
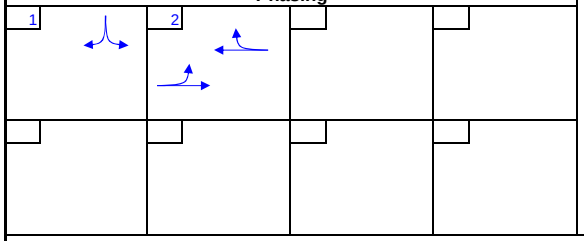
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL	0	1.00	0	325	1.00	325	325	C
2	EB	225	1.00	225	0	1.00	0	225	
2	WB	675	1.00	675	125	1.00	125	800	C

C: Critical Volume — Total 1125; V/C 0.70; LOS B

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL		1.00	0	175	1.00	175	175	C
2	EB	900	1.00	900	0	1.00	0	900	
2	WB	375	1.00	375	150	1.00	150	525	C

C: Critical Volume — Total 700; V/C 0.44; LOS A

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Eastern Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	2040 HI Build
Analyst:	DSG/VHB

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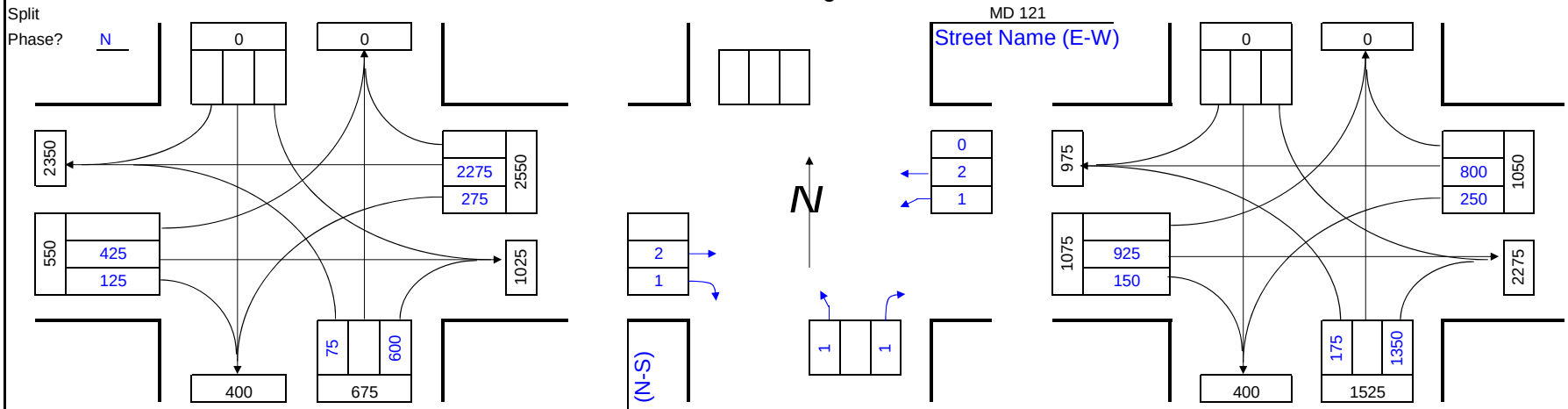
Morning Peak Hour

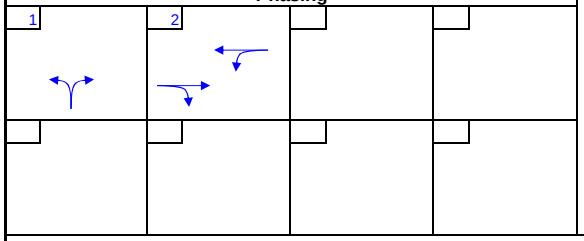
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2)Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	75	1.00	75	25	1.00	25	100	C
2	EB	425	0.53	225	275	1.00	275	500	
2	WB	2275	0.53	1206		1.00	0	1206	C

C: Critical Volume — Total 1306; V/C 0.82; LOS D

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	175	1.00	175	0	1.00	0	175	C
2	EB	800	1.00	800	0	1.00	0	800	
2	WB	925	1.00	925	250	1.00	250	1175	C

C: Critical Volume — Total 1350; V/C 0.84; LOS D

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & MD 121
Major Approach:	MD 355
Minor Approach:	Clarksburg Road (MD 121)
County/State:	Montgomery County/Maryland
Scenario:	2040 HI Build
Analyst:	DSG/VHB

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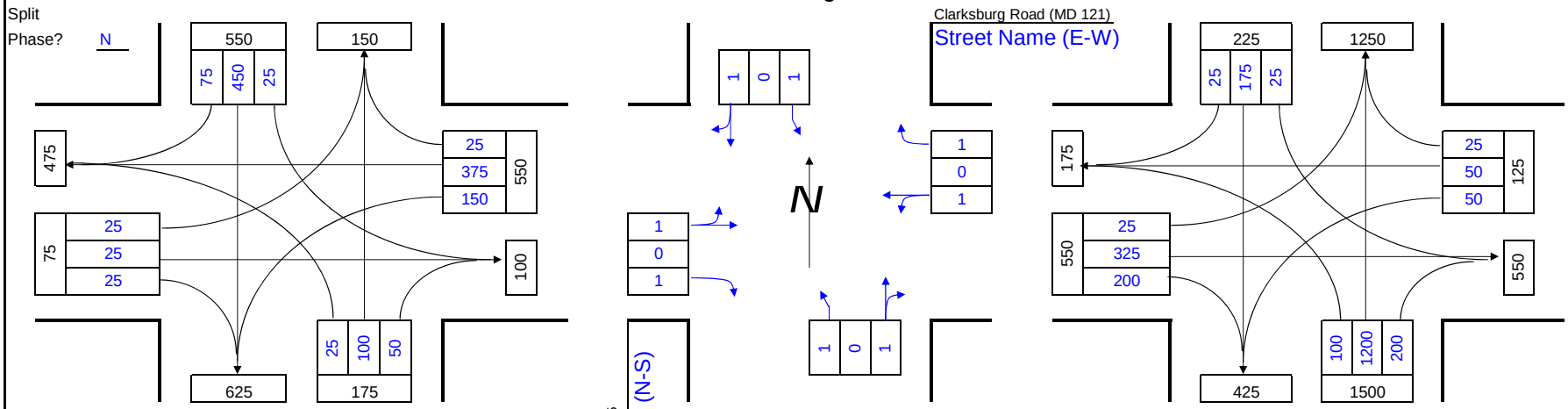
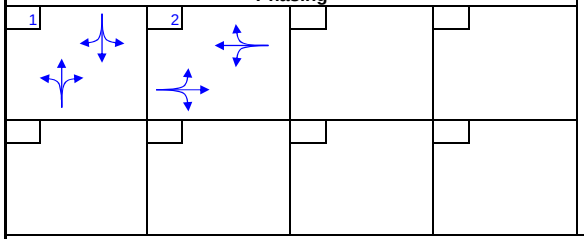
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2)Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	150	1.00	150	25	1.00	25	175	
1	SB	525	1.00	525	25	1.00	25	550	C
2	EB	375	1.00	375	25	1.00	25	400	C
2	WB	25	1.00	25	150	1.00	150	175	

C: Critical Volume — Total 950; V/C 0.59; LOS A

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1400	1.00	1400	25	1.00	25	1425	C
1	SB	200	1.00	200	100	1.00	100	300	
2	EB	325	1.00	325	50	1.00	50	375	C
2	WB	50	1.00	50	25	1.00	25	75	

C: Critical Volume — Total 1800; V/C 1.13; LOS F

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Shawnee Lane
Major Approach:	MD 355
Minor Approach:	Shawnee Lane
County/State:	Montgomery County/Maryland
Scenario:	2040 HI Build
Analyst:	DSG/VHB

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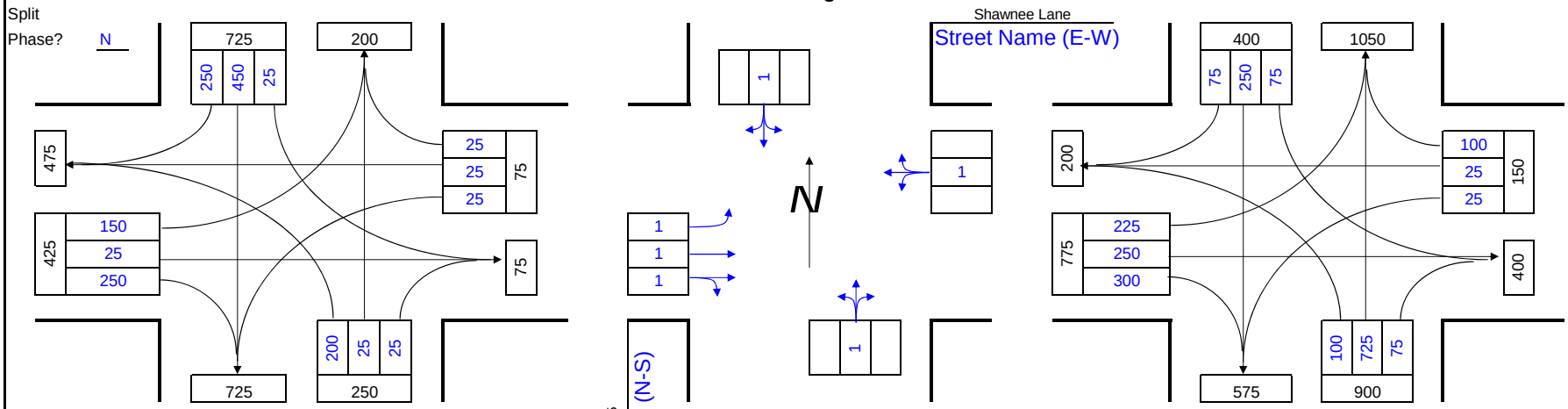
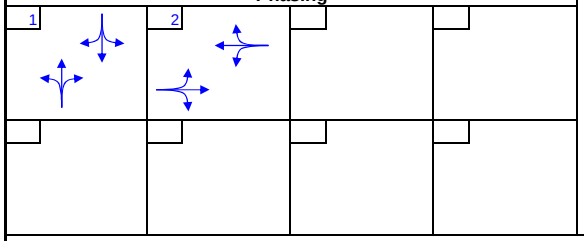
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	50	1.00	50	25	1.00	25	75	
1	SB	700	1.00	700	200	1.00	200	900	C
2	EB	275	0.53	146	150	1.00	150	296	C
2	WB	50	1.00	50	25	1.00	25	75	

C: Critical Volume

Total	1196
V/C	0.75
LOS	C

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	800	1.00	800	75	1.00	75	875	C
1	SB	325	1.00	325	100	1.00	100	425	
2	EB	550	0.53	292	25	1.00	25	317	
2	WB	125	1.00	125	225	1.00	225	350	C

C: Critical Volume

Total	1225
V/C	0.77
LOS	C

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Stringtown Road
Major Approach:	MD 355
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 HI Build
Analyst:	DSG/VHB

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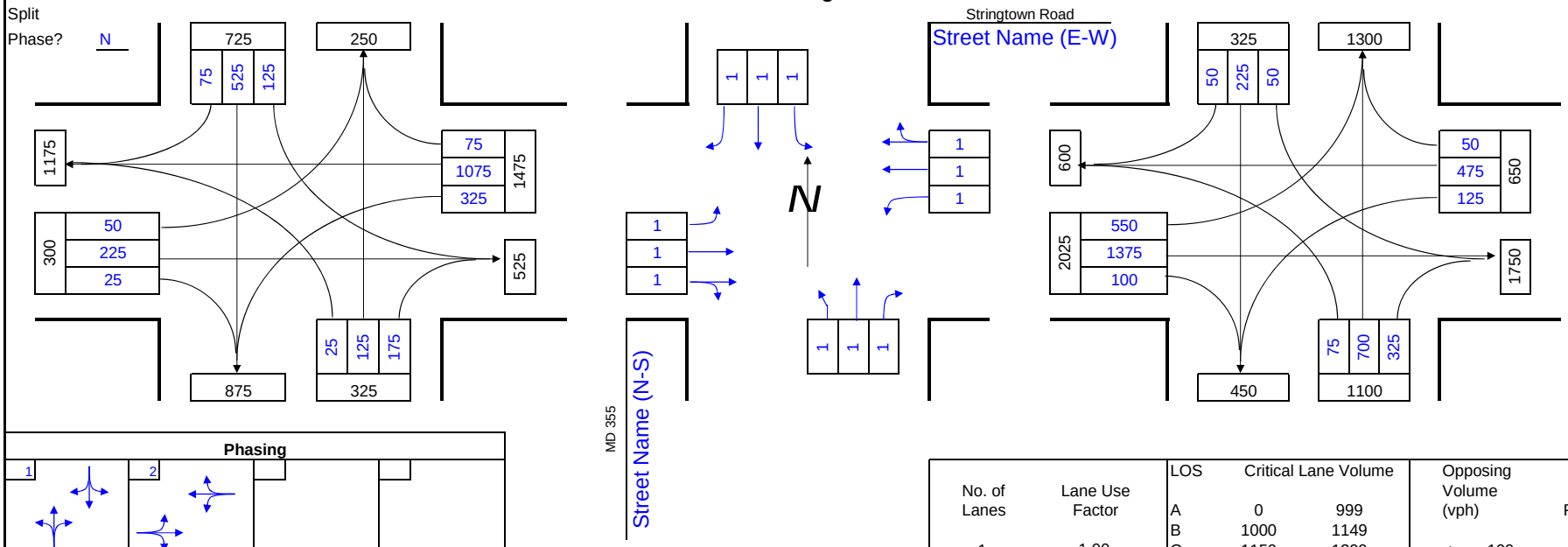
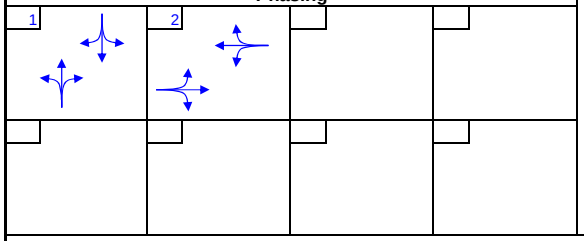
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2)Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	125	1.00	125	125	1.00	125	250	
1	SB	525	1.00	525	25	1.00	25	550	C
2	EB	250	0.53	133	325	1.00	325	458	
2	WB	1150	0.53	610	50	1.00	50	660	C

C: Critical Volume — Total 1210; V/C 0.76; LOS C

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	700	1.00	700	50	1.00	50	750	C
1	SB	225	1.00	225	75	1.00	75	300	
2	EB	1475	0.53	782	125	1.00	125	907	C
2	WB	525	0.53	278	550	1.00	550	828	

C: Critical Volume — Total 1657; V/C 1.04; LOS F

Critical Lane Volume
Level of Service Worksheet

Intersection	Gateway Center Dr & Stringtown Road
Major Approach:	Gateway Center Dr
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 HI Build
Analyst:	DSG/VHB

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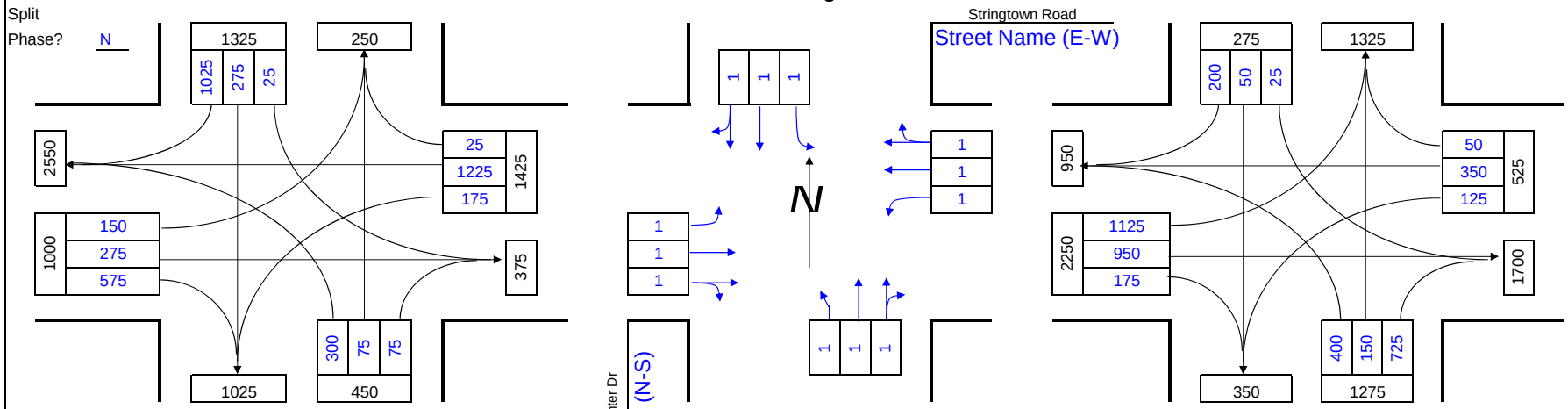
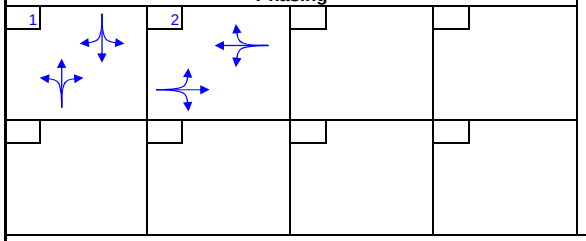
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2)Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	150	0.53	80	25	1.00	25	105	
1	SB	1300	0.53	689	300	1.00	300	989	C
2	EB	850	0.53	451	175	1.00	175	626	
2	WB	1250	0.53	663	150	1.00	150	813	C

C: Critical Volume

Total	1802
V/C	1.13
LOS	F

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	875	0.53	464	25	1.00	25	489	
1	SB	250	0.53	133	400	1.00	400	533	C
2	EB	1125	0.53	596	125	1.00	125	721	
2	WB	400	0.53	212	1125	1.00	1125	1337	C

C: Critical Volume

Total	1870
V/C	1.17
LOS	F

Critical Lane Volume
Level of Service Worksheet

Intersection	New Road & Stringtown Road
Major Approach:	New Road
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 HI Build
Analyst:	DSG/VHB

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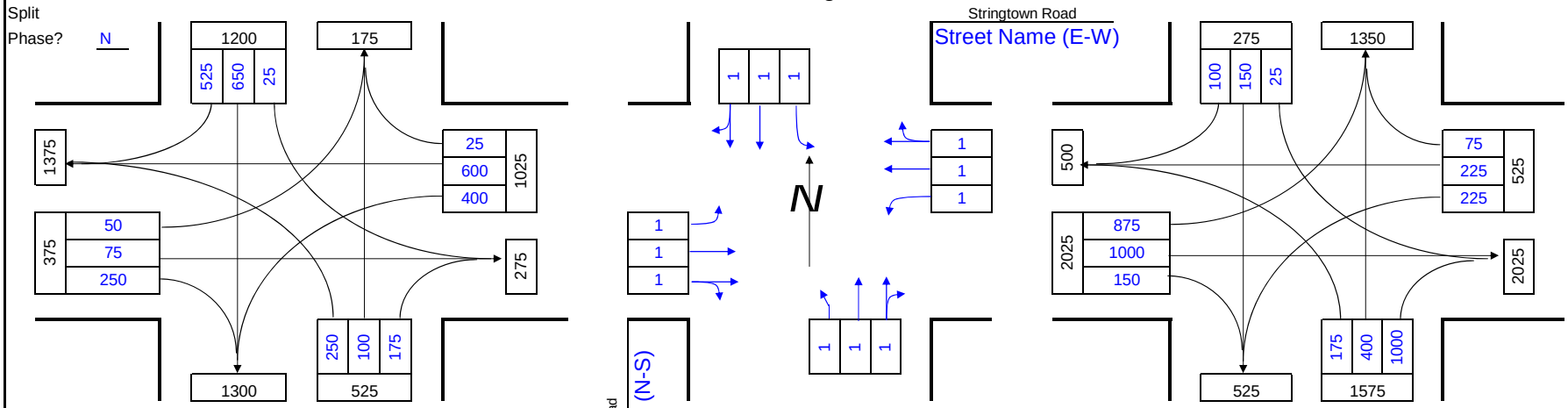
Morning Peak Hour

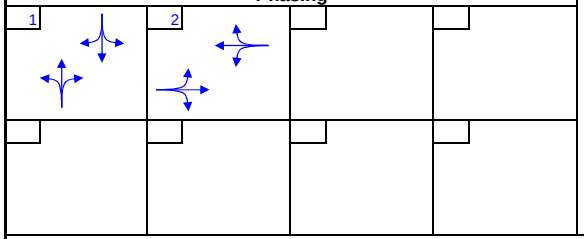
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	275	0.53	146	25	1.00	25	171	
1	SB	1175	0.53	623	250	1.00	250	873	C
2	EB	325	0.53	172	400	1.00	400	572	C
2	WB	625	0.53	331	50	1.00	50	381	

C: Critical Volume — Total 1445; V/C 0.90; LOS D

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1400	0.53	742	25	1.00	25	767	C
1	SB	250	0.53	133	175	1.00	175	308	
2	EB	1150	0.53	610	225	1.00	225	835	
2	WB	300	0.53	159	875	1.00	875	1034	C

C: Critical Volume — Total 1801; V/C 1.13; LOS F

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Western Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build
Analyst:	DSG/VHB

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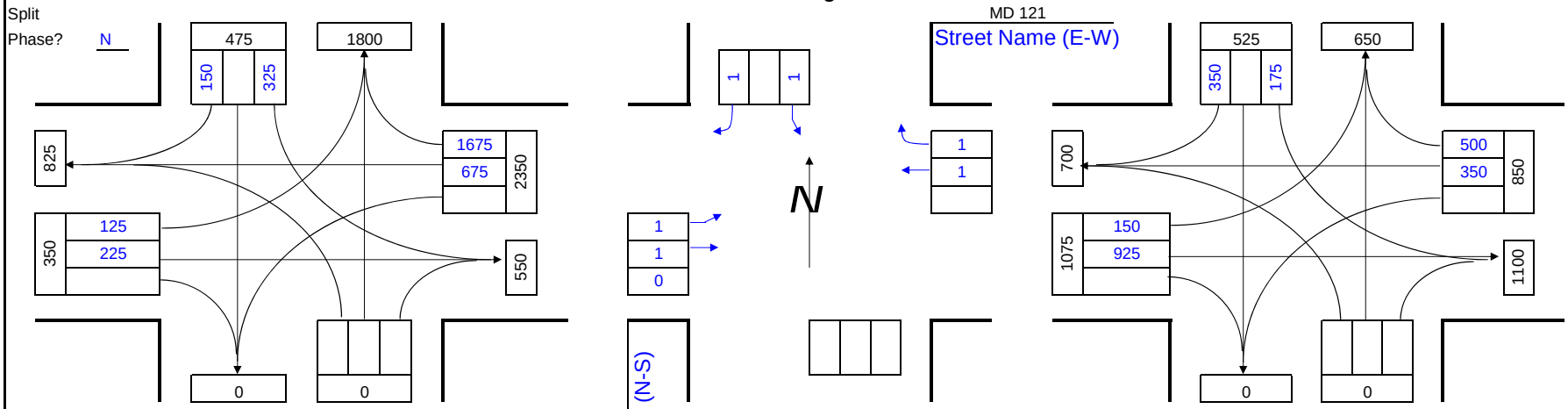
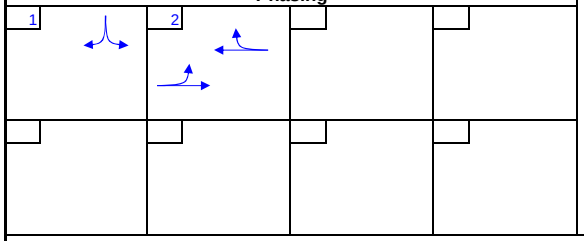
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL	0	1.00	0	325	1.00	325	325	C
2	EB	225	1.00	225	0	1.00	0	225	
2	WB	675	1.00	675	125	1.00	125	800	C
	C: Critical Volume					Total		1125	
						V/C		0.70	
						LOS		B	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	SBL		1.00	0	175	1.00	175	175	C
2	EB	925	1.00	925	0	1.00	0	925	
2	WB	350	1.00	350	150	1.00	150	500	C
	C: Critical Volume					Total		675	
						V/C		0.42	
						LOS		A	

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 121 & I-270 Eastern Intersection
Major Approach:	I-270
Minor Approach:	MD 121
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build
Analyst:	DSG/VHB

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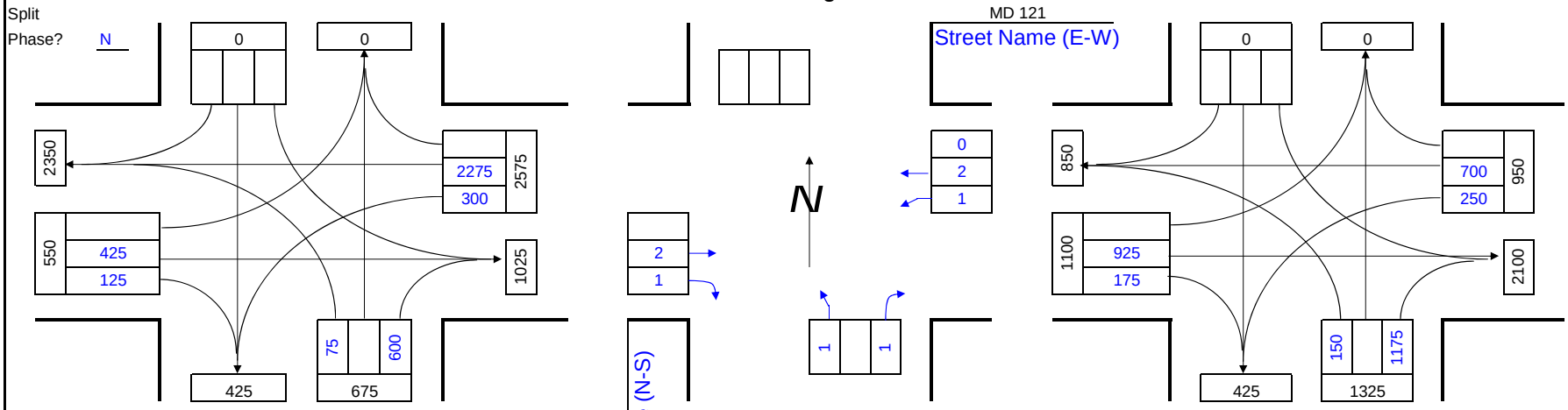
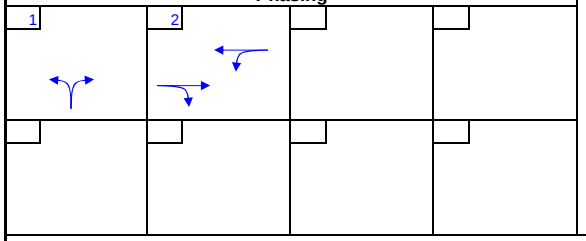
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	75	1.00	75	25	1.00	25	100	C
2	EB	425	0.53	225	300	1.00	300	525	
2	WB	2275	0.53	1206		1.00	0	1206	C
		C: Critical Volume				Total		1306	
						V/C		0.82	
						LOS		D	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NBL	150	1.00	150	0	1.00	0	150	C
2	EB	700	1.00	700	0	1.00	0	700	
2	WB	925	1.00	925	250	1.00	250	1175	C
		C: Critical Volume				Total		1325	
						V/C		0.83	
						LOS		D	

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & MD 121
Major Approach:	MD 355
Minor Approach:	Clarksburg Road (MD 121)
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build
Analyst:	DSG/VHB

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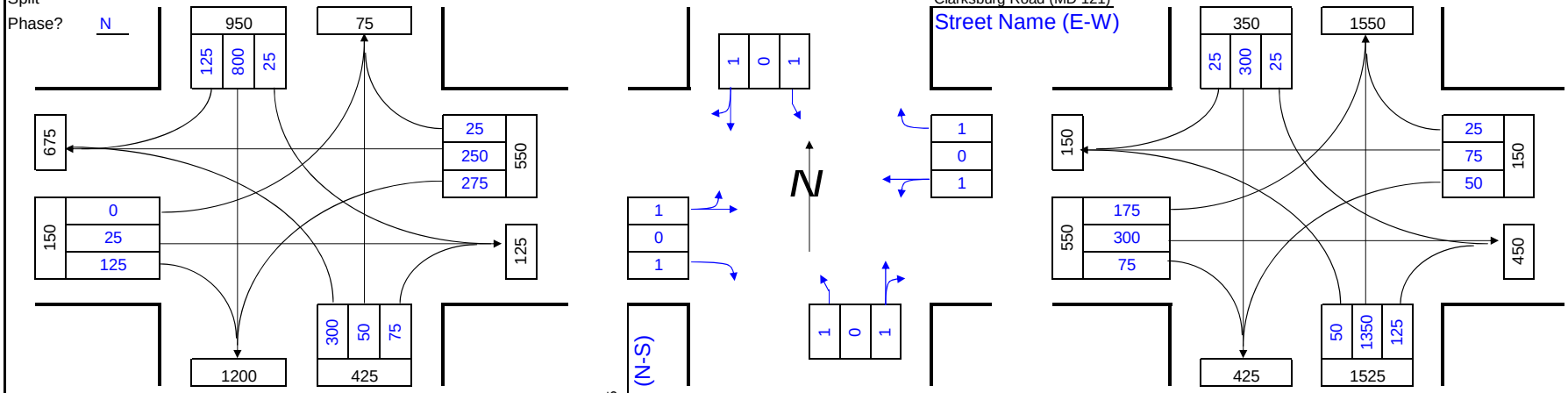
Morning Peak Hour

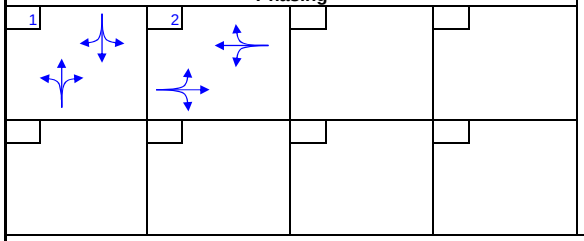
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	125	1.00	125	25	1.00	25	150	
1	SB	925	1.00	925	300	1.00	300	1225	C
2	EB	250	1.00	250	0	1.00	0	250	
2	WB	25	1.00	25	275	1.00	275	300	C

C: Critical Volume — Total 1525; V/C 0.95; LOS E

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1475	1.00	1475	25	1.00	25	1500	C
1	SB	325	1.00	325	50	1.00	50	375	
2	EB	300	1.00	300	50	1.00	50	350	C
2	WB	75	1.00	75	175	1.00	175	250	

C: Critical Volume — Total 1850; V/C 1.16; LOS F

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Shawnee Lane
Major Approach:	MD 355
Minor Approach:	Shawnee Lane
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build
Analyst:	DSG/VHB

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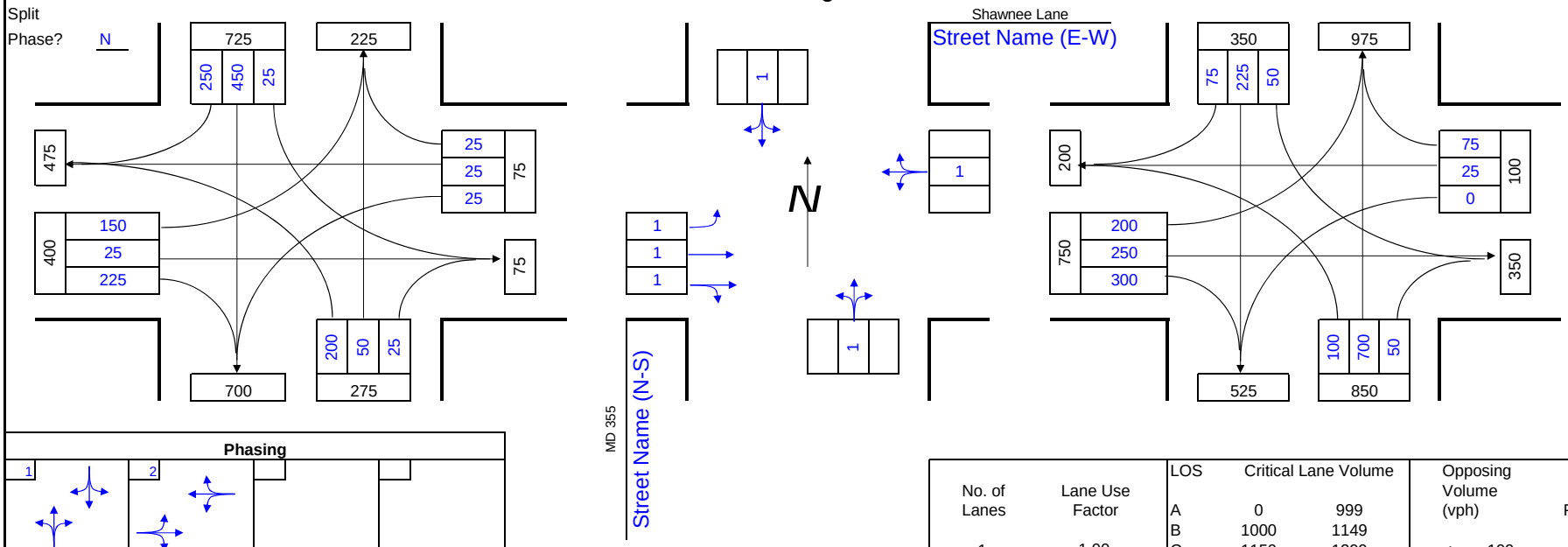
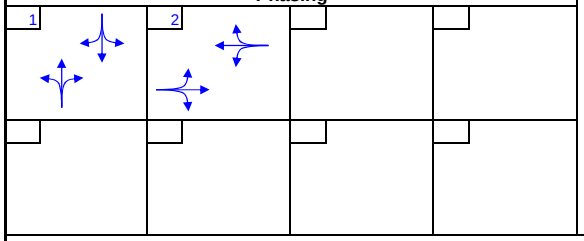
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2)Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	75	1.00	75	25	1.00	25	100	
1	SB	700	1.00	700	200	1.00	200	900	C
2	EB	250	0.53	133	150	1.00	150	283	C
2	WB	50	1.00	50	25	1.00	25	75	

C: Critical Volume

Total	1183
V/C	0.74
LOS	C

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	750	1.00	750	50	1.00	50	800	C
1	SB	300	1.00	300	100	1.00	100	400	
2	EB	550	0.53	292	0	1.00	0	292	
2	WB	100	1.00	100	200	1.00	200	300	C

C: Critical Volume

Total	1100
V/C	0.69
LOS	B

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Stringtown Road
Major Approach:	MD 355
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build
Analyst:	DSG/VHB

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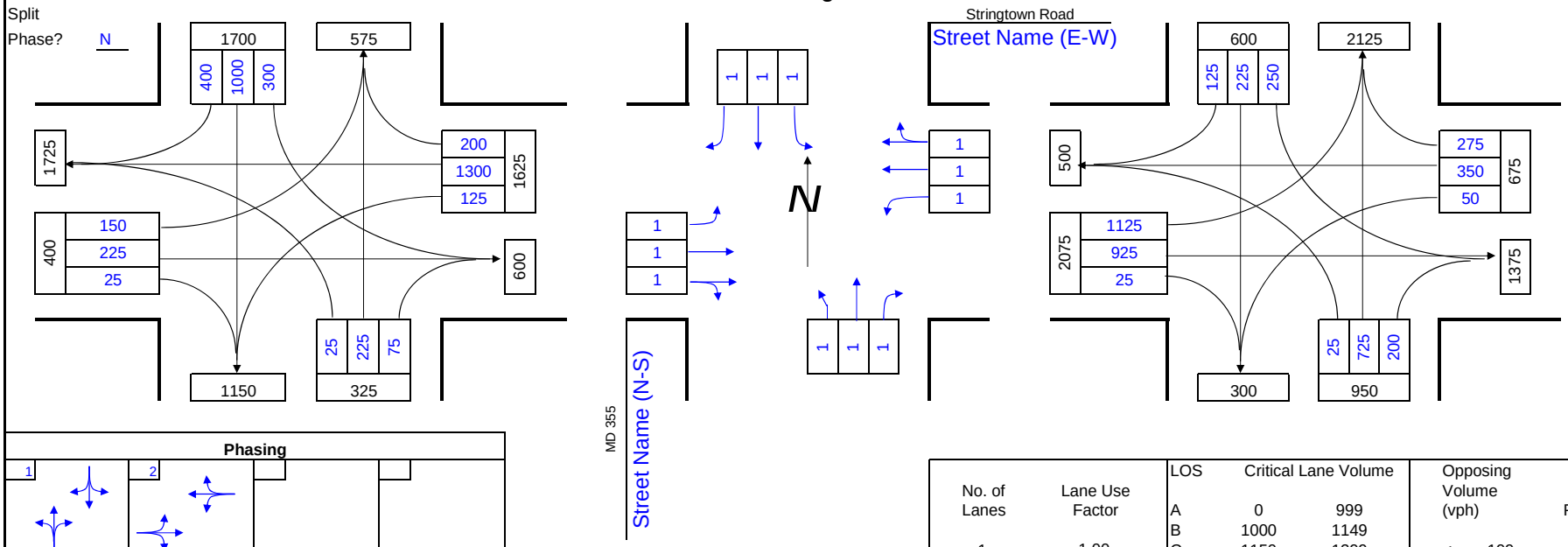
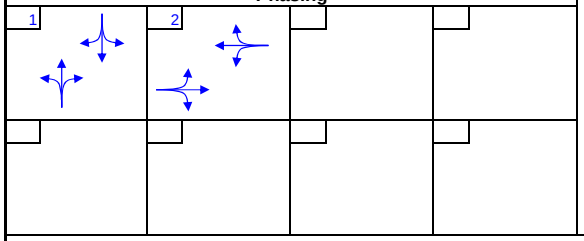
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	225	1.00	225	300	1.00	300	525	
1	SB	1000	1.00	1000	25	1.00	25	1025	C
2	EB	250	0.53	133	125	1.00	125	258	
2	WB	1500	0.53	795	150	1.00	150	945	C
	C: Critical Volume					Total		1970	
						V/C		1.23	
						LOS		F	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	725	1.00	725	250	1.00	250	975	C
1	SB	225	1.00	225	25	1.00	25	250	
2	EB	950	0.53	504	50	1.00	50	554	
2	WB	625	0.53	331	1125	1.00	1125	1456	C
	C: Critical Volume					Total		2431	
						V/C		1.52	
						LOS		F	

Critical Lane Volume
Level of Service Worksheet

Intersection	Gateway Center Dr & Stringtown Road
Major Approach:	Gateway Center Dr
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build
Analyst:	DSG/VHB

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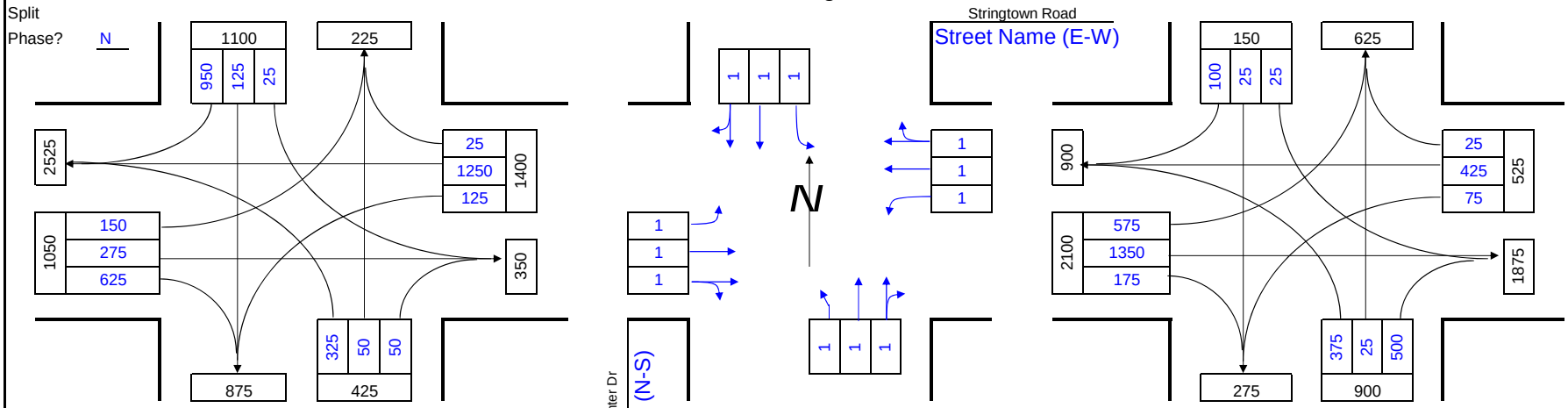
Morning Peak Hour

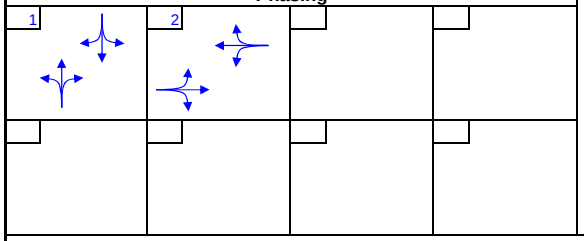
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2)Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	100	0.53	53	25	1.00	25	78	
1	SB	1075	0.53	570	325	1.00	325	895	C
2	EB	900	0.53	477	125	1.00	125	602	
2	WB	1275	0.53	676	150	1.00	150	826	C

C: Critical Volume — Total 1721; V/C 1.08; LOS F

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	525	0.53	278	25	1.00	25	303	
1	SB	125	0.53	66	375	1.00	375	441	C
2	EB	1525	0.53	808	75	1.00	75	883	C
2	WB	450	0.53	239	575	1.00	575	814	

C: Critical Volume — Total 1325; V/C 0.83; LOS D

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & MD 121
Major Approach:	MD 355
Minor Approach:	Clarksburg Road (MD 121)
County/State:	Montgomery County/Maryland
Scenario:	2040 No-Build Mitigation
Analyst:	DSG/VHB

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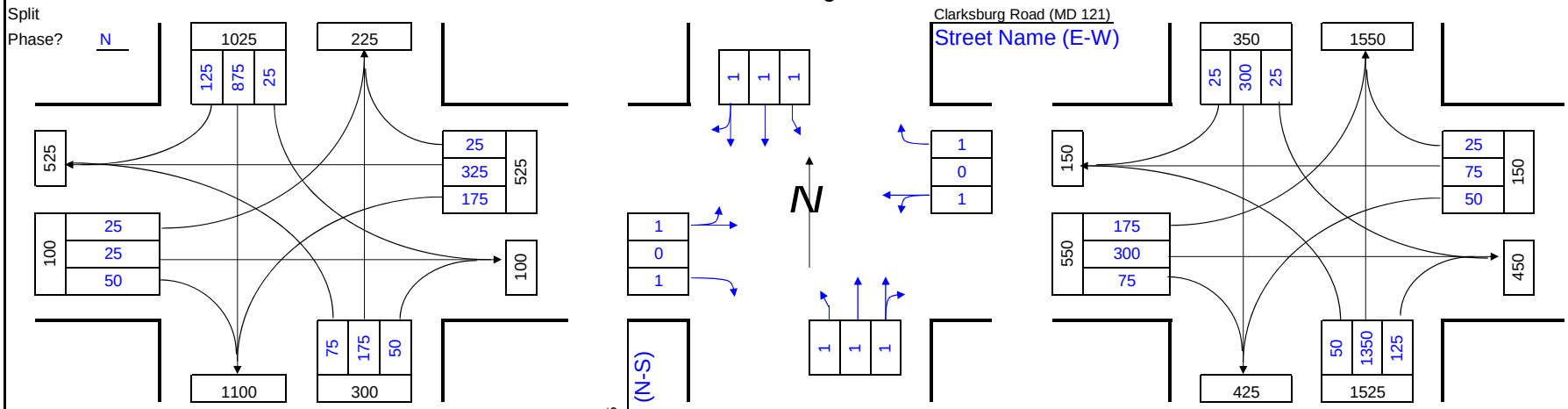
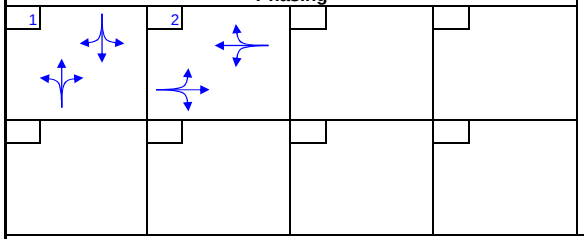
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	225	0.53	119	25	1.00	25	144	
1	SB	1000	0.53	530	75	1.00	75	605	C
2	EB	325	1.00	325	25	1.00	25	350	C
2	WB	25	1.00	25	175	1.00	175	200	
	C: Critical Volume					Total		955	
						V/C		0.60	
						LOS		A	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1475	0.53	782	25	1.00	25	807	C
1	SB	325	0.53	172	50	1.00	50	222	
2	EB	300	1.00	300	50	1.00	50	350	C
2	WB	75	1.00	75	175	1.00	175	250	
	C: Critical Volume					Total		1157	
						V/C		0.72	
						LOS		C	

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & MD 121
Major Approach:	MD 355
Minor Approach:	Clarksburg Road (MD 121)
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build Mitigation
Analyst:	DSG/VHB

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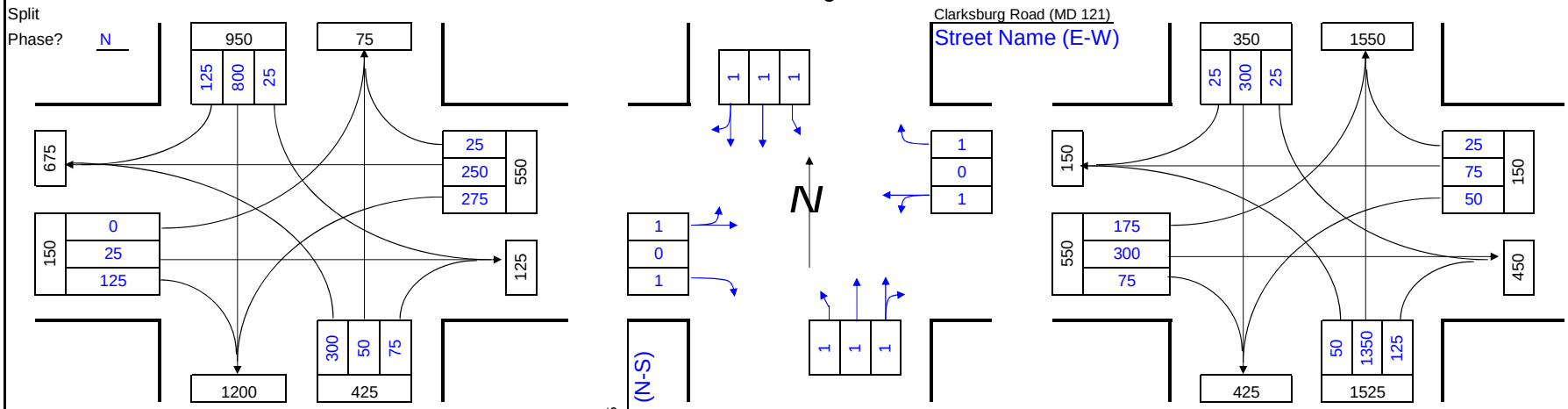
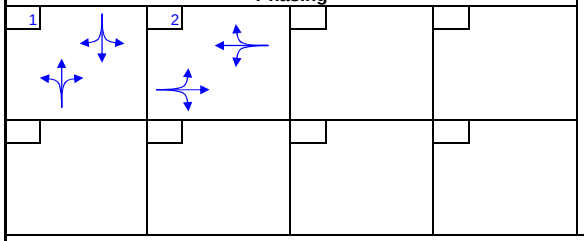
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	125	0.53	66	25	1.00	25	91	
1	SB	925	0.53	490	300	1.00	300	790	C
2	EB	250	1.00	250	0	1.00	0	250	
2	WB	25	1.00	25	275	1.00	275	300	C

C: Critical Volume — Total 1090; V/C 0.68; LOS B

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1475	0.53	782	25	1.00	25	807	C
1	SB	325	0.53	172	50	1.00	50	222	
2	EB	300	1.00	300	50	1.00	50	350	C
2	WB	75	1.00	75	175	1.00	175	250	

C: Critical Volume — Total 1157; V/C 0.72; LOS C

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & Stringtown Road
Major Approach:	MD 355
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build Mitigation
Analyst:	DSG/VHB

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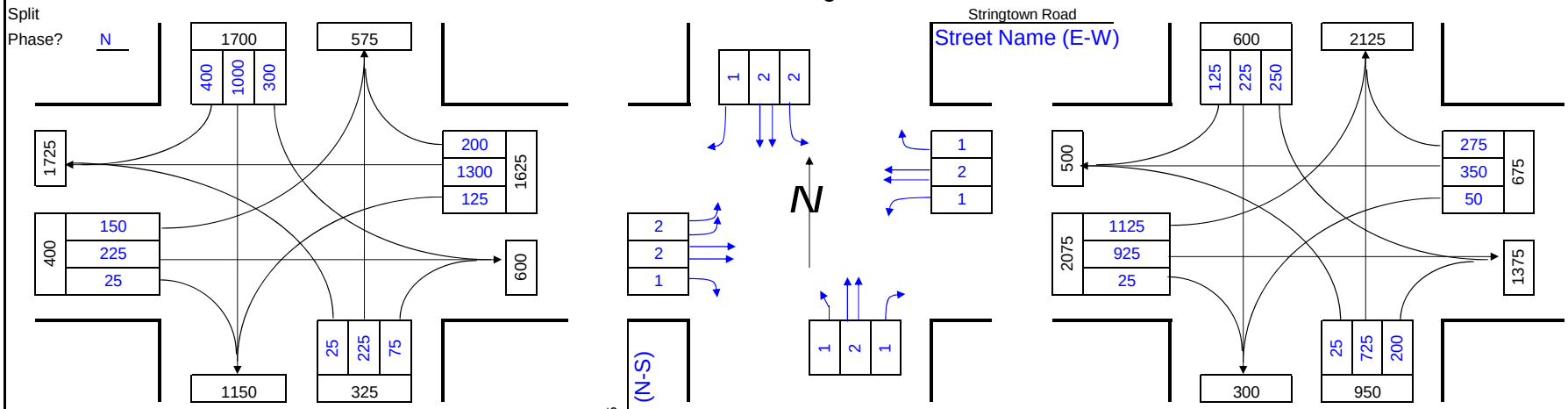
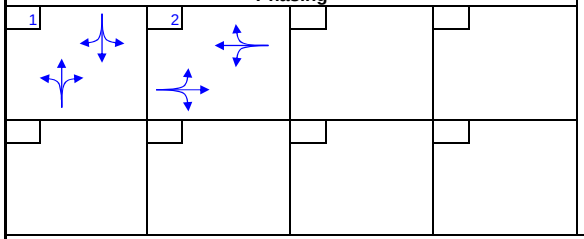
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	225	0.53	119	300	1.00	300	419	
1	SB	1000	0.53	530	25	1.00	25	555	C
2	EB	225	0.53	119	125	1.00	125	244	
2	WB	1300	0.53	689	150	1.00	150	839	C
C: Critical Volume						Total		1394	
						V/C		0.87	
						LOS		D	

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	725	0.53	384	250	1.00	250	634	C
1	SB	225	0.53	119	25	1.00	25	144	
2	EB	925	0.53	490	50	1.00	50	540	
2	WB	350	0.53	186	1125	0.53	596	782	C
C: Critical Volume						Total		1416	
						V/C		0.89	
						LOS		D	

Critical Lane Volume
Level of Service Worksheet

Intersection	Gateway Center Dr & Stringtown Road
Major Approach:	Gateway Center Dr
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 HI No-Build Mitigation
Analyst:	DSG/VHB

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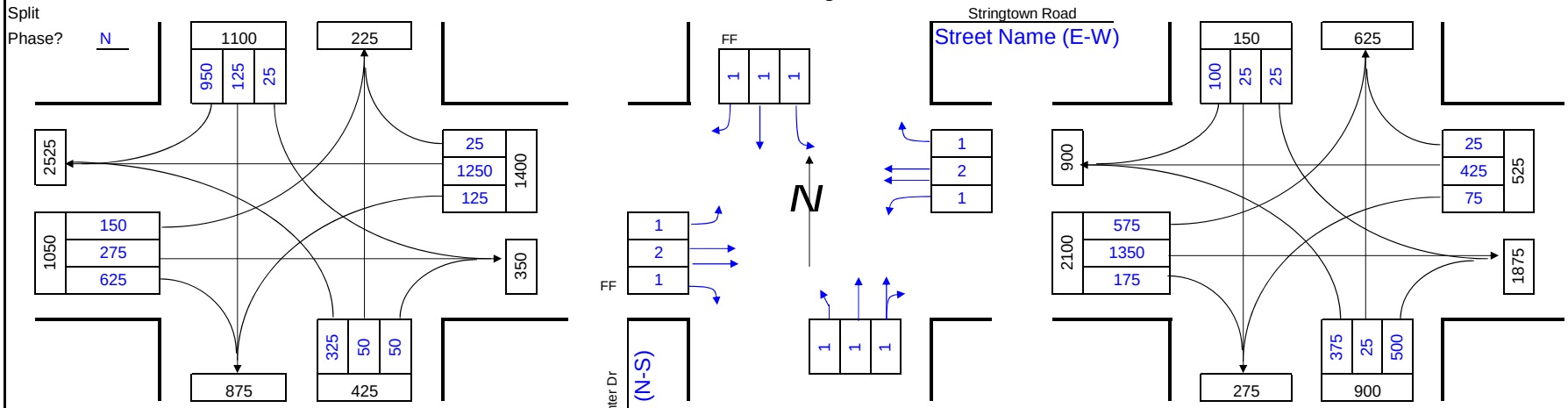
Morning Peak Hour

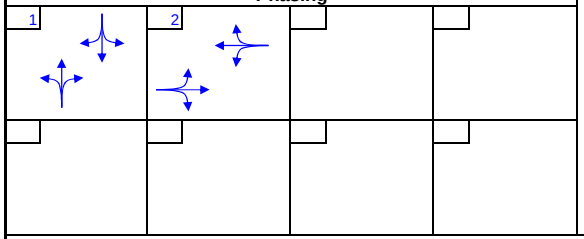
Lane Configuration

Evening Peak Hour

Split Phase? N



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	100	0.53	53	25	1.00	25	78	
1	SB	125	0.53	66	325	1.00	325	391	C
2	EB	275	0.53	146	125	1.00	125	271	
2	WB	1250	0.53	663	150	1.00	150	813	C

C: Critical Volume — Total 1204; V/C 0.75; LOS C

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	525	0.53	278	25	1.00	25	303	
1	SB	25	0.53	13	375	1.00	375	388	C
2	EB	1350	0.53	716	75	1.00	75	791	
2	WB	450	0.53	239	575	1.00	575	814	C

C: Critical Volume — Total 1202; V/C 0.75; LOS C

Critical Lane Volume
Level of Service Worksheet

Intersection	MD 355 & MD 121
Major Approach:	MD 355
Minor Approach:	Clarksburg Road (MD 121)
County/State:	Montgomery County/Maryland
Scenario:	2040 Build Mitigation
Analyst:	DSG/VHB

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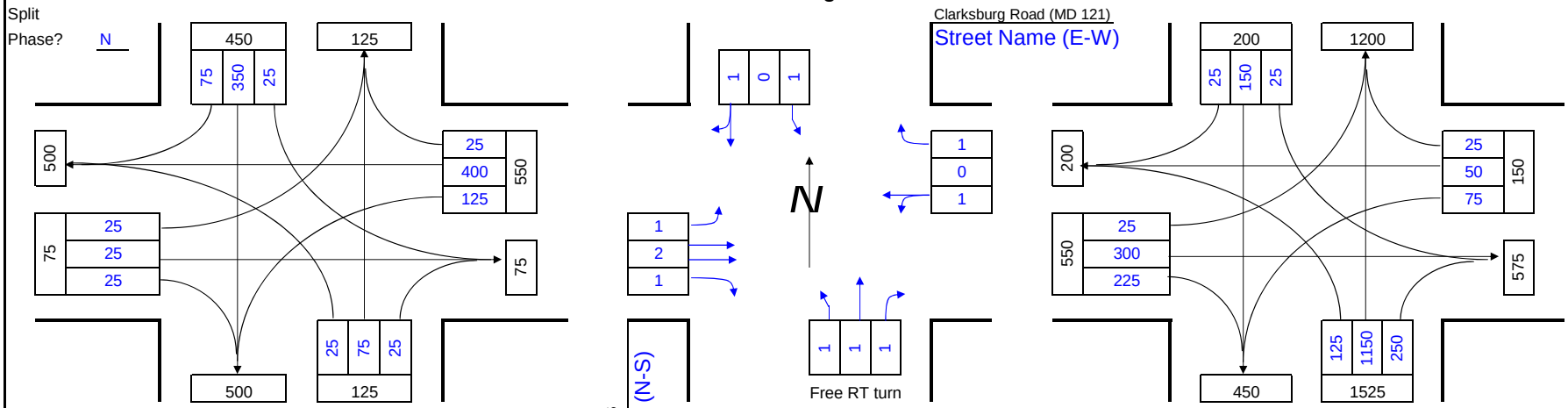
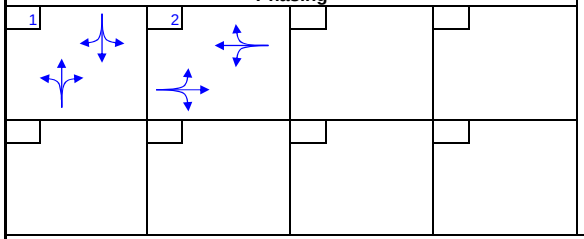
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	100	1.00	100	25	1.00	25	125	
1	SB	425	1.00	425	25	1.00	25	450	C
2	EB	400	1.00	400	25	1.00	25	425	C
2	WB	25	1.00	25	125	1.00	125	150	

C: Critical Volume

Total	875
V/C	0.55
LOS	A

PM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1150	1.00	1150	25	1.00	25	1175	C
1	SB	175	1.00	175	125	1.00	125	300	
2	EB	300	0.53	159	75	1.00	75	234	C
2	WB	50	1.00	50	25	1.00	25	75	

C: Critical Volume

Total	1409
V/C	0.88
LOS	D

Critical Lane Volume
Level of Service Worksheet

Intersection	New Road & Stringtown Road
Major Approach:	New Road
Minor Approach:	Stringtown Road
County/State:	Montgomery County/Maryland
Scenario:	2040 Build Mitigation
Analyst:	DSG/VHB

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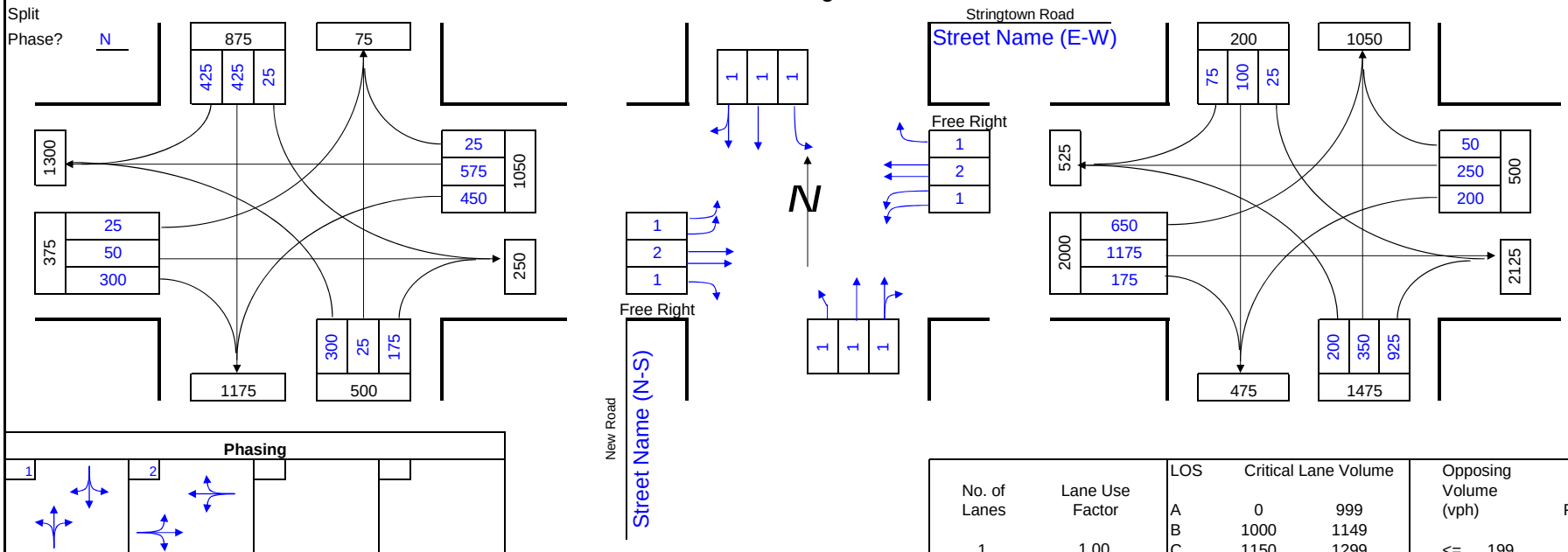
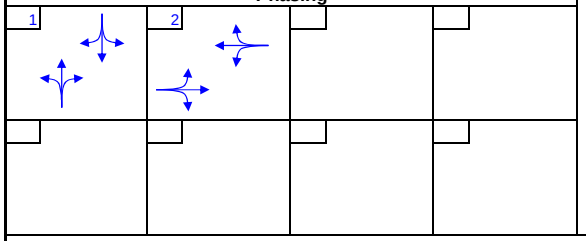
Morning Peak Hour

Lane Configuration

Evening Peak Hour



Phasing



No. of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
Dbl-lft	0.53

LOS	Critical Lane Volume	
A	0	999
B	1000	1149
C	1150	1299
D	1300	1449
E	1450	1600
F	1601	9999

Opposing Volume (vph)	PCE
<= 199	1.1
<= 599	2.0
<= 799	3.0
<= 999	4.0
> 1000	5.0

AM

Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	200	0.53	106	25	1.00	25	131	
1	SB	850	0.53	451	300	1.00	300	751	C
2	EB	350	0.53	186	450	1.00	450	636	C
2	WB	600	0.53	318	25	1.00	25	343	

C: Critical Volume

Total	1386
V/C	0.87
LOS	D

PM

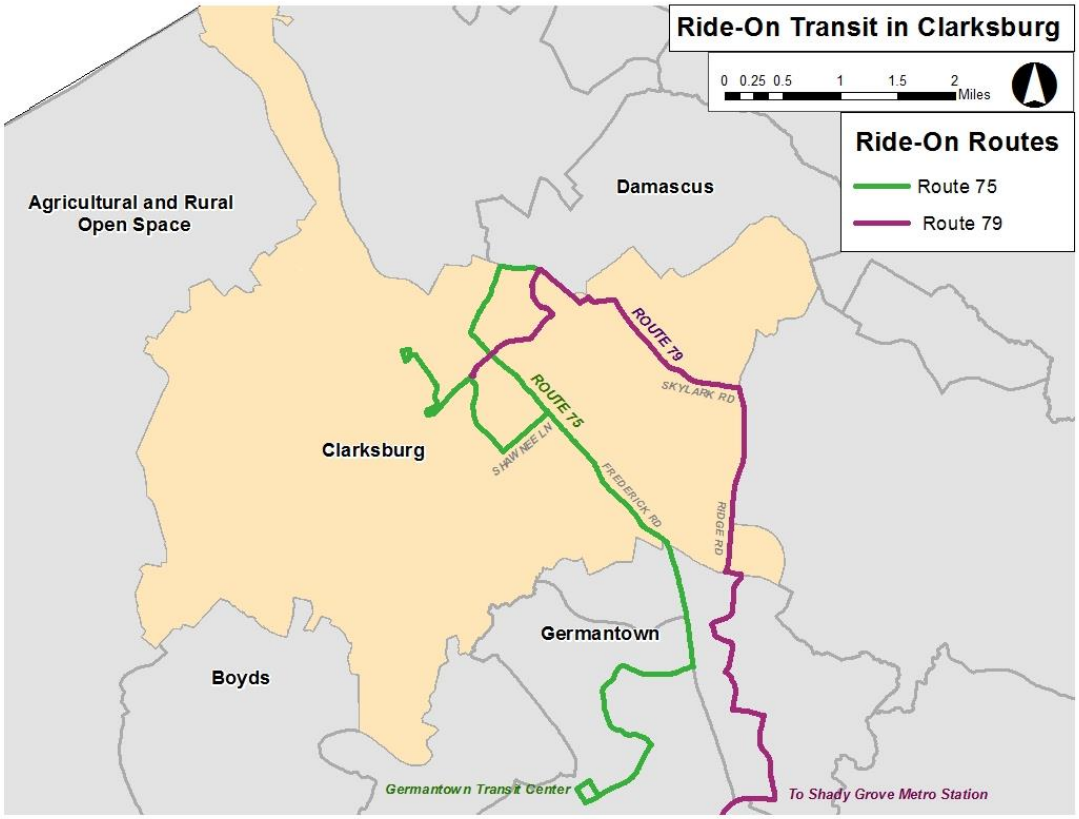
Phase	Movement	(1) Volume	(2) Lane Use Factor	Lane Volume (1) x (2)	(3) Opposing Lefts	(4) Left Turn Lane Use Factor	Lane Volume (3) x (4)	Critical Lane Volume	C
1	NB	1275	0.53	676	25	1.00	25	701	C
1	SB	175	0.53	93	200	1.00	200	293	
2	EB	1175	0.53	623	200	0.53	106	729	C
2	WB	250	0.53	133	650	0.53	345	477	

C: Critical Volume

Total	1430
V/C	0.89
LOS	D

Existing Transit Service

Existing transit service is quite limited as Clarksburg is served by just two Ride-On bus routes (Routes 75 and 79) and no WMATA bus or rail routes. The map below depicts the routes serving Clarksburg:

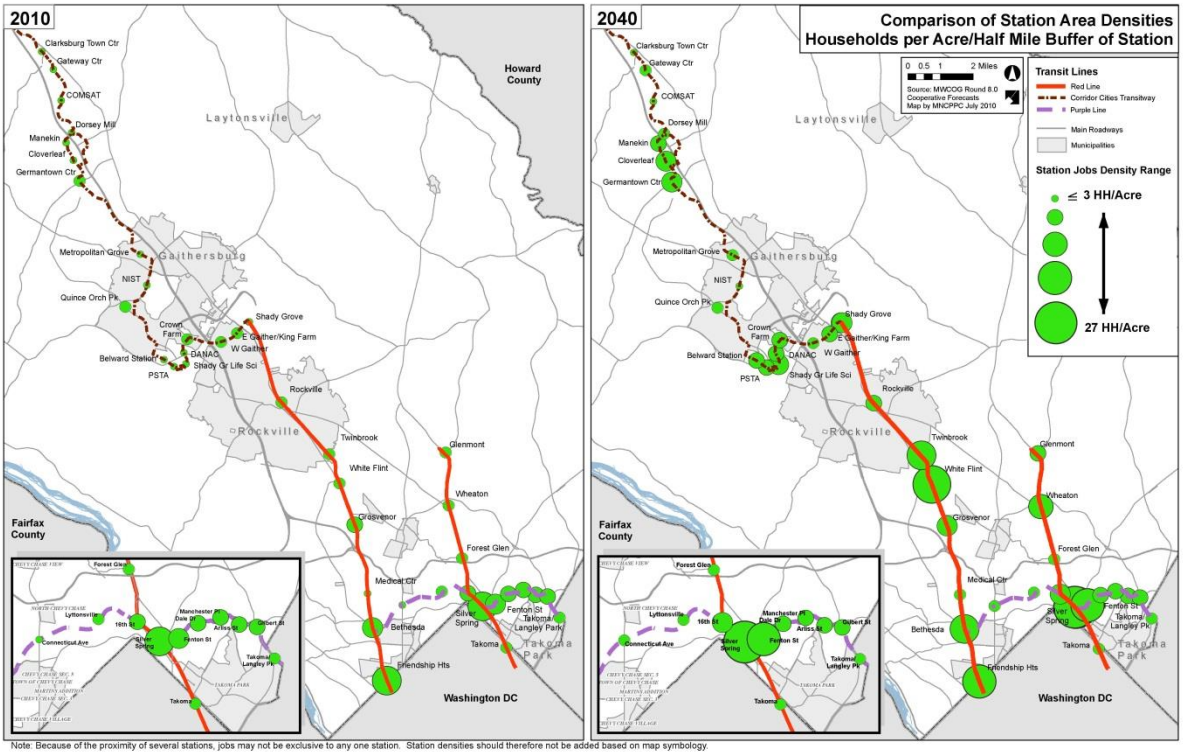


Route 75 runs from the Montgomery County Correctional Facility to Germantown Transit Center via Frederick Road on a 30 minute frequency every weekday. There is no weekend service. Route 79 runs from Gateway Center to Shady Grove Metro Station via Skylark and Ridge Roads on a 30 minute frequency during weekday peak periods. The service is provided in the peak direction only. There is no weekend service.

Analysis of Transit Demand

Planned station area densities north of Father Hurley Boulevard / Ridge Road are generally not at a level considered to be supportive of transit in a dedicated lane (see illustrations below). This is essentially the reason the MTA Corridor Cities Transitway (CCT) concept planning and alternatives analysis work to date assumes a northern terminus at COMSIS where there is a planned park and ride lot. While the year 2040 ridership forecasts developed for the Countywide Transit Corridors Functional Master Plan (CTCFMP) essentially confirmed those earlier findings for this segment the Planning Board Draft CTCFMP does include a recommendation for a MD 355 North Bus Rapid Transit Corridor that would operate in mixed traffic between Milestone and the Clarksburg Town Center Transit Station.

The mean travel time for work trips for Montgomery County residents is about 34 minutes based upon the American Community Survey for the time period 2007-2011. In general, about 40-50 minutes is thought to be the point where travel time begins to influence the selection of the location of the residence and/or job – all other things being equal.



This somewhat theoretical maximum travel time is reflected to some extent in the census data available on weekday residence to work-place county trips (rounded to nearest thousand) for 2006-2010 as noted below.

Residence County to Work Place County Trips 2006 – 2010 – Average Weekday

From/To	Montgomery Co.	D.C.	Prince George's Co.	Arlington Co.	Fairfax Co.
Montgomery Co.	298,000	107,000	29,000	9,000	22,000
Howard Co.	14,000	10,000	14,000	1,000	2,000
Frederick Co.	26,000	4,000	2,000	1,000	3,000
Fairfax Co.	17,000	90,000	10,000	48,200	302,000
Prince George's Co.	44,000	136,000	175,000	16,000	18,000

As noted in the table, travel flows within jurisdictions far exceed flows to adjacent jurisdictions in most instances. Congestion, however, remains an issue (even with the lower volumes) because of the limited

number of corridors available to accommodate the trips between jurisdictions – especially where Metrorail is not available.

The Clarksburg area and its related travel patterns and trip-making are therefore characterized by at least four related conditions in the near and intermediate term (next 10-20 years):

- Residential and employment densities below densities normally thought to be supportive of high quality all day transit service in dedicated lanes
- Travel shed for work trips that extends no more than 40-50 minutes one-way on average for most work trips.
- Limited number of travel corridors with right of way constraints and congested travel conditions.
- Relatively high percentage of peak travel flow in north-south direction.

The origin/destination pairs with highest percentages of an estimated 28,000 work trips originating in Clarksburg and destined for locations in the County, DC, or Frederick County in 2040 – based upon the regional model forecast - include the following:

- Trips to/from City of Gaithersburg – 16%
- Trips Remaining Within Clarksburg – 13%
- Trips to/from Germantown East – 10%
- Trips to/from City of Rockville – 10%
- Trips to/from Germantown West – 8%
- Trips to/from R&D Village – 6%
- Trips to/from DC – 6%
- Trips to/from Frederick County – 6%

The total potential transit market is not large. As an example, a relatively optimistic transit mode share of 15% would translate to 4,200 weekday trips to and from Clarksburg on a typical workday in 2040. A theoretical allocation of those trips to any specific peak hour results in an estimated 300– 500 trips per peak hour - with those trips having dispersed origins and destinations.

These findings suggest that with or without the CCT in Clarksburg Town Center, other components of a (initial) future transit network serving Clarksburg work trips might – at a concept level – consist of the following:

- Peak period frequent (20 minutes or less) express non-stop service from the Clarksburg Town Center to Shady Grove Red Line Metrorail Station via I-270 (estimated 30-35 minute travel time).
- Peak period frequent (20 minutes or less) express non-stop service from the Clarksburg Town Center to Germantown Town Center / Germantown MARC via I-270 (one way travel time an estimated 15-20 minutes).

- Peak period limited stop Ride-On service from the Clarksburg Town Center to Milestone (and ultimate CCT stop) via MD 355 (estimated 15-20 minutes travel time).
- Peak period limited stop Ride-On service from the Clarksburg Town Center to Lakeforest/ Gaithersburg MARC via MD 355 (estimated 30-35 minute travel time).
- Internal Clarksburg circulator service that would connect activity centers east and west of I-270 with the Town Center and the CCT COMSAT station until such time that the CCT was extended to the Town Center. Once the CCT was extended, the need for the circulator service connecting points east and west of I-270 would still likely remain.

The allocation of resources in support of a network similar to the concept described above – given the overall relatively low transit ridership forecast and dispersed trip patterns - is viewed as a better fit for the potential transit market for the foreseeable future. Once the CCT is ultimately extended to the Town Center, the supporting bus network and associated resources would likely be reevaluated. This concept or approach to a developing activity center is similar to what has been successfully implemented by Ride-On in Germantown.

Transportation Policy Area Review Analysis

In support of this Plan, a Countywide Transportation Policy Area Transportation Review (TPAR) analysis was conducted assuming a land use/transportation scenario reflecting the following key elements:

- **Regional Background Conditions:** The year 2040 Round 8.1 Cooperative Forecast is assumed for the region in conjunction with a transportation network generally reflecting the Constrained Long Range Plan. Regional transportation network assumptions also include the extension of HOV lanes on I-270 between MD 121 and MD 15 in Frederick County.

- **Clarksburg Area Conditions:** The proposed "alternative master plan" land use development scenario is assumed within the Ten Mile Creek Area in combination with year 2040 Round 8.1 Cooperative Forecast land use in the remainder of the Clarksburg policy area. The scenario assumed that the employment uses proposed for the Adventist site in Cabin Branch and Miles/Coppala properties located east of I-270 in the vicinity of the Town Center are replaced by retail uses in order to examine worst case traffic conditions. This development scenario is assumed in combination with the adopted Clarksburg Master Plan transportation network.

The results of this analysis are depicted in the graphic shown below as Figure 1. The following notes should be used in support of interpreting the results provided in this graphic:

- The vertical "blue-hatched" bars show the **range** of the average of roadway speeds by direction of travel in relation to the "free flow speed", or LOS, for each Policy Area in the PM peak period.

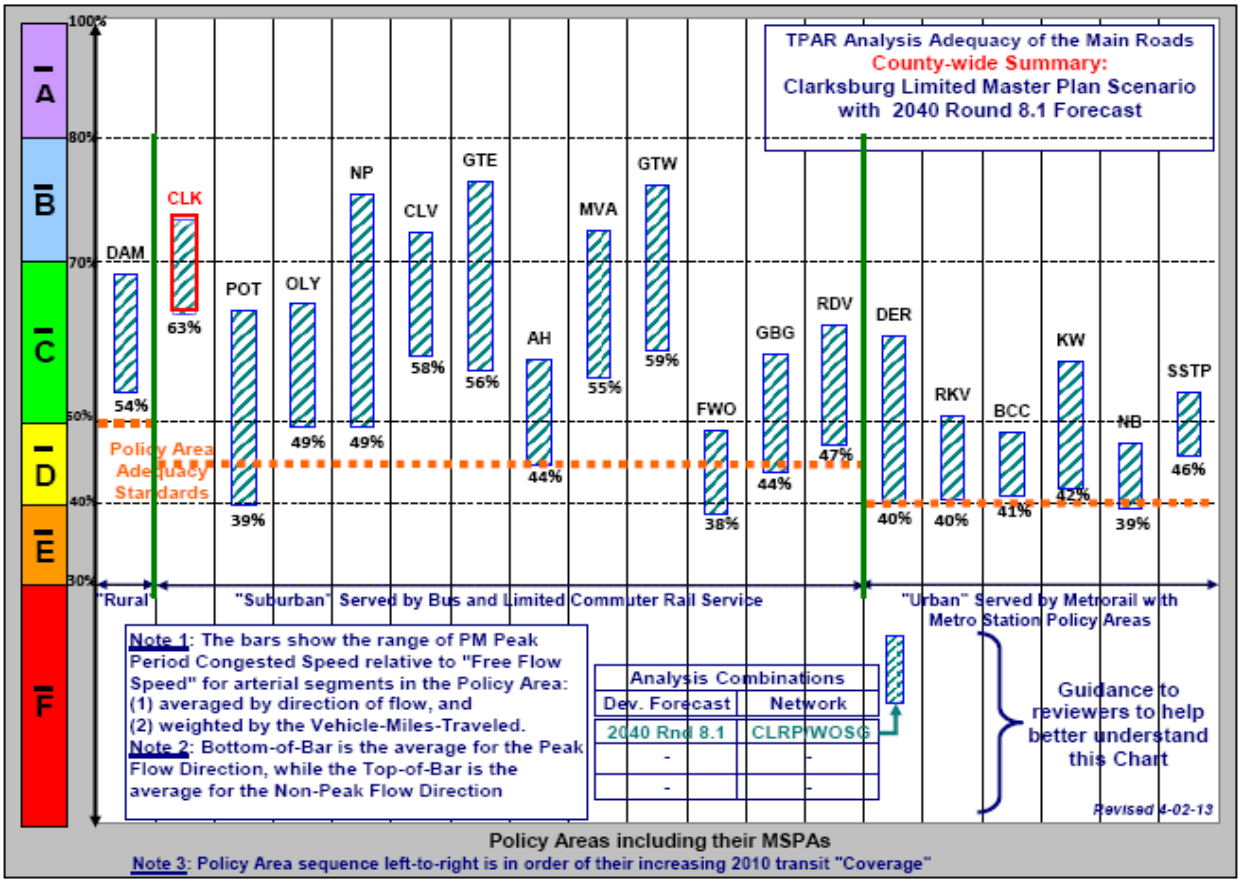
- The bottom of the bar shows the average LOS in the peak direction of travel. The top of the bar shows the average speed (LOS) in the non-peak direction.

- The measurement scale weighted average LOS is shown on the left side of the chart.

- Horizontal dotted orange lines are shown to depict the adequacy standards (LOS) for the Rural, Suburban and Urban (with Metrorail) Policy Areas, from left to right, corresponds to the Standards of Roadway Adequacy as defined the context of TPAR.

The TPAR results depicted in the figure shows that the bottom of the blue-hatched bar for Clarksburg (as noted by the red abbreviation "CLK" and highlighted in the figure below) is projected to achieve a 63% ratio of congested relative to uncongested roadway travel speed. This ratio is well above the 45% policy area standard for suburban policy areas the County as determined by the Subdivision Staging Policy. This result shows that the Clarksburg policy area is forecasted to achieve adequate roadway travel conditions by the year 2040 planning horizon with the proposed alternative master Plan development scenario in the Ten Mile Creek Area.

Figure 1: Year 2040 County-wide TPAR Adequacy Analysis of the Main Roads with the Clarksburg 10 Mile Creek Limited Master Plan Amendment Scenario



For comparison purposes, the summary TPAR results derived from the year 2040 County-wide roadway adequacy analysis performed in support of the 2012- 2016 Subdivision Staging Policy are also provided. These results are depicted in Figure 2 and reflect the build-out of the adopted Clarksburg Master Plan by the year 2040.

As can be observed, the highlighted results for Clarksburg show that the policy area is projected to achieve a 57% ratio of congested relative to uncongested roadway travel speed. This ratio is well above the 45% policy area standard for suburban policy areas the County as determined by the Subdivision Staging Policy. This result shows that the Clarksburg policy area is forecasted to achieve adequate roadway travel conditions by the year 2040 planning horizon with the land use assumed in the adopted Clarksburg Master Plan.

While the land/use transportation assumptions reflected in Figure 2 are generally comparable to those reflected in Figure 1, there are key differences which particularly impact the TPAR results for Clarksburg, as well as Germantown East. These differences are described below.

- **Demographic Differences:** Figure 1 reflects the year 2040 **Round 8.1** Cooperative Forecast while Figure 2 reflects the year 2040 **Round 8.0** Cooperative Forecast. The year 2040 employment forecast for Frederick County is roughly 35% lower in Round 8.1 relative to Round 8.0. This difference influences the forecast of trip distribution patterns between Frederick County and northern Montgomery County, particularly along the upper I-270 Corridor.

- **Network Differences:** Figure 1 generally reflects the regional Constrained Long Range Plan network, including the full length of Midcounty Highway through Germantown East. Figure 2 reflects those projects needed to achieve TPAR roadway adequacy by 2040 as determined by the TPAR costing analysis performed in support of the 2012-2016 Subdivision Staging Policy. The transportation network assumed in support of the TPAR costing analysis did not reflect the segment Midcounty Highway between Middlebrook Road and Montgomery Village Avenue.

Figure 2: Year 2040 County-wide TPAR Adequacy Analysis of the Main Roads with the Adopted 1994 Clarksburg Master Plan Scenario