Bluestem

Baltimore County, Maryland
REVISED September 14, 2018

Traffic Impact Analysis

Prepared for:
Vanguard Commercial Development

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The Traffic Group

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Professional Certification:

Prepared by:	Mickey A. Cornelius, P.E., PTOE Shulin Li, P.E., PTOE

MAC:mlj
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INTRODUCTION AND SUMMARY OF FINDINGS

Study Purpose

The Traffic Group, Inc. has prepared this Traffic Impact Analysis to identify the impact of the proposed development of Bluestem on surrounding area traffic conditions. The subject property is located along the east side of Falls Road (MD 25), south of Old Pimlico Road in Baltimore County, Maryland. The site is proposed to be developed as a mixed-use community containing 38,900 sq ft of retail space, 17,700 sq ft of office space, and 152 residential apartment units. All access to the subject property is proposed at a single location along Falls Road at the existing signalized intersection with Clarkview Road. The site access would form the fourth leg of this signalized intersection.

Study Criteria/Methodology

This study was conducted in accordance with typical Baltimore County and SHA requirements. A Scoping Meeting was held with the SHA to identify the specific scope of the study. Intersection Capacity Analyses were conducted using the Critical Lane Volume (CLV) Methodology and a Synchro Model was prepared for the study area. The SHA and Baltimore County desire Level of Service "D" or better conditions.

This study is a revision to the May 8, 2018 Traffic Study to address SHA comments and minor site development changes. Copies of the SHA comments and responses are included in Appendix A.

Scope of Services

The principal scope of services undertaken as part of this study was as follows:

- Conduct a Field Inspection to collect physical information concerning the nearby road system.
- Conduct Intersection Turning Movement Counts during the weekday morning and evening peak periods at the study intersections.
- Conduct Trip Generation and Trip Distribution Analyses for the proposed development of the site.
- Develop Total Future Traffic Volume Forecasts for the study intersections.
- Conduct Intersection Capacity Analyses and Level of Service Evaluations for the study intersections.

- Prepare a Synchro Traffic Simulation Model to identify operating conditions in the study area.
- Provide an overall evaluation of the impact of the proposed development of the site on the surrounding area road system.

Summary of Findings and Recommendations

The results of Intersection Capacity Analyses conducted as part of the study using the CLV Methodology are shown in Exhibit 7. These results show that the study intersections are projected to maintain acceptable Level of Service "D" or better conditions under existing geometrics. This study recommends a southbound left turn lane along Falls Road at the site access which results in acceptable Level of Service "C" or better conditions at all locations.

The results of the Synchro/SimTraffic Simulation Analyses are also shown in Exhibit 7. These results show acceptable Level of Service "C" or better conditions for all movements at the study intersections. This exhibit also identifies queuing conditions for the study intersections and as a result, it is recommended that a left turn lane be constructed along southbound Falls Road at the site access to provide a minimum of 75 feet of storage.

Based upon the data and analyses presented in this study, the proposed Bluestem can be adequately accommodated by the surrounding area road system. The proposed development has a minimal impact on surrounding area traffic conditions and with a recommended southbound left turn lane along Falls Road at the site access, efficient traffic operations will be maintained at that signalized location.

The study methodology is detailed in the sections that follow.

EXISTING TRAFFIC CONDITIONS

Site Information

The subject property is located along the east side of Falls Road (MD 25), south of Old Pimlico Road in Baltimore County, Maryland as shown in Exhibit 1. Multiple access points currently exist to the site along Falls Road but none of them are currently controlled by the signalized intersection.

Under the redevelopment proposal, the subject property is anticipated to be developed with a mixed-use community containing 38,900 sq ft of retail space, 17,700 sq ft of office space and 152 residential apartment units. All access is proposed to be condensed to a single access at the existing signalized intersection along Falls Road, opposite Clarkview Road.

Study Area

Based upon the location of the subject property and the SHA traffic study scope, the following intersections were included as part of this study:

- Falls Road and Old Pimlico Road
- Falls Road and Clarkview Road/Site Access

MD 25 is an Arterial SHA maintained road which traverses a north/south direction through Baltimore County. In the vicinity of the site, MD 25 has a two-lane cross section and a posted speed limit of 40 mph. Signalized intersections exist at Clarkview Road and Old Pimlico Road.

The existing lane use and traffic control at the study intersections are identified in Exhibit 2. Appendix A contains aerial photographs of the study intersections.

Traffic Volumes

Intersection Turning Movement Counts were collected for the study intersections between the hours of 7 and 9 AM and 4 to 6 PM on a weekday. The resulting peak hour traffic volumes in the study area are shown in Exhibit 3. Copies of the turning movement count summary sheets are contained in Appendix A of this report.

Analysis of Existing Traffic Conditions

Intersection Capacity Analyses were conducted for the study intersections using the CLV Capacity Procedure and copies of the worksheets are contained in Appendix B of this report. The results

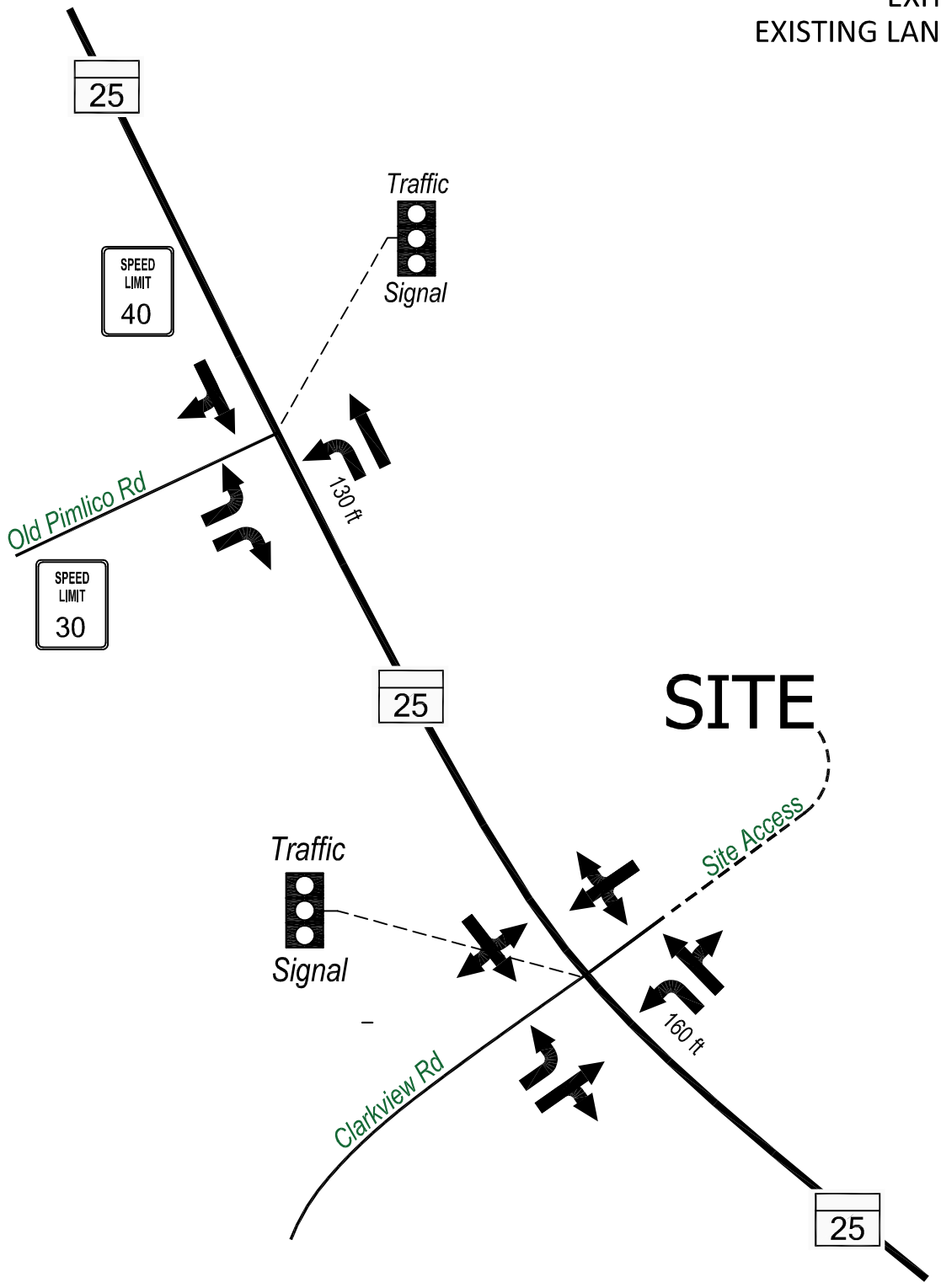
of the analyses are shown in Exhibit 7. A review of these results shows that the existing intersections are currently operating with acceptable Level of Service “C” and “B” conditions during the weekday morning and evening peak hours, respectively.

In addition to the CLV Analyses, a Synchro/SimTraffic Simulation was prepared for the existing conditions. Copies of the Synchro worksheets are included in Appendix B of this report. The results of the Synchro Analyses are shown in Exhibit 7. These results show acceptable Level of Service “C” and “B” conditions for the study locations during the weekday morning and evening peak hours.

EXHIBIT 1
SITE LOCATION MAP
(GRID SPACING: 1/2 MILE)

SLI, job\lakeRoland 160614.dwg-LOC_ST, C12/11/17

EXHIBIT 2
EXISTING LANE USE



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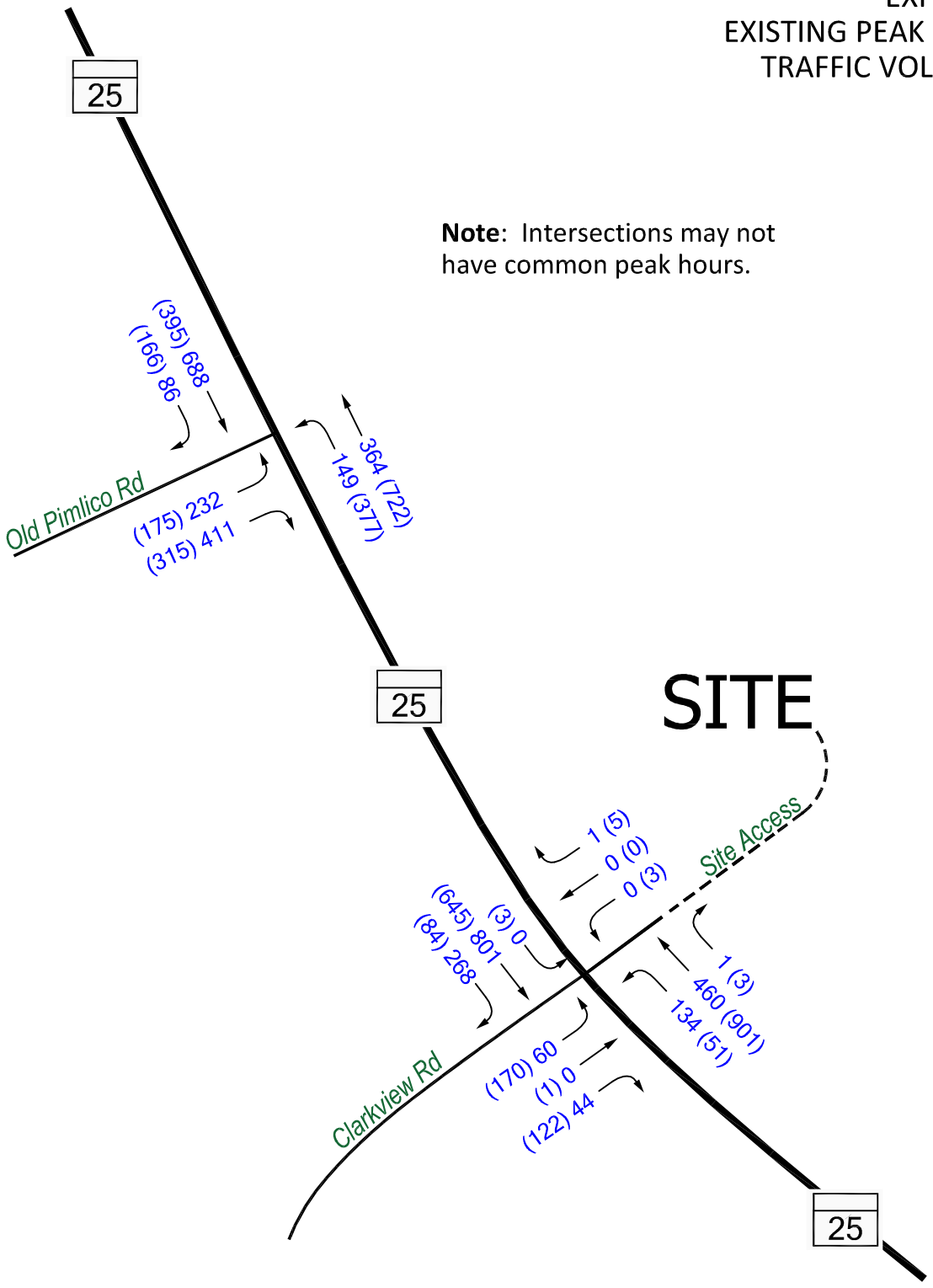
SIGNALIZED INTERSECTION

"STOP" CONTROL

SLI, 160614\REV1\Ex17DecA.dwg-LU-EX, F12/18/2017

EXHIBIT 3
EXISTING PEAK HOUR
TRAFFIC VOLUMES



Note: Intersections may not have common peak hours.

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00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

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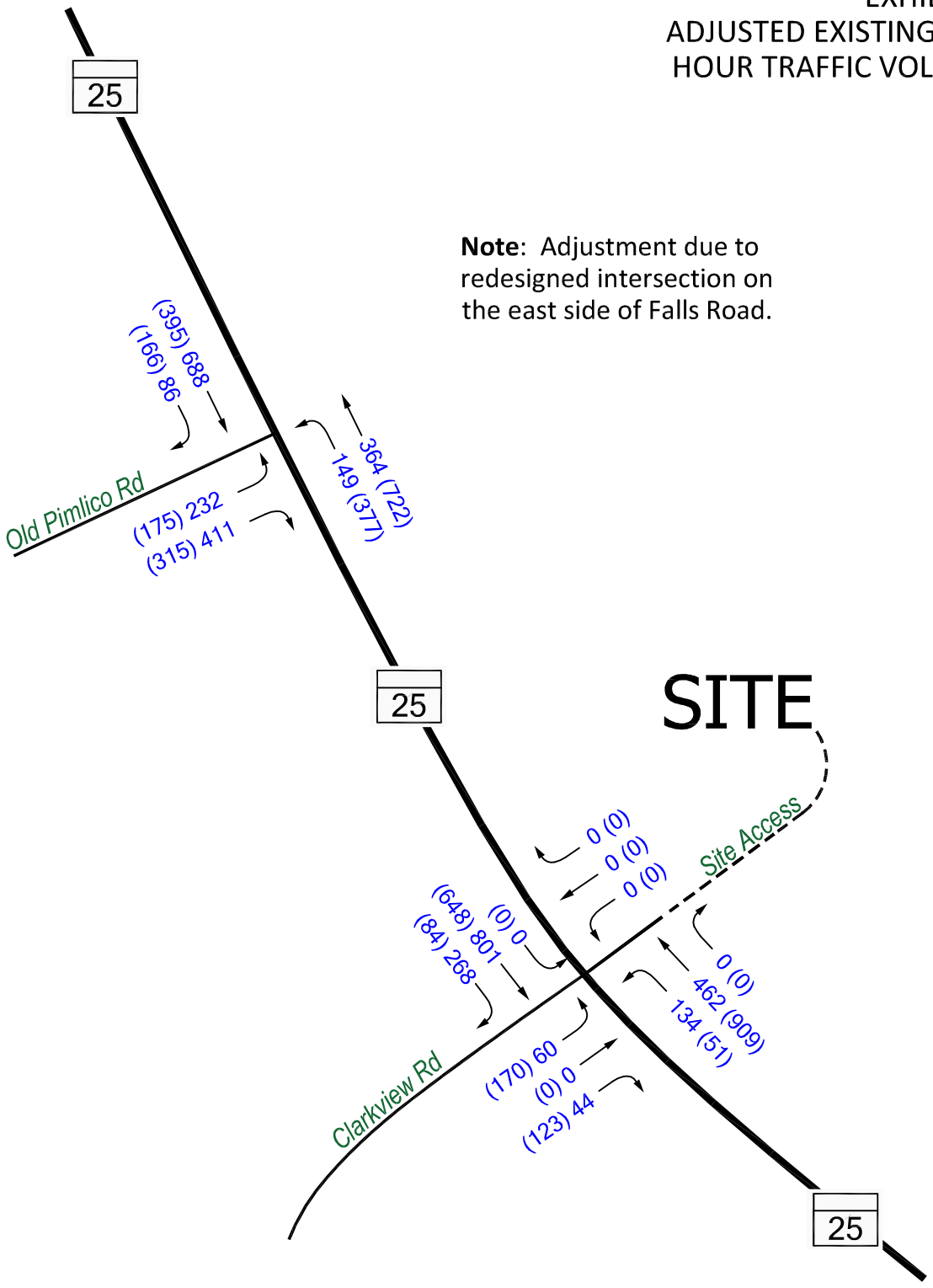
EXHIBIT 3A
ADJUSTED EXISTING PEAK HOUR TRAFFIC VOLUMES



Note: Adjustment due to redesigned intersection on the east side of Falls Road.

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00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

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TOTAL TRAFFIC CONDITIONS

Background Traffic

A review of SHA Historical Traffic Data for this section of MD 25 shows that traffic volumes have been consistent in this area over the past ten years. Therefore, no regional traffic growth was included in this analysis. In addition, no significant approved developments were identified in the surrounding vicinity. Therefore, future traffic volumes for this study include the existing traffic and projected traffic to be generated by the proposed redevelopment of the site.

Site Information

Bluestem is proposed to be located along the east side of Falls Road (MD 25) south of Old Pimlico Road in Baltimore County, Maryland. The site is proposed to be developed with a mixed-use community containing 38,900 sq ft of retail space, 17,700 sq ft of office space, and 152 residential apartment units. All access to the subject property is proposed at a single location along Falls Road at the existing signalized intersection with Clarkview Road. The site access would form the fourth leg of the intersection. With the site access modifications, the existing traffic volumes at the site access intersection were adjusted as shown in Exhibit 3A.

Trip Generation/Distribution

The Institute of Transportation Engineers Trip Generation Report (10th Edition) was used to estimate the trips projected to be generated by the development of the site. Exhibit 4 provides the trip generation rates and the projected peak hour trips for this development.

The new trips projected to be generated by the residential portion of the site were assigned to the surrounding area road system as shown in Exhibit 5A. Exhibit 5B shows the new trip assignments for the proposed commercial development. Exhibit 5C shows the effect of pass-by trips projected to be generated by this site.

Combining the trips projected to be generated by the proposed development with the adjusted existing traffic volumes results in the total future peak hour traffic volumes shown in Exhibit 6.

Analysis of Total Traffic Conditions

Intersection Capacity Analyses were conducted for the total traffic volumes using the CLV Methodology and the results are shown in Exhibit 7. Copies of the capacity worksheets are contained in Appendix B of this report. A review of Exhibit 7 shows that the study intersections

are projected to maintain acceptable Level of Service “D” or better conditions under existing geometrics. However, given the proposed access changes, it is recommended that a southbound left turn lane be provided along Falls Road at the site access intersection. With this improvement, acceptable Level of Service “C” or better conditions are projected to be maintained throughout the study area.

The results of Synchro/SimTraffic Simulation Analyses are also shown in Exhibit 7. These results show acceptable Level of Service “C” or better conditions for all movements using the Highway Capacity Manual (HCM) Capacity Procedures. In addition, these results show that with a southbound left turn lane providing at least 75 feet of storage at the site access, future projected left turn demand can be accommodated at this location.

With the recommend access improvement, the development of Bluestem can be accommodated by the surrounding area road system. The proposed redevelopment of the site has a minimal impact on surrounding area traffic conditions and acceptable Levels of Service can be maintained at the study intersections. Exhibit 8 provides the recommended geometrics at the site access location.

TRIP GENERATION FOR BLUESTEM

Trip Rates / Formulae	In/Out %
Multifamily Housing, Mid-Rise General Urban/Suburban (ITE-221, Units)	
Ln(Morning Trips) = 0.98 x Ln(Units) - 0.98	26/74
Ln(Evening Trips) = 0.96 x Ln(Units) - 0.63	61/39
General Office Building (ksf, ITE-710)	
Morning Trips = 1.16 x ksf	86/14
Evening Trips = 1.15 x ksf	16/84
Shopping Center (ksf, ITE-820)	
Morning Trips = 0.94 x ksf	62/38
Evening Trips = 3.81 x ksf	48/52

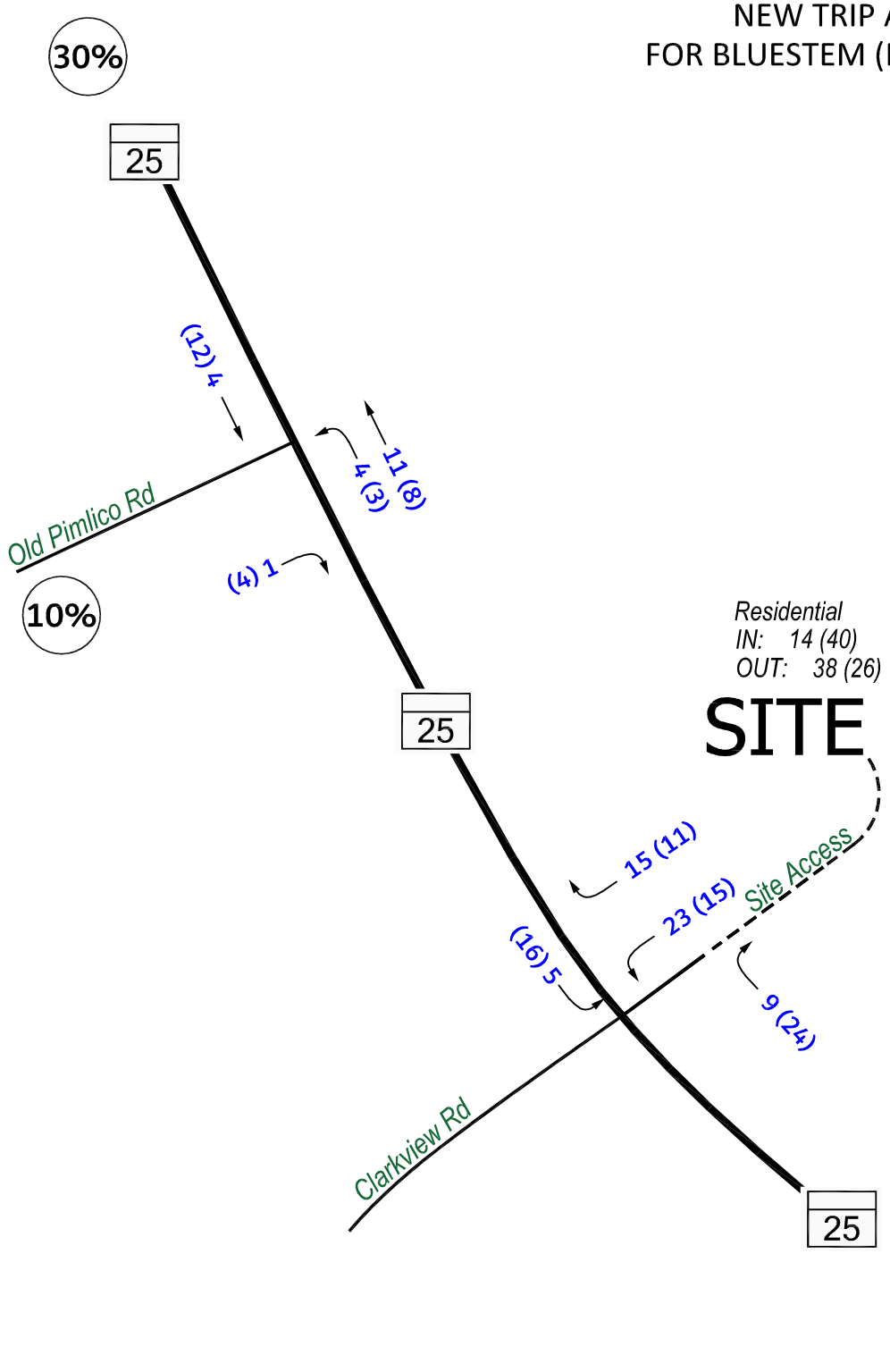
	MORNING PEAK HOUR			EVENING PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Multifamily Housing, Mid-Rise General Urban/Suburban (ITE-221, Units)						
152 units	14	38	52	40	26	66
Shopping Center (ksf, ITE-820)						
38,900 sq.ft.	23	14	37	71	77	148
Pass-by Trips(am 0%, pm 44%)	0	0	0	-31	-34	-65
New Trips	**23**	**14**	**37**	**40**	**43**	**83**
General Office Building (ksf, ITE-710)						
17,700 sq.ft.	18	3	21	3	17	20
Total Pass-by Trips	**0**	**0**	**0**	**31**	**34**	**65**
Total New Trips	**55**	**55**	**110**	**83**	**86**	**169**

NOTE: ITE Trip Generation 10th Edition

EXHIBIT 4
TRIP GENERATION
FOR BLUESTEM

Sli, 160614\rev4\trips 08-22-2018.xlsx-site trips, F08/27/18

EXHIBIT 5A
NEW TRIP ASSIGNMENT
FOR BLUESTEM (RESIDENTIAL)



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00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

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EXHIBIT 5B
NEW TRIP ASSIGNMENT FOR BLUESTEM (RETAIL & OFFICE)

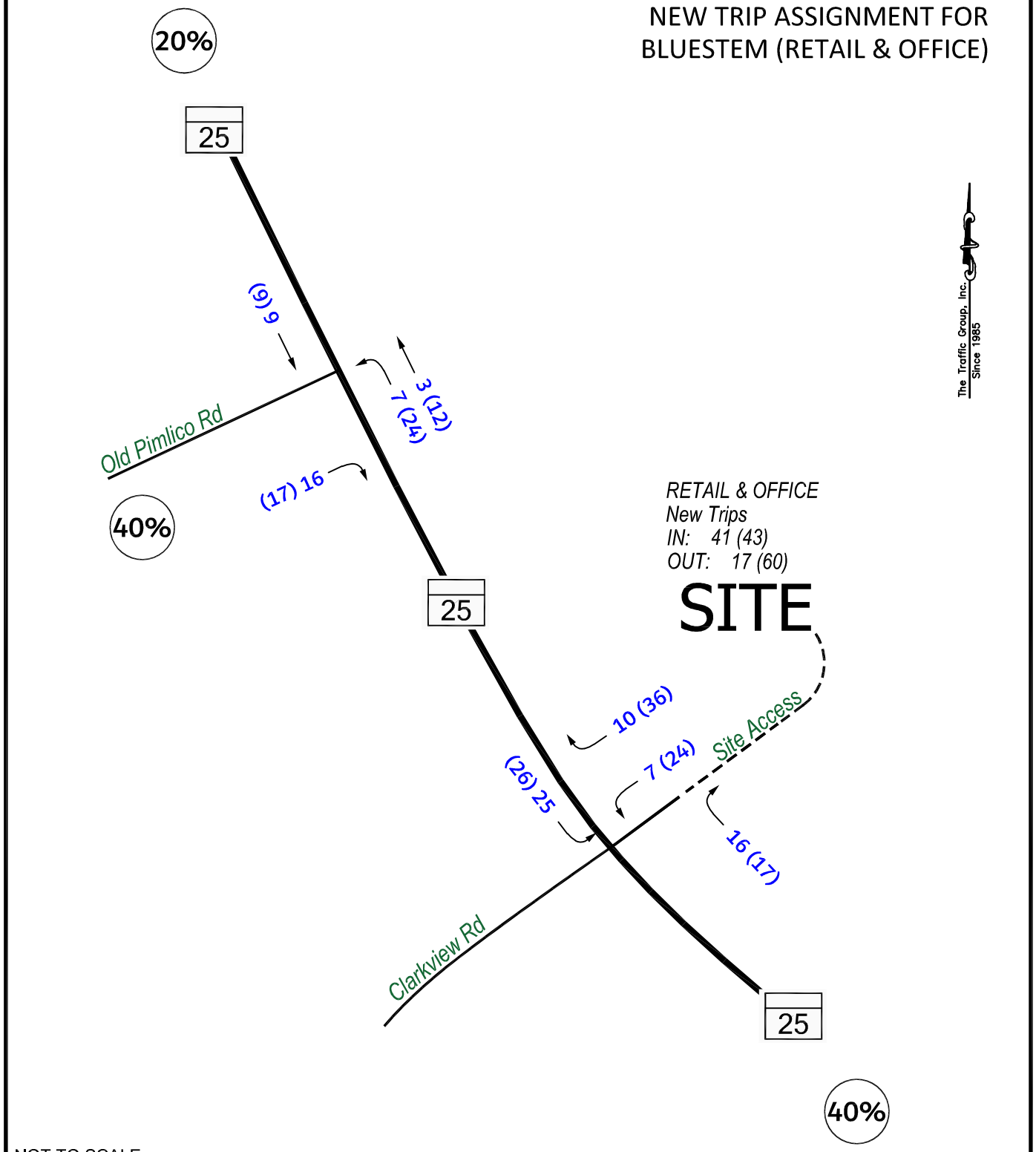

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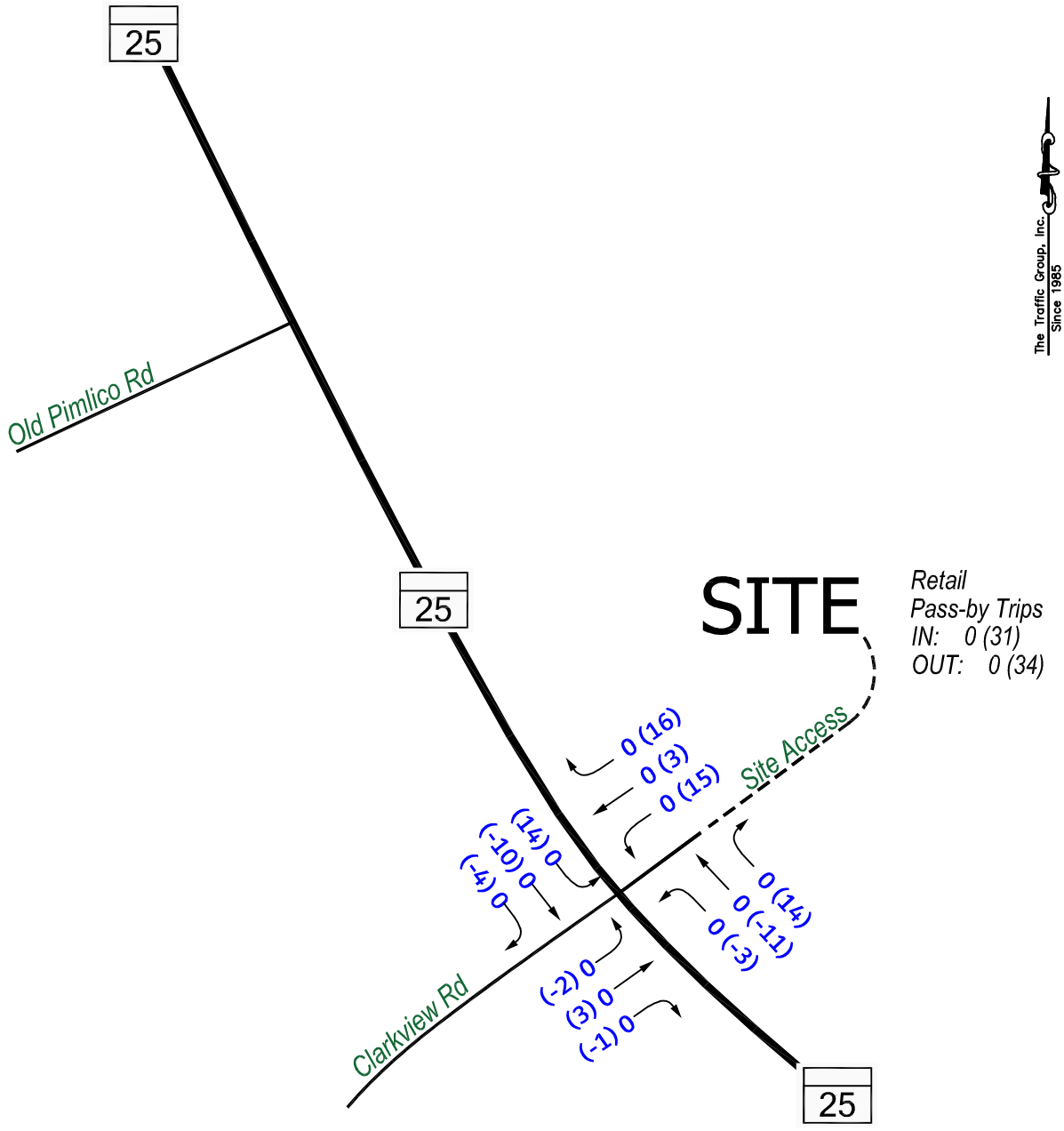
EXHIBIT 5C
PASS-BY TRIP ASSIGNMENT
FOR BLUESTEM (RETAIL)



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(00) - EVENING PEAK HOUR

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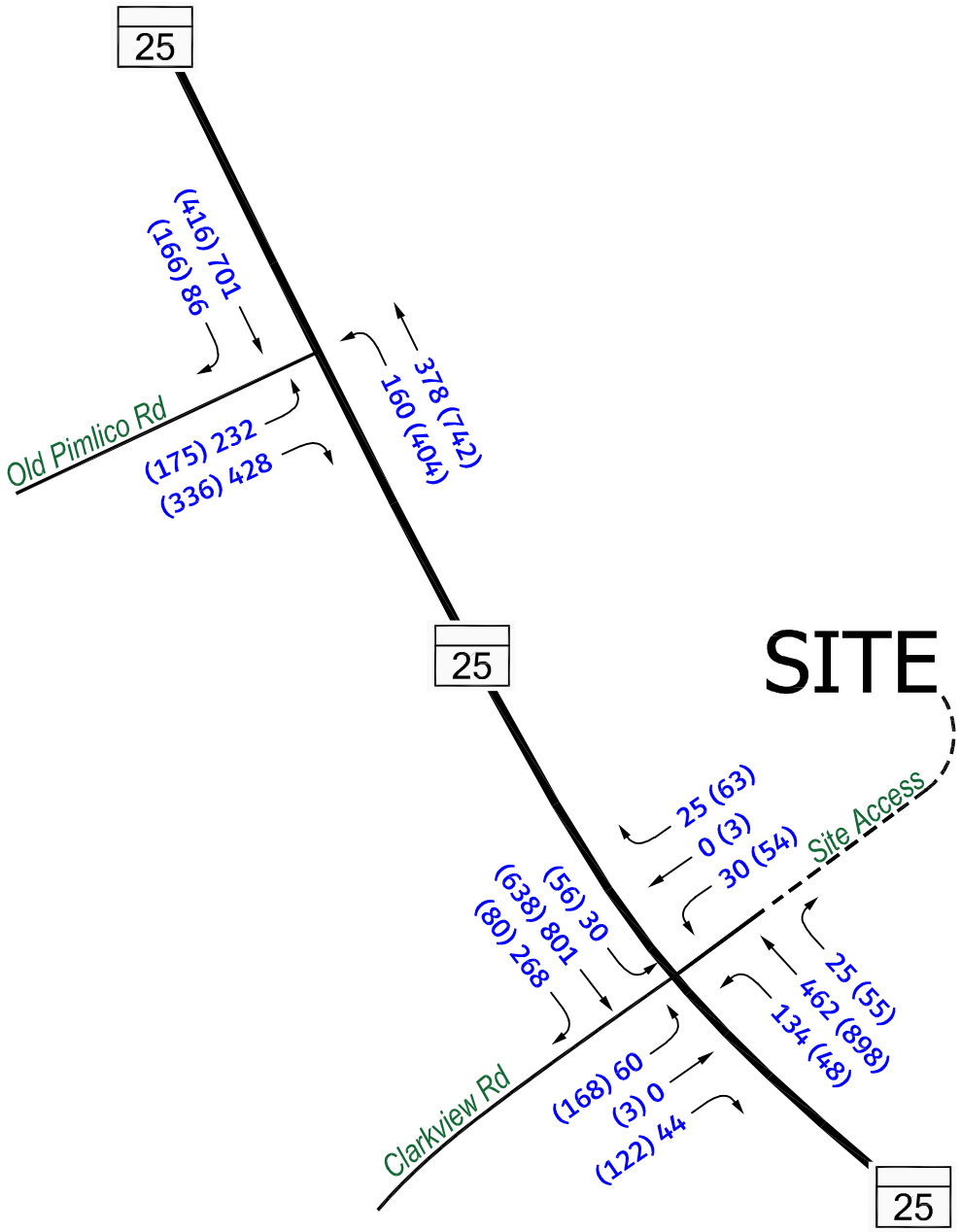
EXHIBIT 6
TOTAL PEAK HOUR
TRAFFIC VOLUMES



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00 - MORNING PEAK HOUR
(00) - EVENING PEAK HOUR

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CLV CAPACITY ANALYSIS

	EXISTING TRAFFIC	TOTAL TRAFFIC
MORNING PEAK HOUR TRAFFIC		
1. Falls Road & Old Pimlico Road	C/1185	C/1215
2. Falls Road & Clarkview Road/Site Access	C/1264	D/1381
with improvement	----	C/1296
EVENING PEAK HOUR TRAFFIC		
1. Falls Road & Old Pimlico Road	B/1113	C/1161
2. Falls Road & Clarkview Road/Site Access	B/1085	D/1302
with improvement	----	C/1239

SYNCHRO/SIMTRAFFIC ANALYSIS

		EXISTING TRAFFIC	TOTAL TRAFFIC
MORNING PEAK HOUR TRAFFIC		**LOS/Delay (sec)**	**LOS/Delay (sec)**
1. Falls Rd & Old Pimlico Rd (SynChro LOS/Delay)		C/27.2	C/29.4
NB left turn on Fall Rd (SimTraffic 95th Queue)	Storage: 130 ft	124 ft	128 ft
2. Falls Rd & Clarkview Rd/Site with imp (SynChro LOS/Dela		B/19.8	C/20.7
SB left turn on Fall Rd (SimTraffic 95th Queue)	Recommended Storage: 100 ft	n/a	63 ft
NB left turn on Fall Rd (SimTraffic 95th Queue)	Storage: 160 ft	144 ft	143 ft
EVENING PEAK HOUR TRAFFIC		**LOS/Delay (sec)**	**LOS/Delay (sec)**
1. Falls Rd & Old Pimlico Rd (SynChro LOS/Delay)		B/15.8	B/17.6
NB left turn on Fall Rd (SimTraffic 95th Queue)	Storage: 130 ft	184 ft	184 ft
2. Falls Rd & Clarkview Rd/Site with imp (SynChro LOS/Dela		B/14.9	B/19.7
SB left turn on Fall Rd (SimTraffic 95th Queue)	Recommended Storage: 100 ft	n/a	81 ft
NB left turn on Fall Rd (SimTraffic 95th Queue)	Storage: 160 ft	47 ft	49 ft

NOTE:

1. Total Traffic is derived from combining Existing Traffic and traffic to be generated by site.

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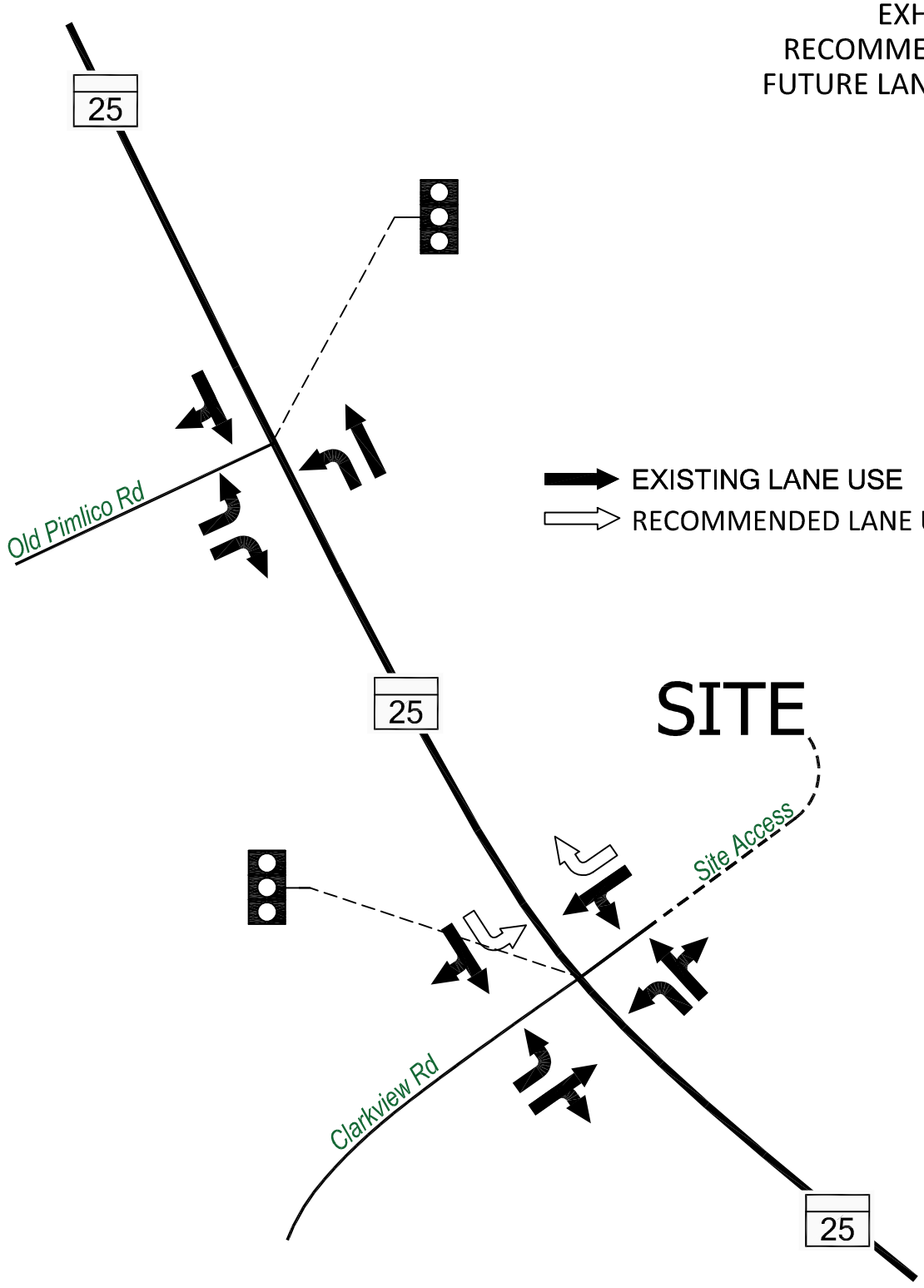
EXHIBIT 7
RESULTS OF INTERSECTION
CAPACITY ANALYSIS (CLV)

EXHIBIT 8
RECOMMENDED
FUTURE LANE USE



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RESULTS, RECOMMENDATIONS, AND CONCLUSIONS

Study Purpose

The Traffic Group, Inc. has prepared this Traffic Impact Analysis to identify the impact of the proposed development of Bluestem on surrounding area traffic conditions. The subject property is located along the east side of Falls Road (MD 25), south of Old Pimlico Road in Baltimore County, Maryland. The site is proposed to be developed as a mixed-use community containing 38,900 sq ft of retail space, 17,700 sq ft of office space, and 152 residential apartment units. All access to the subject property is proposed at a single location along Falls Road at the existing signalized intersection with Clarkview Road. The site access would form the fourth leg of this signalized intersection.

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Based upon the data and analyses presented in this study, the proposed Bluestem can be adequately accommodated by the surrounding area road system. The proposed development has a minimal impact on surrounding area traffic conditions and with a recommended southbound left turn lane along Falls Road at the site access, efficient traffic operations will be maintained at that signalized location.

APPENDIX A

Correspondence, Traffic Counts and Aerial Photos

A SERVICE DISABLED
VETERAN-OWNED
SMALL BUSINESS

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FIELD LOCATIONS

Arkansas
Arizona
Georgia
Maryland
New York
North Carolina
Ohio
South Carolina
Texas
Utah
Virginia
Washington State
West Virginia

September 14, 2018

Ms. Wendy Wolcott, P.L.A.
Metropolitan District Engineer
MDOT-SHA District #4-Baltimore & Harford Counties
320 West Warren Road
Hunt Valley, Maryland 21030
Attn: Mr. Richard Zeller

RE: Bluestem
TRAFFIC IMPACT ANALYSIS
Baltimore County, Maryland
SHA Tracking No.: 17APBA002XX
Our Job No.: 2016-0614

Dear Ms. Wolcott:

The Traffic Group, Inc. is in receipt of your letter dated July 18, 2018 regarding the SHA review of the Traffic Impact Study for Bluestem in Baltimore County, Maryland. This letter has been prepared to provide a point-by-point to the SHA comments. In addition, the Traffic Impact Study has been revised in accordance with the SHA comments and responses below. Each comment is repeated below along with our response. A copy of the SHA Comment Letter is attached to this letter.

Comment No. 1 – Proposed signal modifications, including signal type and phasing should be clearly stated.

Response No. 1 – As noted in Comment No. 4, an evaluation was conducted of appropriate left turn phasing based upon SHA guidelines. An exhibit detailing the results of that analysis are attached to this letter. Considering that the existing northbound left turn movement has exclusive/permissive phasing and the results of the left turn phasing analysis for the southbound left turn, we are suggesting exclusive/permissive phasing for this movement. We are also recommending that the side street operate concurrently and have also included auto turn exhibits for the concurrent left turn movements as requested in Comment No. 2. SHA will make the final determination regarding signal phasing once the design request has been submitted.

Comment No. 2 – A concept plan with auto turn analysis should be submitted for the proposed current left turn movements.

Response No. 2 - Auto turn exhibits for concurrent left turn movements for both passenger cars and SU-30 vehicles are attached to this letter.

Comment No. 3 – A design request should be submitted for the proposed geometric improvements and signal modifications at the intersection of MD 25 at Clarkview Road/Site Access, after the TIS is approved.

Response No. 3 – This comment is noted.

Comment No. 4 – Consultant will need to submit additional information based on MDOT SHA left turn phase guidelines to determine feasibility of E/P phasing along the southbound MD 25 approach.

Response No. 4 – As noted in the response to Comment No. 1, an analysis of left turn phasing using SHA guidelines is attached to this letter. Considering that the northbound left turn is exclusive/permissive, we are recommending the same type of phasing for the southbound left turn.

Comment No. 5 – Saturday peak hour analysis should be considered since the proposed site includes retail space.

Response No. 5 – Saturday peak hour analysis was discussed during the Scoping Meeting and SHA indicated that it would not be needed for this study. At the Scoping Meeting, it was discussed that Falls Road is not a commercial retail corridor and Saturday traffic volumes would not be as high as weekday traffic volumes. While there is some commercial retail space in the proposed development, it is relatively minor. A graph obtained from SHA showing percent of weekly traffic on various types of roads is also attached to this letter. This graph shows that typical roads such as Falls Road have higher traffic volumes on Wednesday during the time our counts were taken than on Saturdays. Furthermore, traffic volumes would peak in a more confined time period during the weekday morning and evening rush hours versus Saturday. Given this information and the fact that this was discussed during the Scoping Meeting, we don't believe Saturday traffic analyses are necessary for this development.

Comment No. 6 – Presently, there is site access that is slightly offset from the intersection which also provides access to Princeton Sports. The existing access points should be closed, and new access provided directly across from Clarkview. An internal connection to Princeton Sports should be maintained. Please provide a site plan showing proposed access point and lane configurations.

Response No. 6 – The subject site has an existing access to Falls Road which is located within the signalized intersection of Falls Road with Clarkview Road. However, the site access is not controlled by the signal. Princeton Sports has a connection from their parking lot to the access located on the subject property. However, the access is located solely on the subject property and there is no access easement for the Princeton Sports site. The Princeton Sports site has access to Racquet Road which in turn, provides access to Falls Road.

A review of the existing peak hour traffic volumes contained in the Traffic Impact Study, shows the offset access located on the subject property has minimal traffic volumes. A total of four vehicles entered the site during the morning peak hour and two vehicles exited. During the weekday evening peak hour, a total of eight vehicles entered and four exited. Given the fact that the existing access is offset from Clarkview Road, located within the signalized intersection and uncontrolled, the proposed development

of the site greatly improves the access by aligning the site access with Clarkview Road and proposing signal modifications to control the access. A connection to the Princeton Sports parking lot would need to be made within 25 feet of Falls Road along the site access given the existing location of the building and parking spaces. This connection would be too close to the signalized intersection and create safety issues for both entering and exiting motorists. With access to Racquet Road, there is no need to provide a connection between the subject property and the Princeton Sports site.

Comment No. 7 – Consultant should consider lengthening the MD 25 northbound left turn lane at Old Pimlico Road to accommodate 95 percent queuing during the AM and PM peak periods.

Response No. 7 – The potential of lengthening the northbound MD 25 left turn lane at Old Pimlico Road was researched. Unfortunately, there is no right-of-way to lengthen the existing left turn lane. Furthermore, this is an off-site intersection and the proposed development has a negligible impact on 95th percentile queues for the northbound left turn movement. The SimTraffic analysis shows the site increases the 95th percentile queue by four feet in the morning peak hour and does not impact the 95th percentile queue during the weekday evening peak hour.

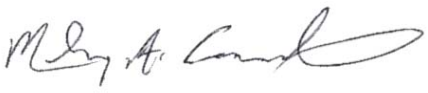
Comment No. 8 – Please note that Baltimore's revised September 2016 Western County Pedestrian and Bicycle Access Plan includes proposed bicycle improvements along MD 25 from the City/County Line to Ruxton Road, affecting facilities analyzed in this TIS. All roadway improvements to MDOT SHA facilities should provide for and maintain bicycle facilities, as well as, full ADA compliant pedestrian facilities.

Response No. 8 – This comment is noted.

Based upon the SHA comments and responses noted in this letter, the Traffic Impact Study for Bluestem has been updated. The update also includes minor revisions based upon slight changes in the Site Development Plan. The revised Traffic Impact Study does not show any significant changes in results from the previous study. The results show the surrounding area road system can accommodate the proposed development.

If you have any questions or need additional information, please contact me.

Sincerely,



Mickey A. Cornelius, P.E., PTOE
Senior Vice President

MAC:mlj
(F:\2016\2016-0614_Bluestem\DOCS\CORRESP\ANALYST\Ltr_Comment Response Ltr_Wolcott.docx)

SHA PROCEDURE FOR DETERMINING TYPE OF LEFT-TURN PHASING

(for Left SB MD 25 at Site access)

1. Left Turn Volumes	56	vph	
2. Cycle Length	120	seconds	
3. Left turn demand per cycle	2		
4. Is left turn demand > 2 per cycle	No		Permissive LT Phasing Recommended.
5. How many opposing lanes	1		
6. Opposing thru and right-turn volumes	953	vph	
7. Is volume cross product > 100,000	No		
8. Is the opposing speed > 45 mph	Yes		Consider Exclusive LT Phasing.
9. Is sight distance restricted	No		
10. Is there a severe left turn accidents problem which could be corrected by exclusive phasing	n/a		

Recommended Left-turn Phasing: Exclusive/Permissive

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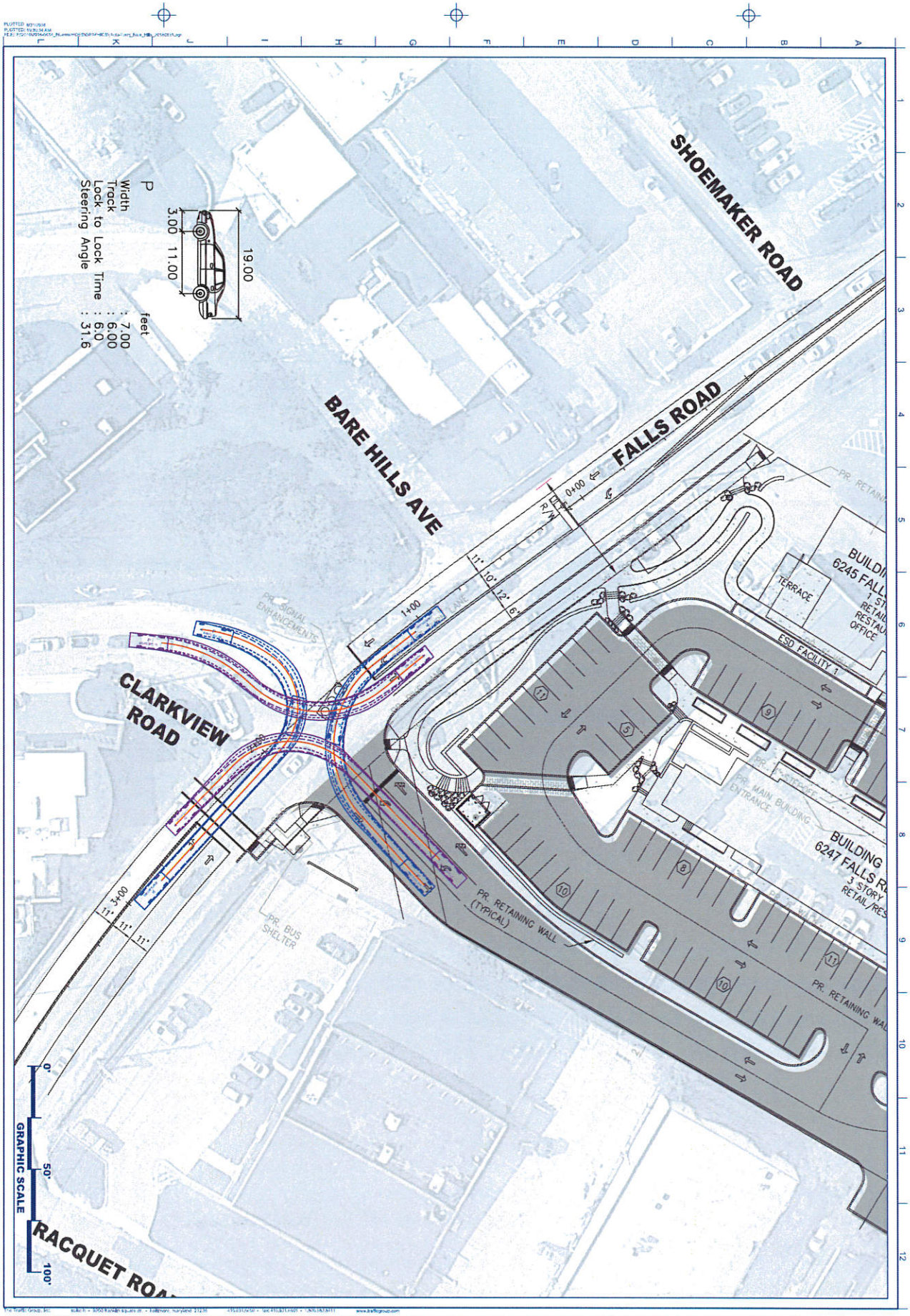
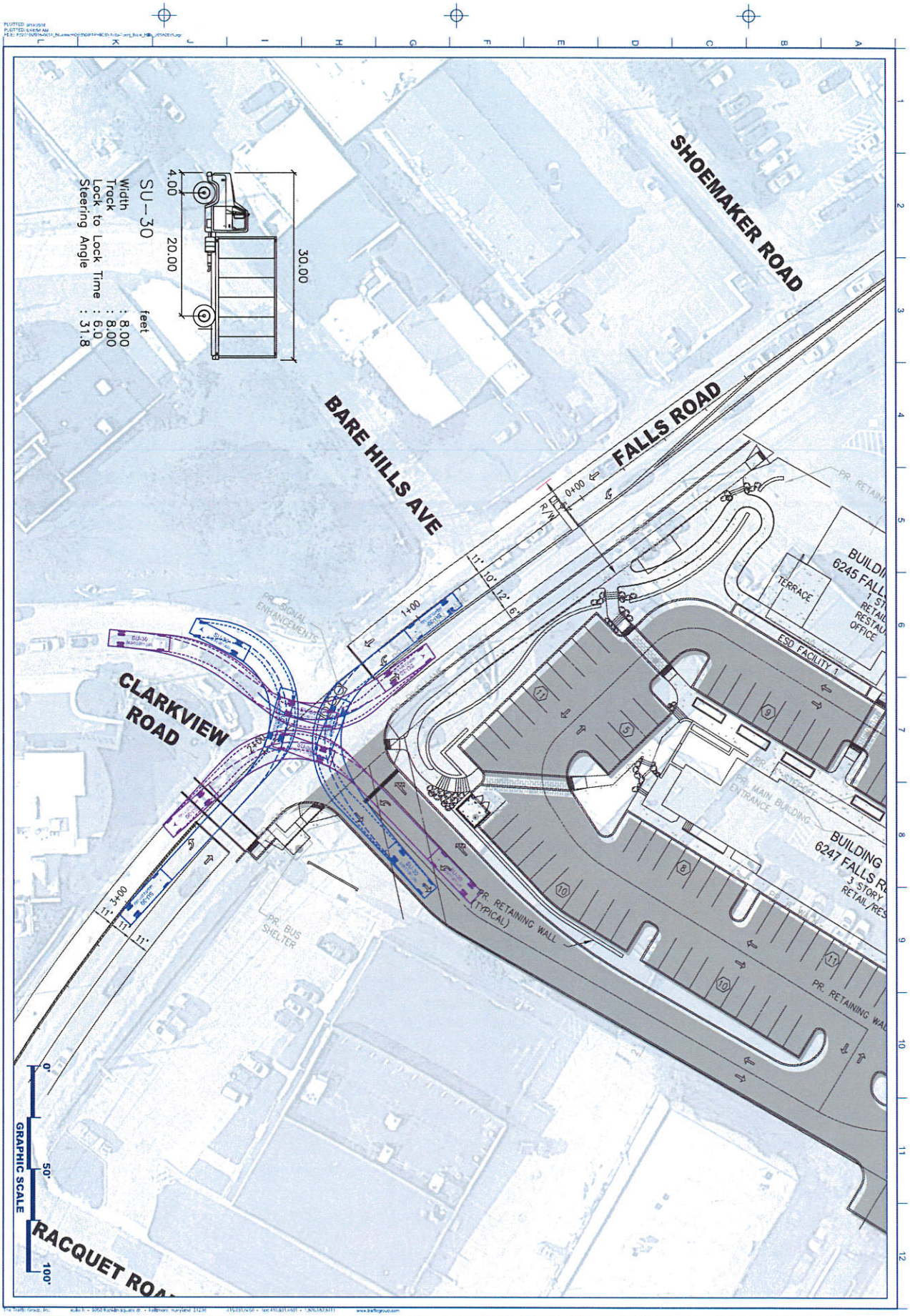
TYPE OF LEFT-TURN PHASING DETERMINATION (SHA PROCEDURE)



Bare Hills

Auto-Turn



Bare Hills

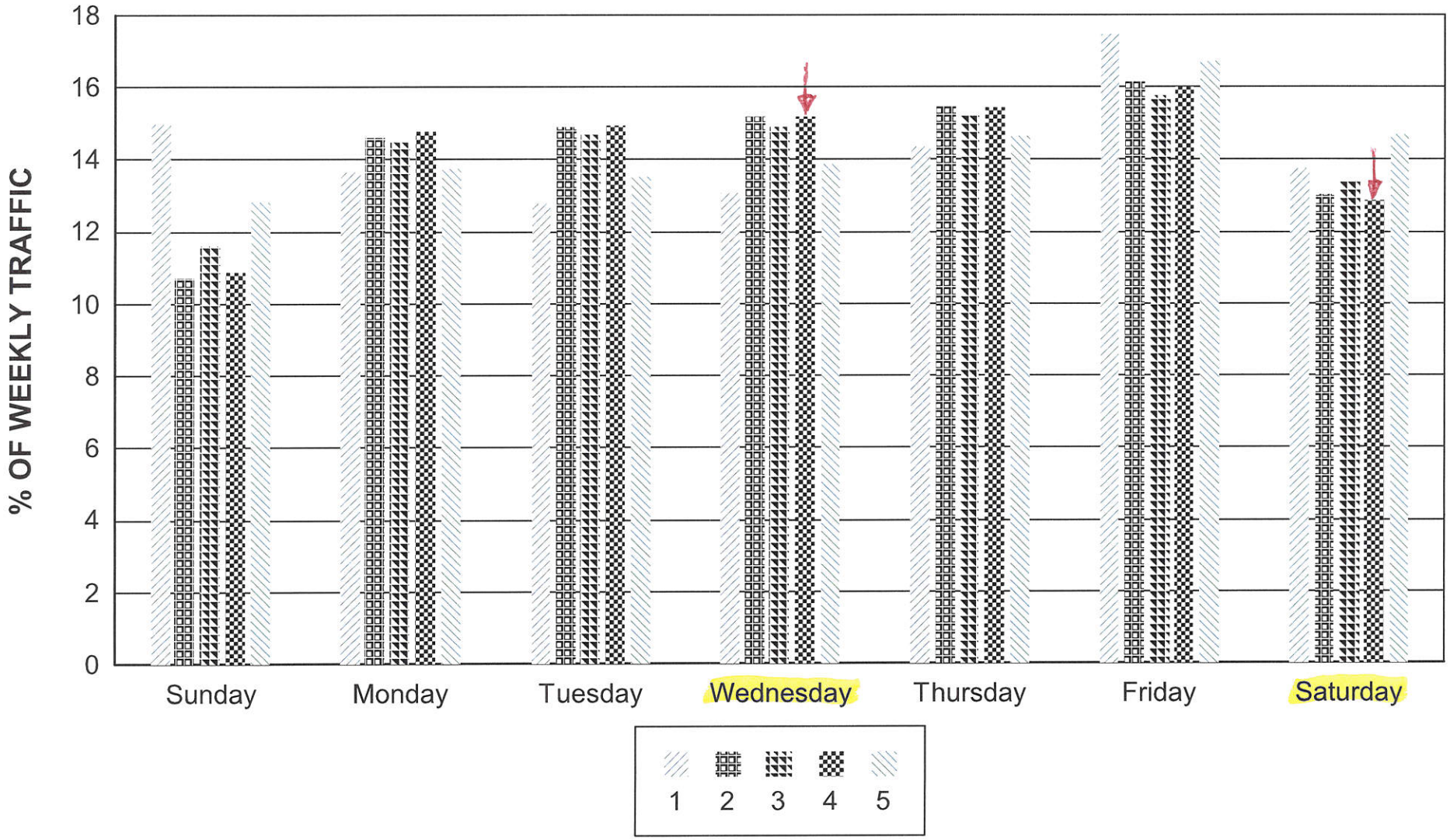
Auto-Turn

NORTH

Maryland Department of Transportation
State Highway Administration
Data Services Engineering Division

Daily Variation By Group Weekly Traffic

Year: 2016



1 Rural Interstate
2 Rural Other
3 Urban Interstate
4 Urban Other
5 Summer Seasonal

July 18, 2018

Mr. Glenn Cook
Senior Vice President
The Traffic Group
9900 Franklin Square Drive, Suite H
Baltimore MD 21236

Dear Mr. Cook:

Thank you for the opportunity to review the Traffic Impact Study (TIS) for the Bluestem Development located at MD 25 (Falls Road) and Clarkview Road in Baltimore County. The Maryland Department of Transportation State Highway Administration (MDOT SHA) has reviewed the submission for the project listed below and we are pleased to respond. Detailed comments are attached.

Bluestem Mixed Use Community
MD 25 at Clarkview Road/Site Access
MDOT SHA Tracking No: 17APBA002XX
Traffic Impact Study Dated May 2018
Baltimore County

Based on the information provided in the traffic impact study, MDOT SHA will require the applicant to submit four hard copies of a point-by-point response to the attached comments and one electronic revised traffic impact study for further review to the attached comments to Mr. Richard Zeller at 320 West Warren Road, Hunt Valley MD 21030. Please reference the MDOT SHA tracking number on any future submissions. Please keep in mind that you can view the reviewer and project status via MDOT SHA Access Management Division web page at http://www.roads.maryland.gov/pages/amd.aspx.

If you have any questions, or require additional information, please contact Mr. Zeller at 410-229-2332 or via email at rzeller@sha.state.md.us.

Sincerely,

Wendy Wolcott, P.L.A.
Metropolitan District Engineer
MDOT - State Highway Administration
District 4 - Baltimore and Harford Counties

Attachment

cc: Mr. Jan M. Cook, Development Plans Review, Baltimore County
Mr. Vishnu Desai, Development Plans Review, Baltimore County
Ms. Rola Daher, Consultant for MDOT, TFAD, MDOT SHA
Ms. Sarah Gary, Consultant for MDOT, TFAD, MDOT SHA
Ms. Kandese Holford, Regional Planner, RIPD, MDOT SHA
Ms. Erin Kuhn, Assistant District Engineer for Traffic, District Four, MDOT SHA
Ms. Tina Saxon, Administrative Assistant, OPPE RIPD, MDOT SHA
Ms. Lisa Shemer, Division Chief, OPPE, TFAD, MDOT SHA
Mr. Oscar Yen, Transportation Engineer, OOTS, MDOT SHA
Mr. Rich Zeller, Transportation Engineer, District Four Access Management, MDOT SHA
file/Hines/BH33937

Bluestem Mixed Use Community
MD 25 at Clarkview Road/Site Access
MDOT SHA Tracking No: 17APBA002XX
Traffic Impact Study Dated May 2018
Baltimore County

The Traffic Impact Study for the Bluestem Mixed Use Community report findings and MDOT SHA comments and conclusions:

- The planned future development includes 38,000 Sq. Ft. of retail space, 12,000 Sq. Ft. of office space, and 145 residential apartment units via full movement access at the signalized intersection of MD 25 (Falls Road) at Clarkview Road. The site access would form the fourth leg of this intersection.
- The study analyzed the following intersections under existing, background, and future conditions:
    - MD 25 and Old Pimlico Road
    - MD 25 and Clarkview Road/Site Access

The results of the traffic impact study show that acceptable level of service "C" or better are projected to be maintained throughout the study area with the proposed improvements. It is recommended that under the subject development a southbound left turn lane with 75 ft. of storage be constructed at the site access.

MDOT SHA comments and conclusions:

- Proposed signal modifications, including signal type and phasing should be clearly stated.
- A concept plan with auto turn analysis should be submitted for the proposed concurrent left turn movements.
- A design request should be submitted for the proposed geometric improvements and signal modifications at the intersection of MD 25 at Clarkview Road/Site Access, after the TIS is approved.
- Consultant will need to submit additional information based on MDOT SHA left turn phase guidelines to determine feasibility of E/P phasing along the southbound MD 25 approach.
- Saturday peak hour analysis should be considered since the proposed site includes retail space.
- Presently, there is site access that is slightly offset from the intersection which also provides access to Princeton Sports. The existing access points should be closed and new access provided directly across from Clarkview. An internal connection to Princeton Sports should be maintained. Please provide a site plan showing proposed access point and lane configurations.
- Consultant should consider lengthening the MD 25 northbound left turn lane at Old Pimlico Road to accommodate 95 percent queueing during the AM and PM peak periods.
- Please note that Baltimore's revised September 2016 Western County Pedestrian and Bicycle Access Plan includes proposed bicycle improvements along MD 25 from the City/County Line to Ruxton Road, affecting facilities analyzed in this TIS. All roadway improvements to MDOT SHA facilities should provide for and maintain bicycle facilities, as well as, full ADA compliant pedestrian facilities.

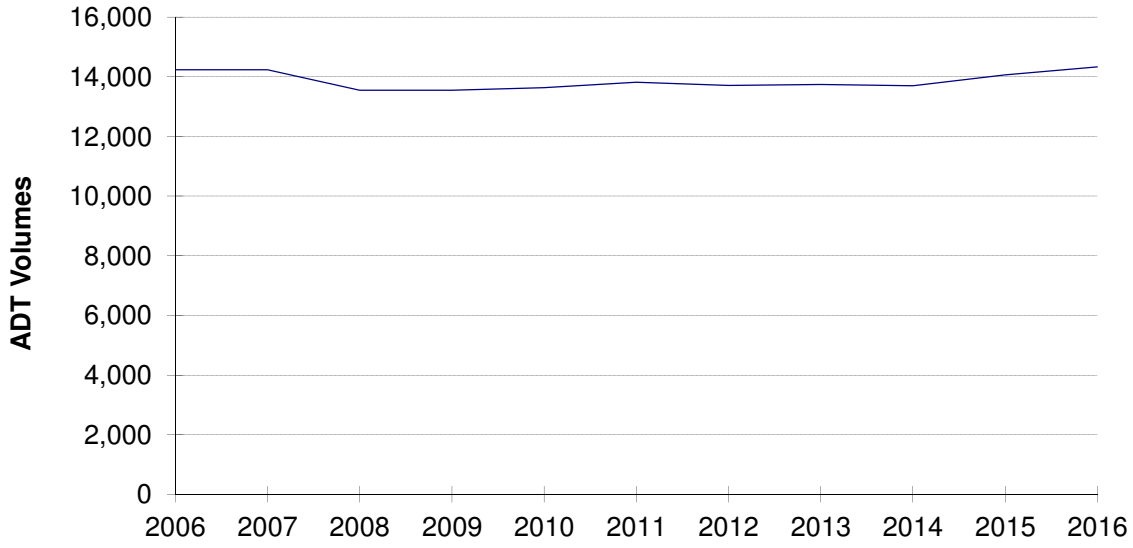
TRAFFIC GROWTH PROJECTION

LOCATION: MD 25 South of Clarkview Road

REPORT DATE: 11-Dec-17

AVERAGE GROWTH:	0.09%
MATHEMATICAL GROWTH:	0.07%

Year	ADT Volume	Vol. increase	% increase	Average %
2006	14,231			
2007	14,232	1	0.01%	0.01%
2008	13,550	-682	-4.79%	-2.39%
2009	13,551	1	0.01%	-1.59%
2010	13,632	81	0.60%	-1.04%
2011	13,820	188	1.38%	-0.56%
2012	13,711	-109	-0.79%	-0.60%
2013	13,742	31	0.23%	-0.48%
2014	13,703	-39	-0.28%	-0.46%
2015	14,064	361	2.63%	-0.11%
2016	14,335	271	1.93%	0.09%



TRAFFIC GROWTH ALONG
MD NEAR SITE ACCESS

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Counted by: VCU

Intersection of: Falls Road | Date: November 29, 2017 | Wednesday

and: Old Pimlico Road | Weather: Cool, Clear

Location: Baltimore County, Maryland | Entered by: CK | Star Rating: 5

TIME	TRAFFIC FROM NORTH on: Falls Road					TRAFFIC FROM SOUTH on: Falls Road					TRAFFIC FROM EAST on:					TRAFFIC FROM WEST on: Old Pimlico Road					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	15	129	0	0	144	0	42	19	0	61	0	0	0	0	0	70	0	21	0	91	296
7:15 - 7:30	9	177	0	0	186	0	76	24	0	100	0	0	0	0	0	113	0	41	0	154	440
7:30 - 7:45	20	193	0	0	213	0	89	30	0	119	0	0	0	0	0	94	0	60	0	154	486
7:45 - 8:00	16	170	0	0	186	0	102	42	0	144	0	0	0	0	0	95	0	56	0	151	481
8:00 - 8:15	28	152	0	0	180	0	99	41	0	140	0	0	0	0	0	105	0	54	0	159	479
8:15 - 8:30	22	173	0	0	195	0	74	36	0	110	0	0	0	0	0	117	0	62	0	179	484
8:30 - 8:45	10	161	0	0	171	0	68	32	0	100	0	0	0	0	0	114	0	66	0	180	451
8:45 - 9:00	22	168	0	0	190	0	68	33	0	101	0	0	0	0	0	100	0	55	0	155	446
2 Hr Totals	142	1323	0	0	1465	0	618	257	0	875	0	0	0	0	0	808	0	415	0	1223	3563
1 Hr Totals																					
7:00 - 8:00	60	669	0	0	729	0	309	115	0	424	0	0	0	0	0	372	0	178	0	550	1703
7:15 - 8:15	73	692	0	0	765	0	366	137	0	503	0	0	0	0	0	407	0	211	0	618	1886
7:30 - 8:30	86	688	0	0	774	0	364	149	0	513	0	0	0	0	0	411	0	232	0	643	1930
7:45 - 8:45	76	656	0	0	732	0	343	151	0	494	0	0	0	0	0	431	0	238	0	669	1895
8:00 - 9:00	82	654	0	0	736	0	309	142	0	451	0	0	0	0	0	436	0	237	0	673	1860
PEAK HOUR																					
7:30 - 8:30	86	688	0	0	774	0	364	149	0	513	0	0	0	0	0	411	0	232	0	643	1930
PM																					
4:00 - 4:15	36	84	0	0	120	0	194	93	0	287	0	0	0	0	0	94	0	39	0	133	540
4:15 - 4:30	39	116	0	0	155	0	195	103	0	298	0	0	0	0	0	81	0	42	0	123	576
4:30 - 4:45	43	98	0	0	141	0	171	100	0	271	0	0	0	0	0	73	0	50	0	123	535
4:45 - 5:00	48	97	0	0	145	0	162	81	0	243	0	0	0	0	0	67	0	44	0	111	499
5:00 - 5:15	66	93	0	0	159	0	163	79	0	242	0	0	0	0	0	80	0	38	0	118	519
5:15 - 5:30	71	106	0	0	177	0	176	81	0	257	0	0	0	0	0	56	0	28	0	84	518
5:30 - 5:45	56	101	0	0	157	0	173	104	0	277	0	0	0	0	0	61	0	25	0	86	520
5:45 - 6:00	57	99	0	0	156	0	175	111	0	286	0	0	0	0	0	64	0	18	0	82	524
2 Hr Totals	416	794	0	0	1210	0	1409	752	0	2161	0	0	0	0	0	576	0	284	0	860	4231
1 Hr Totals																					
4:00 - 5:00	166	395	0	0	561	0	722	377	0	1099	0	0	0	0	0	315	0	175	0	490	2150
4:15 - 5:15	196	404	0	0	600	0	691	363	0	1054	0	0	0	0	0	301	0	174	0	475	2129
4:30 - 5:30	228	394	0	0	622	0	672	341	0	1013	0	0	0	0	0	276	0	160	0	436	2071
4:45 - 5:45	241	397	0	0	638	0	674	345	0	1019	0	0	0	0	0	264	0	135	0	399	2056
5:00 - 6:00	250	399	0	0	649	0	687	375	0	1062	0	0	0	0	0	261	0	109	0	370	2081
PEAK HOUR																					
4:00 - 5:00	166	395	0	0	561	0	722	377	0	1099	0	0	0	0	0	315	0	175	0	490	2150

Falls Road & Old Pimlico Road

TOTALS TURNING MOVEMENT COUNT - SUMMARY

Counted by: VCU

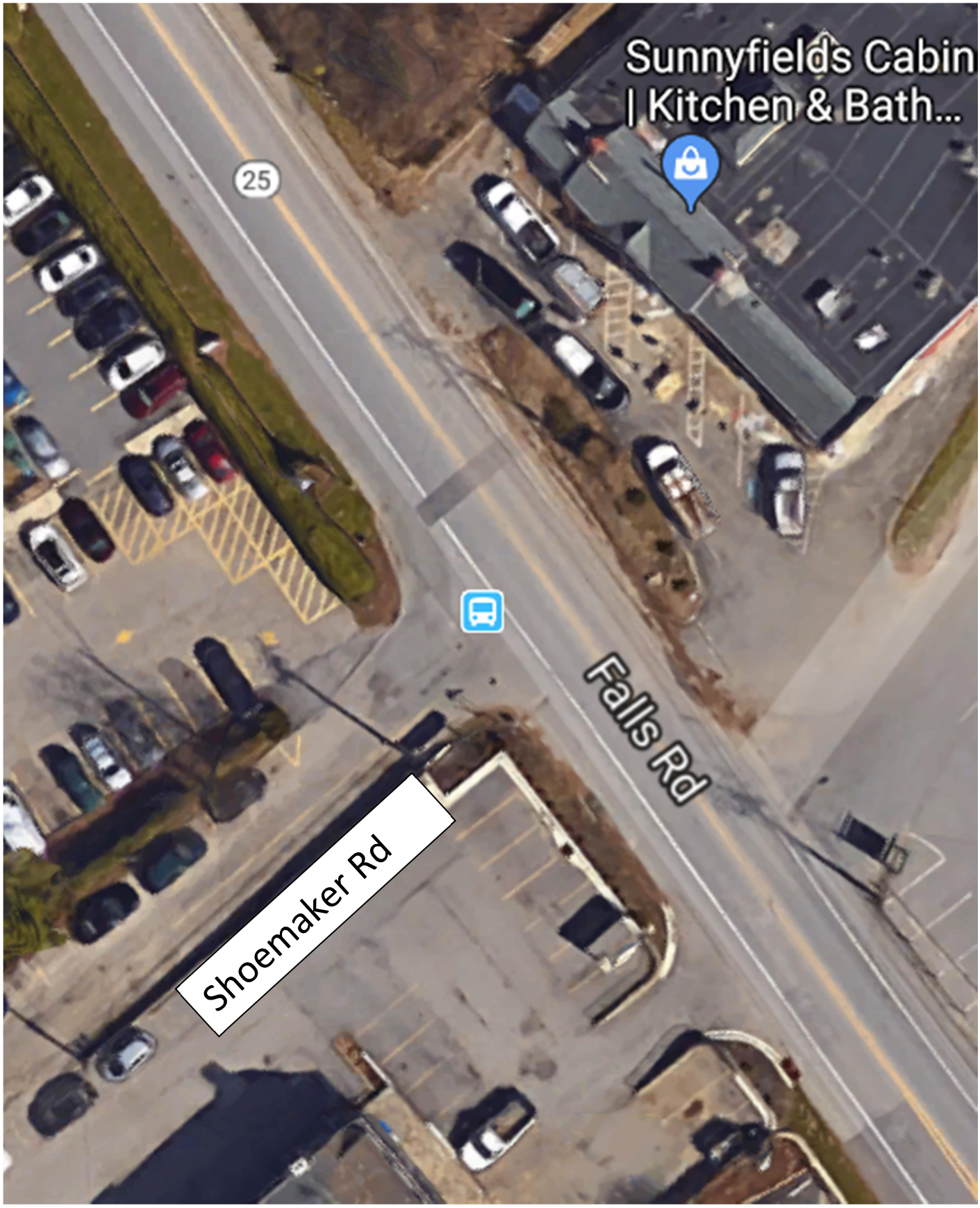
Intersection of: Falls Road | Date: November 29, 2017 | Wednesday

and: ShoemakerRd | Weather: Cool, Clear

Location: Baltimore County, Maryland | Entered by: CK | Star Rating: 5

TIME	TRAFFIC FROM NORTH on: Falls Road					TRAFFIC FROM SOUTH on: Falls Road					TRAFFIC FROM EAST on:					TRAFFIC FROM WEST on: ShoemakerRd					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	2	178	0	0	180	0	57	5	0	62	0	0	0	0	0	5	0	8	0	13	255
7:15 - 7:30	5	275	0	0	280	0	100	5	0	105	0	0	0	0	0	1	0	4	0	5	390
7:30 - 7:45	8	269	0	0	277	0	109	3	0	112	0	0	0	0	0	5	0	4	0	9	398
7:45 - 8:00	7	249	0	0	256	0	148	4	0	152	0	0	0	0	0	6	0	0	0	6	414
8:00 - 8:15	1	257	0	0	258	0	132	5	0	137	0	0	0	0	0	1	0	2	0	3	398
8:15 - 8:30	7	263	0	0	270	0	114	4	0	118	0	0	0	0	0	1	0	3	0	4	392
8:30 - 8:45	6	265	0	0	271	0	103	4	0	107	0	0	0	0	0	2	0	3	0	5	383
8:45 - 9:00	13	260	0	0	273	0	88	3	0	91	0	0	0	0	0	3	0	4	0	7	371
2 Hr Totals	49	2016	0	0	2065	0	851	33	0	884	0	0	0	0	0	24	0	28	0	52	3001
1 Hr Totals																					
7:00 - 8:00	22	971	0	0	993	0	414	17	0	431	0	0	0	0	0	17	0	16	0	33	1457
7:15 - 8:15	21	1050	0	0	1071	0	489	17	0	506	0	0	0	0	0	13	0	10	0	23	1600
7:30 - 8:30	23	1038	0	0	1061	0	503	16	0	519	0	0	0	0	0	13	0	9	0	22	1602
7:45 - 8:45	21	1034	0	0	1055	0	497	17	0	514	0	0	0	0	0	10	0	8	0	18	1587
8:00 - 9:00	27	1045	0	0	1072	0	437	16	0	453	0	0	0	0	0	7	0	12	0	19	1544
PEAK HOUR																					
7:30 - 8:30	23	1038	0	0	1061	0	503	16	0	519	0	0	0	0	0	13	0	9	0	22	1602
PM																					
4:00 - 4:15	5	176	0	0	181	0	289	4	0	293	0	0	0	0	0	5	0	8	0	13	487
4:15 - 4:30	3	194	0	0	197	0	284	4	0	288	0	0	0	0	0	6	0	7	0	13	498
4:30 - 4:45	9	167	0	0	176	0	258	6	0	264	0	0	0	0	0	6	0	12	0	18	458
4:45 - 5:00	7	155	0	0	162	0	241	4	0	245	0	0	0	0	0	5	0	7	0	12	419
5:00 - 5:15	6	165	0	0	171	0	230	0	0	230	0	0	0	0	0	6	0	10	0	16	417
5:15 - 5:30	6	154	0	0	160	0	250	2	0	252	0	0	0	0	0	10	0	7	0	17	429
5:30 - 5:45	4	158	0	0	162	0	275	2	0	277	0	0	0	0	0	7	0	7	0	14	453
5:45 - 6:00	2	159	0	0	161	0	274	1	0	275	0	0	0	0	0	8	0	10	0	18	454
2 Hr Totals	42	1328	0	0	1370	0	2101	23	0	2124	0	0	0	0	0	53	0	68	0	121	3615
1 Hr Totals																					
4:00 - 5:00	24	692	0	0	716	0	1072	18	0	1090	0	0	0	0	0	22	0	34	0	56	1862
4:15 - 5:15	25	681	0	0	706	0	1013	14	0	1027	0	0	0	0	0	23	0	36	0	59	1792
4:30 - 5:30	28	641	0	0	669	0	979	12	0	991	0	0	0	0	0	27	0	36	0	63	1723
4:45 - 5:45	23	632	0	0	655	0	996	8	0	1004	0	0	0	0	0	28	0	31	0	59	1718
5:00 - 6:00	18	636	0	0	654	0	1029	5	0	1034	0	0	0	0	0	31	0	34	0	65	1753
PEAK HOUR																					
4:00 - 5:00	24	692	0	0	716	0	1072	18	0	1090	0	0	0	0	0	22	0	34	0	56	1862

Falls Road & Shoemaker Rd



TOTALS TURNING MOVEMENT COUNT - SUMMARY

Counted by: VCU

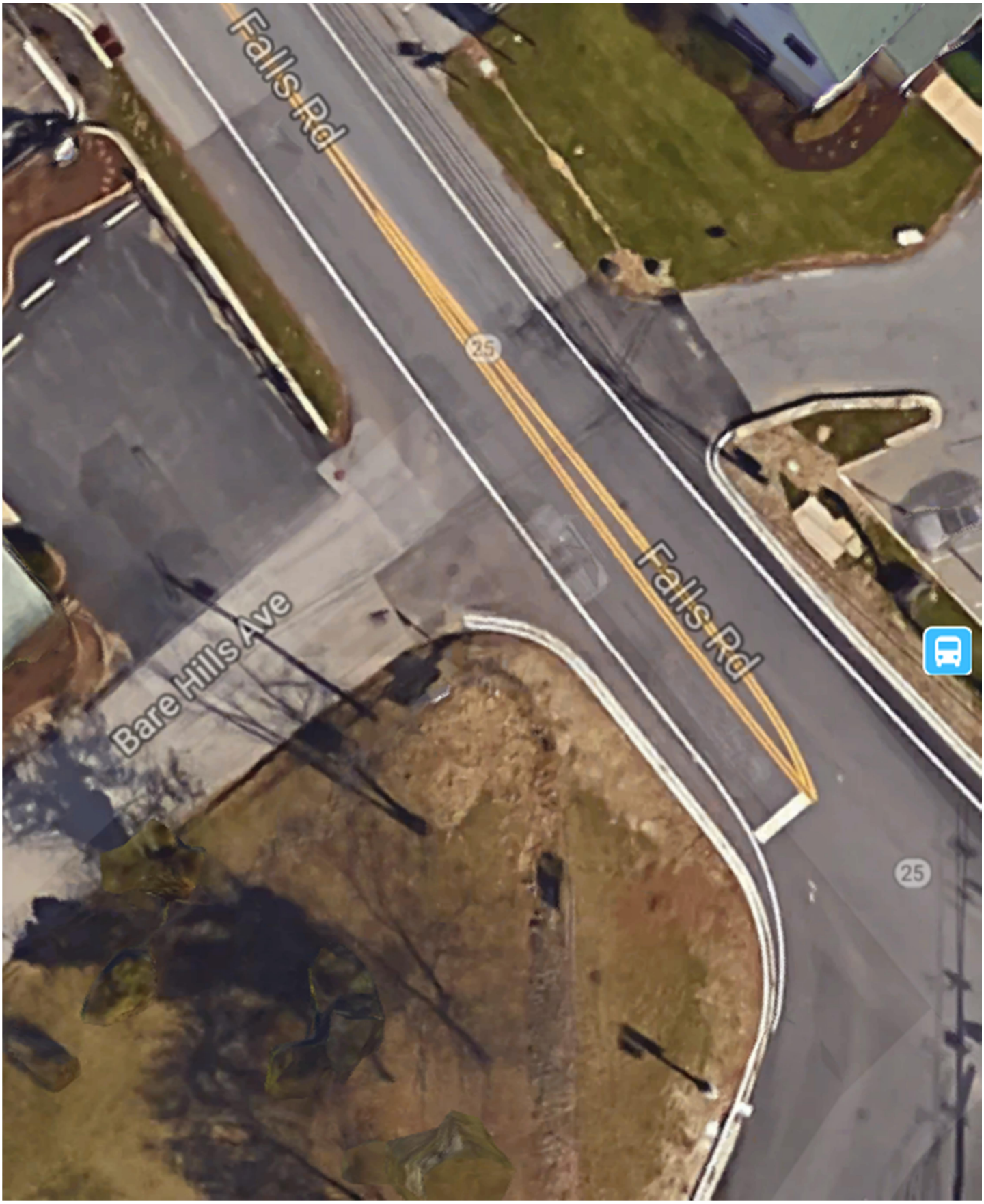
Intersection of: Falls Road **Date: November 29, 2017** **Wednesday**

and: Bare Hills Avenue **Weather: Cool, Clear**

Location: Baltimore County, Maryland **Entered by: CK** **Star Rating: 4**

TIME	TRAFFIC FROM NORTH on: Falls Road					TRAFFIC FROM SOUTH on: Falls Road					TRAFFIC FROM EAST on: Business Entrance					TRAFFIC FROM WEST on: Bare Hills Avenue					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	4	189	0	0	193	0	68	2	0	70	0	0	0	0	0	3	0	1	0	4	267
7:15 - 7:30	5	291	0	0	296	0	98	1	0	99	0	0	0	0	0	1	0	5	0	6	401
7:30 - 7:45	1	285	0	0	286	0	128	3	0	131	0	0	0	0	0	0	0	1	0	1	418
7:45 - 8:00	1	249	1	0	251	0	142	6	0	148	0	0	0	0	0	0	0	3	0	3	402
8:00 - 8:15	5	254	0	0	259	0	134	0	0	134	0	0	0	0	0	2	0	3	0	5	398
8:15 - 8:30	1	261	0	0	262	0	115	5	0	120	0	0	0	0	0	3	0	2	0	5	387
8:30 - 8:45	7	261	0	0	268	0	112	2	0	114	0	0	0	0	0	2	0	3	0	5	387
8:45 - 9:00	2	251	0	0	253	0	104	1	0	105	1	0	1	0	2	3	0	0	0	3	363
2 Hr Totals	26	2041	1	0	2068	0	901	20	0	921	1	0	1	0	2	14	0	18	0	32	3023
1 Hr Totals																					
7:00 - 8:00	11	1014	1	0	1026	0	436	12	0	448	0	0	0	0	0	4	0	10	0	14	1488
7:15 - 8:15	12	1079	1	0	1092	0	502	10	0	512	0	0	0	0	0	3	0	12	0	15	1619
7:30 - 8:30	8	1049	1	0	1058	0	519	14	0	533	0	0	0	0	0	5	0	9	0	14	1605
7:45 - 8:45	14	1025	1	0	1040	0	503	13	0	516	0	0	0	0	0	7	0	11	0	18	1574
8:00 - 9:00	15	1027	0	0	1042	0	465	8	0	473	1	0	1	0	2	10	0	8	0	18	1535
PEAK HOUR																					
7:15 - 8:15	12	1079	1	0	1092	0	502	10	0	512	0	0	0	0	0	3	0	12	0	15	1619
PM																					
4:00 - 4:15	4	185	1	0	190	0	295	5	0	300	2	0	0	0	2	2	0	4	0	6	498
4:15 - 4:30	0	194	0	0	194	0	274	1	0	275	0	0	1	0	1	3	0	3	0	6	476
4:30 - 4:45	2	183	0	0	185	0	255	0	0	255	0	0	0	0	0	3	0	4	0	7	447
4:45 - 5:00	3	154	0	0	157	0	247	2	0	249	0	0	1	0	1	2	0	2	0	4	411
5:00 - 5:15	0	174	1	0	175	0	219	0	0	219	2	0	0	0	2	4	0	8	0	12	408
5:15 - 5:30	0	159	0	0	159	0	245	0	0	245	3	0	0	0	3	4	0	0	0	4	411
5:30 - 5:45	6	172	0	0	178	0	268	1	0	269	1	0	0	0	1	2	0	3	0	5	453
5:45 - 6:00	2	162	0	0	164	0	278	1	0	279	0	0	0	0	0	3	0	1	0	4	447
2 Hr Totals	17	1383	2	0	1402	0	2081	10	0	2091	8	0	2	0	10	23	0	25	0	48	3551
1 Hr Totals																					
4:00 - 5:00	9	716	1	0	726	0	1071	8	0	1079	2	0	2	0	4	10	0	13	0	23	1832
4:15 - 5:15	5	705	1	0	711	0	995	3	0	998	2	0	2	0	4	12	0	17	0	29	1742
4:30 - 5:30	5	670	1	0	676	0	966	2	0	968	5	0	1	0	6	13	0	14	0	27	1677
4:45 - 5:45	9	659	1	0	669	0	979	3	0	982	6	0	1	0	7	12	0	13	0	25	1683
5:00 - 6:00	8	667	1	0	676	0	1010	2	0	1012	6	0	0	0	6	13	0	12	0	25	1719
PEAK HOUR																					
4:00 - 5:00	9	716	1	0	726	0	1071	8	0	1079	2	0	2	0	4	10	0	13	0	23	1832

Falls Road & Bare Hills Avenue



TOTALS TURNING MOVEMENT COUNT - SUMMARY

Counted by: VCU

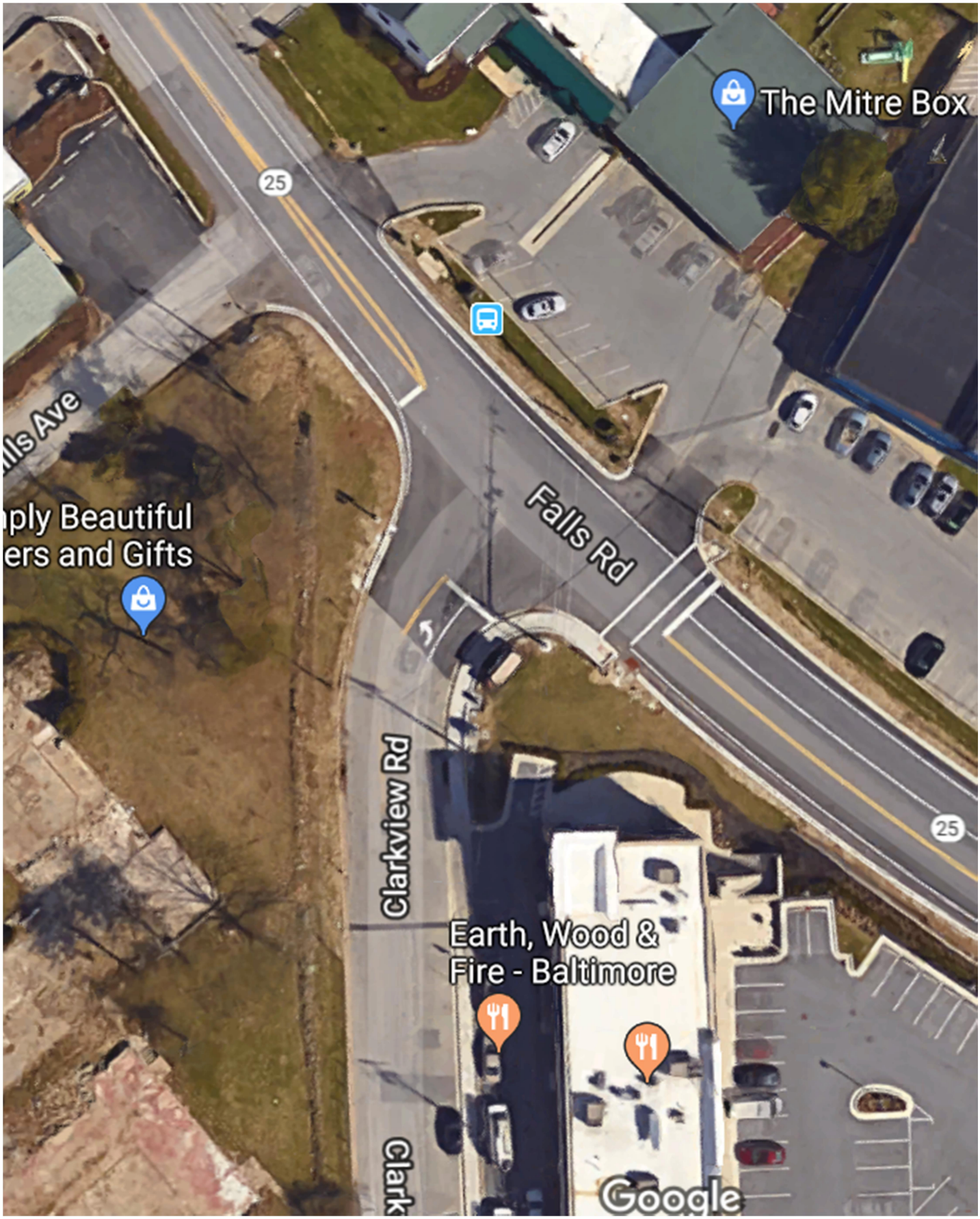
Intersection of: Falls Road | **Date: November 29, 2017** | **Wednesday**

and: Clarkview Road | **Weather: Cool, Clear**

Location: Baltimore County, Maryland | **Entered by: CK** | **Star Rating: 4**

TIME	TRAFFIC FROM NORTH on: Falls Road					TRAFFIC FROM SOUTH on: Falls Road					TRAFFIC FROM EAST on: Business Entrance					TRAFFIC FROM WEST on: Clarkview Road					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	42	147	1	0	190	0	56	9	0	65	0	0	0	0	0	6	0	10	0	16	271
7:15 - 7:30	39	252	0	0	291	0	88	13	0	101	2	0	0	0	2	5	0	13	0	18	412
7:30 - 7:45	55	244	0	0	299	0	109	20	0	129	0	0	0	0	0	8	0	13	0	21	449
7:45 - 8:00	59	194	0	0	253	1	135	25	0	161	1	0	0	0	1	13	0	17	0	30	445
8:00 - 8:15	71	180	0	0	251	0	107	38	0	145	0	0	0	0	0	14	0	18	0	32	428
8:15 - 8:30	83	183	0	0	266	0	109	51	0	160	0	0	0	0	0	9	0	12	0	21	447
8:30 - 8:45	87	178	0	0	265	0	95	51	0	146	0	0	0	0	0	16	0	17	0	33	444
8:45 - 9:00	95	168	1	0	264	3	81	42	0	126	0	0	0	0	0	9	0	17	0	26	416
2 Hr Totals	531	1546	2	0	2079	4	780	249	0	1033	3	0	0	0	3	80	0	117	0	197	3312
1 Hr Totals																					
7:00 - 8:00	195	837	1	0	1033	1	388	67	0	456	3	0	0	0	3	32	0	53	0	85	1577
7:15 - 8:15	224	870	0	0	1094	1	439	96	0	536	3	0	0	0	3	40	0	61	0	101	1734
7:30 - 8:30	268	801	0	0	1069	1	460	134	0	595	1	0	0	0	1	44	0	60	0	104	1769
7:45 - 8:45	300	735	0	0	1035	1	446	165	0	612	1	0	0	0	1	52	0	64	0	116	1764
8:00 - 9:00	336	709	1	0	1046	3	392	182	0	577	0	0	0	0	0	48	0	64	0	112	1735
PEAK HOUR																					
7:30 - 8:30	268	801	0	0	1069	1	460	134	0	595	1	0	0	0	1	44	0	60	0	104	1769
PM																					
4:00 - 4:15	24	156	1	0	181	0	244	10	0	254	1	0	0	0	1	22	0	47	0	69	505
4:15 - 4:30	19	188	1	0	208	2	243	11	0	256	0	0	0	0	0	33	0	37	0	70	534
4:30 - 4:45	19	162	1	0	182	1	209	20	0	230	1	0	2	0	3	34	1	43	0	78	493
4:45 - 5:00	22	139	0	0	161	0	205	10	0	215	3	0	1	0	4	33	0	43	0	76	456
5:00 - 5:15	25	149	2	0	176	0	133	9	0	142	1	0	0	0	1	39	1	87	0	127	446
5:15 - 5:30	24	144	1	0	169	0	170	20	0	190	1	0	0	0	1	27	1	66	0	94	454
5:30 - 5:45	39	131	0	0	170	2	190	20	0	212	0	0	1	0	1	48	0	80	0	128	511
5:45 - 6:00	31	133	2	0	166	0	227	18	0	245	2	0	2	0	4	34	0	48	0	82	497
2 Hr Totals	203	1202	8	0	1413	5	1621	118	0	1744	9	0	6	0	15	270	3	451	0	724	3896
1 Hr Totals																					
4:00 - 5:00	84	645	3	0	732	3	901	51	0	955	5	0	3	0	8	122	1	170	0	293	1988
4:15 - 5:15	85	638	4	0	727	3	790	50	0	843	5	0	3	0	8	139	2	210	0	351	1929
4:30 - 5:30	90	594	4	0	688	1	717	59	0	777	6	0	3	0	9	133	3	239	0	375	1849
4:45 - 5:45	110	563	3	0	676	2	698	59	0	759	5	0	2	0	7	147	2	276	0	425	1867
5:00 - 6:00	119	557	5	0	681	2	720	67	0	789	4	0	3	0	7	148	2	281	0	431	1908
PEAK HOUR																					
4:00 - 5:00	84	645	3	0	732	3	901	51	0	955	5	0	3	0	8	122	1	170	0	293	1988

Falls Road & Clarkview Road



TOTALS TURNING MOVEMENT COUNT - SUMMARY

Counted by: VCU

Intersection of: Falls Road | **Date: November 29, 2017** | **Wednesday**

and: Racquet Road | **Weather: Cool, Clear**

Location: Baltimore County, Maryland | **Entered by: CK** | **Star Rating: 4**

TIME	TRAFFIC FROM NORTH on: Falls Road					TRAFFIC FROM SOUTH on: Falls Road					TRAFFIC FROM EAST on: Racquet Road					TRAFFIC FROM WEST on: Business Entrance					TOTAL N + S + E + W
	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	RIGHT	THRU	LEFT	U-TN	TOTAL	
AM																					
7:00 - 7:15	0	144	1	0	145	0	61	1	0	62	4	0	1	0	5	0	0	0	0	0	212
7:15 - 7:30	1	244	3	0	248	0	101	2	0	103	1	0	0	0	1	0	0	0	0	0	352
7:30 - 7:45	0	247	0	0	247	0	124	0	0	124	0	0	0	0	0	1	0	0	0	1	372
7:45 - 8:00	1	195	3	0	199	0	163	6	0	169	2	0	0	0	2	0	0	1	0	1	371
8:00 - 8:15	0	196	0	0	196	0	149	4	0	153	1	0	0	0	1	2	0	0	0	2	352
8:15 - 8:30	0	194	1	0	195	0	159	3	0	162	0	0	0	0	0	1	0	0	0	1	358
8:30 - 8:45	1	186	1	0	188	0	144	3	0	147	1	0	0	0	1	1	0	0	0	1	337
8:45 - 9:00	0	180	1	0	181	0	127	4	0	131	1	0	0	0	1	2	0	0	0	2	315
2 Hr Totals	3	1586	10	0	1599	0	1028	23	0	1051	10	0	1	0	11	7	0	1	0	8	2669
1 Hr Totals																					
7:00 - 8:00	2	830	7	0	839	0	449	9	0	458	7	0	1	0	8	1	0	1	0	2	1307
7:15 - 8:15	2	882	6	0	890	0	537	12	0	549	4	0	0	0	4	3	0	1	0	4	1447
7:30 - 8:30	1	832	4	0	837	0	595	13	0	608	3	0	0	0	3	4	0	1	0	5	1453
7:45 - 8:45	2	771	5	0	778	0	615	16	0	631	4	0	0	0	4	4	0	1	0	5	1418
8:00 - 9:00	1	756	3	0	760	0	579	14	0	593	3	0	0	0	3	6	0	0	0	6	1362
PEAK HOUR																					
7:30 - 8:30	1	832	4	0	837	0	595	13	0	608	3	0	0	0	3	4	0	1	0	5	1453
PM																					
4:00 - 4:15	1	171	1	0	173	2	250	3	0	255	2	0	1	0	3	0	1	1	0	2	433
4:15 - 4:30	0	222	0	0	222	2	255	1	0	258	3	0	0	0	3	2	0	0	0	2	485
4:30 - 4:45	0	189	0	0	189	0	224	2	0	226	1	0	1	0	2	2	0	0	0	2	419
4:45 - 5:00	0	175	1	0	176	1	217	2	0	220	2	0	0	0	2	4	0	0	0	4	402
5:00 - 5:15	1	182	0	0	183	1	138	2	0	141	0	0	1	0	1	14	0	0	0	14	339
5:15 - 5:30	1	176	0	0	177	0	195	3	0	198	1	0	1	0	2	1	0	0	0	1	378
5:30 - 5:45	4	169	1	0	174	1	209	5	0	215	0	0	1	0	1	7	0	1	0	8	398
5:45 - 6:00	8	170	0	0	178	1	252	1	0	254	0	0	0	0	0	0	0	0	0	0	432
2 Hr Totals	15	1454	3	0	1472	8	1740	19	0	1767	9	0	5	0	14	30	1	2	0	33	3286
1 Hr Totals																					
4:00 - 5:00	1	757	2	0	760	5	946	8	0	959	8	0	2	0	10	8	1	1	0	10	1739
4:15 - 5:15	1	768	1	0	770	4	834	7	0	845	6	0	2	0	8	22	0	0	0	22	1645
4:30 - 5:30	2	722	1	0	725	2	774	9	0	785	4	0	3	0	7	21	0	0	0	21	1538
4:45 - 5:45	6	702	2	0	710	3	759	12	0	774	3	0	3	0	6	26	0	1	0	27	1517
5:00 - 6:00	14	697	1	0	712	3	794	11	0	808	1	0	3	0	4	22	0	1	0	23	1547
PEAK HOUR																					
4:00 - 5:00	1	757	2	0	760	5	946	8	0	959	8	0	2	0	10	8	1	1	0	10	1739

Falls Road & Racquet Road

APPENDIX B

Intersection Capacity Analysis (CLV),

and SynChro/SimTraffic Queuing Analysis

CRITICAL LANE VOLUME (CLV) METHODOLOGY
for MSHA

E/W Road Name: Old Pimlico Road
N/S Road Name: Falls Road
Conditions: Existing Traffic

Date of Count: 11/29/2017
Day of Count: Wednesday
Analyst: Shulin Li

AM Peak: 7:30 -8:30
PM Peak: 4:00 -5:00

FALLS ROAD

R	T	
166	395	PM
86	688	AM

RT

OLD PIMLICO ROAD

PM	AM	
175	232	L
315	411	R

L
R

L T

	L	T
AM	149	364
PM	377	722

FALLS ROAD

Capacity Analysis

Morning Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	AM CLV
EB	262	1.00	262				262
NB	364	1.00	364				923
SB	774	1.00	774	149	1.00	149	
					CLV TOTAL=		1,185
					Level of Service (LOS)=		C

Evening Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	PM CLV
EB	175	1.00	175				175
NB	722	1.00	722				938
SB	561	1.00	561	377	1.00	377	
					CLV TOTAL=		1,113
					Level of Service (LOS)=		B

Scenario ID - EXIST1
CLV V/C =0.74
PM V/C =0.7

CRITICAL LANE VOLUME (CLV) METHODOLOGY
for MSHA

E/W Road Name: Old Pimlico Road
N/S Road Name: Falls Road
Conditions: Total Traffic

Date of Count: 11/29/2017
Day of Count: Wednesday
Analyst: Shulin Li

AM Peak: 7:30 -8:30
PM Peak: 4:00 -5:00

FALLS ROAD

R	T	
166	416	PM
86	701	AM

RT

OLD PIMLICO ROAD

PM	AM	
175	232	L
336	428	R

L
R

L T

	L	T
AM	160	378
PM	404	742

FALLS ROAD

Capacity Analysis

Morning Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	AM CLV
EB	268	1.00	268				268
NB	378	1.00	378				947
SB	787	1.00	787	160	1.00	160	
					CLV TOTAL=		1,215
					Level of Service (LOS)=		C

Evening Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	PM CLV
EB	175	1.00	175				175
NB	742	1.00	742				986
SB	582	1.00	582	404	1.00	404	
					CLV TOTAL=		1,161
					Level of Service (LOS)=		C

Scenario ID - TOT1
CLV V/C =0.76
PM V/C =0.73

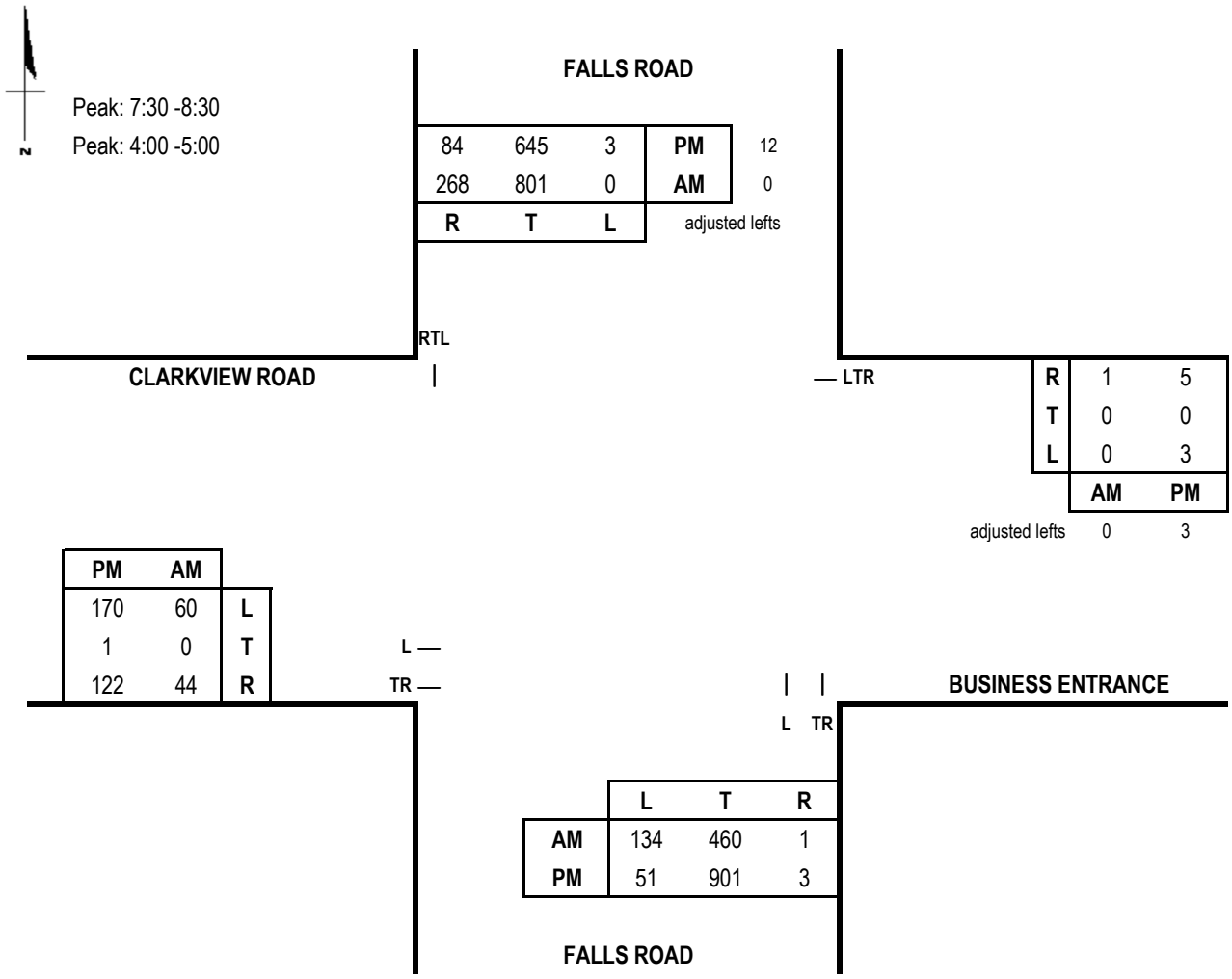
CRITICAL LANE VOLUME (CLV) METHODOLOGY

for MSHA

E/W Road: Business Entrance/Clarkview Road **Date of Count:** 11/29/2017

N/S Road: Falls Road **Day of Count:** Wednesday

Conditions: Existing Traffic **Analyst:** Shulin Li



Capacity Analysis

Morning Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	AM CLV
NB	461	1.00	461	0	1.00	0	1203
SB	1069	1.00	1069	134	1.00	134	
EB	44	1.00	44	0	1.00	0	61
WB	1	1.00	1	60	1.00	60	

CLV TOTAL= **1,264**

Level of Service (LOS)= **C**

Scenario ID - EXIST4

CLV V/C =0.79

Evening Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	PM CLV
NB	904	1.00	904	3	1.00	3	907
SB	741	1.00	741	51	1.00	51	
EB	123	1.00	123	3	1.00	3	178
WB	8	1.00	8	170	1.00	170	

CLV TOTAL= **1,085**

Level of Service (LOS)= **B**

PM V/C =0.68

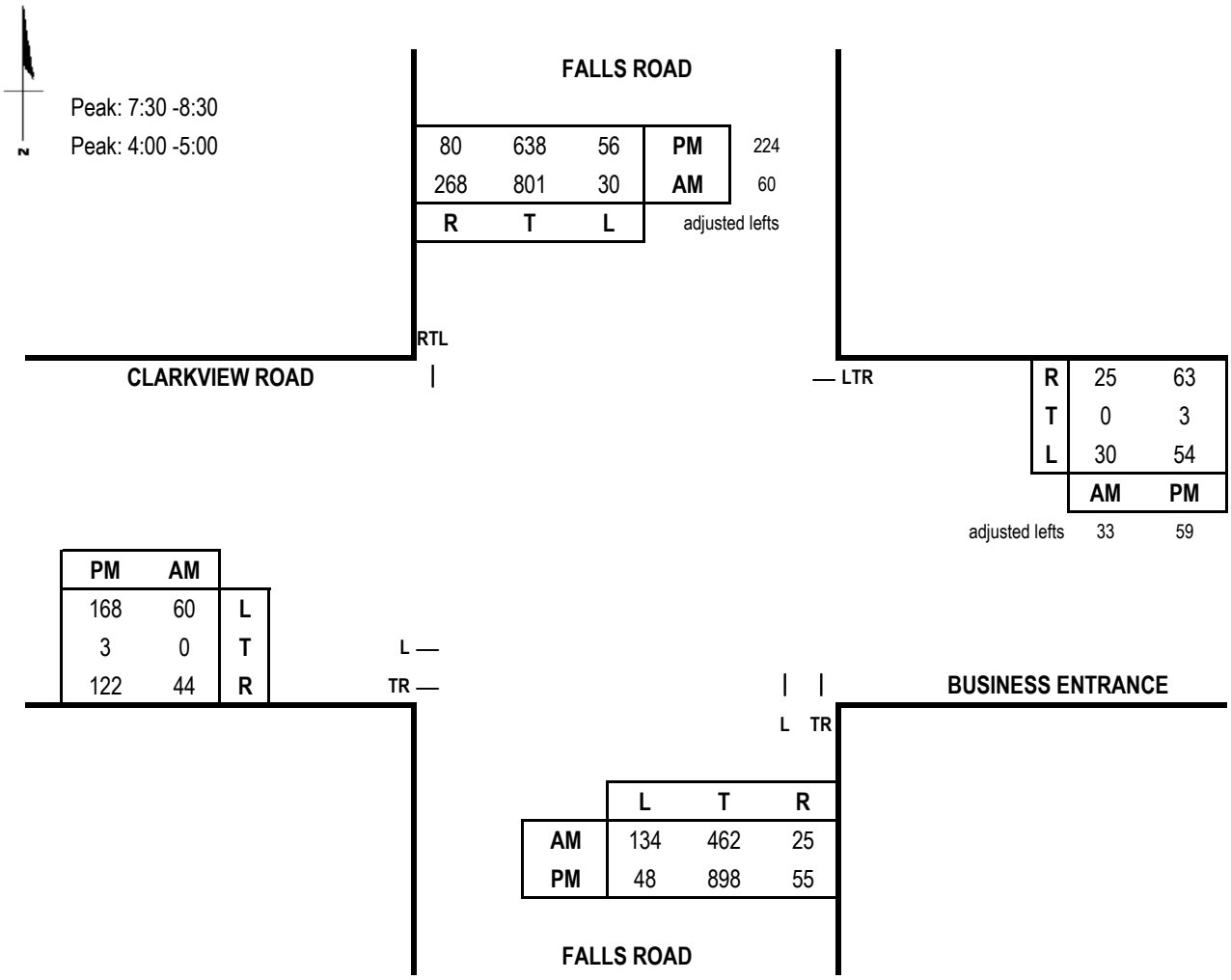
CRITICAL LANE VOLUME (CLV) METHODOLOGY

for MSHA

E/W Road: Business Entrance/Clarkview Road **Date of Count:** 11/29/2017

N/S Road: Falls Road **Day of Count:** Wednesday

Conditions: Total Traffic **Analyst:** Shulin Li



Capacity Analysis

Morning Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	AM CLV
NB	487	1.00	487	30	1.00	30	1263
SB	1129	1.00	1129	134	1.00	134	
EB	44	1.00	44	30	1.00	30	118
WB	58	1.00	58	60	1.00	60	

CLV TOTAL= **1,381**

Level of Service (LOS)= **D**

Evening Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	PM CLV
NB	953	1.00	953	56	1.00	56	1009
SB	942	1.00	942	48	1.00	48	
EB	125	1.00	125	54	1.00	54	293
WB	125	1.00	125	168	1.00	168	

CLV TOTAL= **1,302**

Level of Service (LOS)= **D**

Scenario ID - TOT4

CLV V/C =0.86

PM V/C =0.81

CRITICAL LANE VOLUME (CLV) METHODOLOGY

for MSHA

E/W Road: Business Entrance/Clarkview Road **Date of Count:** 11/29/2017

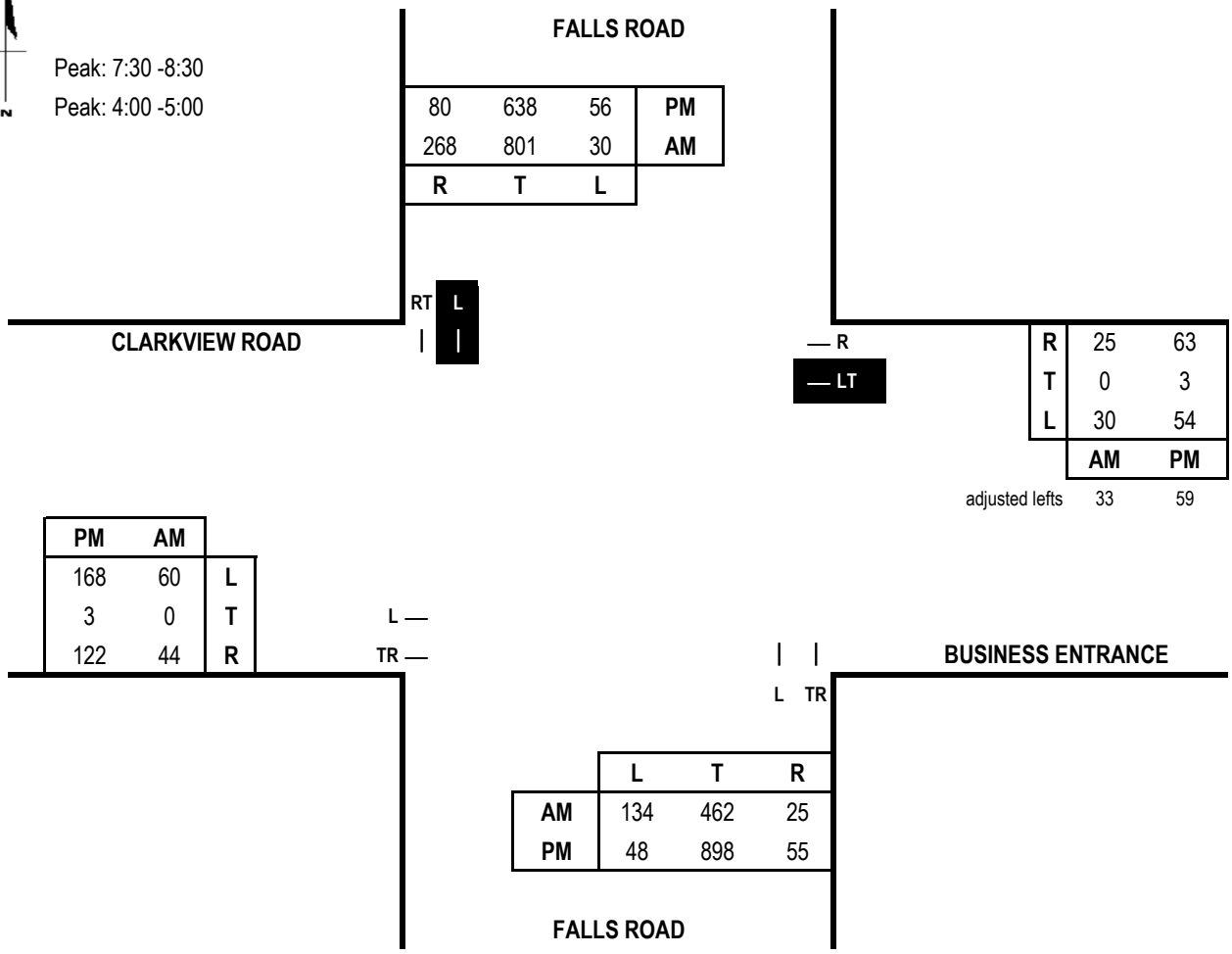
N/S Road: Falls Road **Day of Count:** Wednesday

Conditions: Total Traffic **Analyst:** Shulin Li

w/ improvement

Peak: 7:30 -8:30

Peak: 4:00 -5:00



Capacity Analysis

Morning Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	AM CLV
NB	487	1.00	487	30	1.00	30	1203
SB	1069	1.00	1069	134	1.00	134	
EB	44	1.00	44	30	1.00	30	93
WB	33	1.00	33	60	1.00	60	

CLV TOTAL= **1,296**

Level of Service (LOS)= **C**

Scenario ID - TOT4

CLV V/C =0.81

Evening Peak Hour

Dir	Thru Volumes VOL	x LUF	= Total	+ Opposing Lefts VOL	x LUF	= Total	PM CLV
NB	953	1.00	953	56	1.00	56	1009
SB	718	1.00	718	48	1.00	48	
EB	125	1.00	125	54	1.00	54	230
WB	62	1.00	62	168	1.00	168	

CLV TOTAL= **1,239**

Level of Service (LOS)= **C**

PM V/C =0.77

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	232	411	149	364	688	86
Future Volume (vph)	232	411	149	364	688	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	220	130			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Satd. Flow (prot)	1805	1615	1805	1900	1872	0
Flt Permitted	0.950		0.152			
Satd. Flow (perm)	1805	1615	289	1900	1872	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		306			8	
Link Speed (mph)	30			40	40	
Link Distance (ft)	948			872	1048	
Travel Time (s)	21.5			14.9	17.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	447	162	396	841	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Total Split (s)	32.0	32.0	17.0	88.0	71.0	
Total Lost Time (s)	7.0	7.0	6.0	7.5	7.5	
Act Effct Green (s)	21.1	21.1	85.9	84.4	69.5	
Actuated g/C Ratio	0.18	0.18	0.72	0.70	0.58	
v/c Ratio	0.79	0.83	0.51	0.30	0.77	
Control Delay	65.3	28.9	10.4	6.8	26.6	
Queue Delay	0.0	0.4	0.0	0.0	0.9	
Total Delay	65.3	29.3	10.4	6.8	27.5	
LOS	E	C	B	A	C	
Approach Delay	42.3			7.8	27.5	
Approach LOS	D			A	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 14 (12%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 27.2		Intersection LOS: C	
Intersection Capacity Utilization 79.6%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Falls Rd & Old Pimlico Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	0	44	0	0	1	134	460	1	0	801	268
Future Volume (vph)	60	0	44	0	0	1	134	460	1	0	801	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	1805	1615	0	0	1900	1615	1805	1900	0	0	1835	0
Flt Permitted	0.757						0.047					
Satd. Flow (perm)	1438	1615	0	0	1900	1615	89	1900	0	0	1835	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		259				457					27	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		536			303			288			872	
Travel Time (s)		12.2			6.9			4.9			14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	48	0	0	0	1	146	501	0	0	1162	0
Turn Type	Perm	NA				Perm	pm+pt	NA			NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	24.6	24.6		24.6	24.6	24.6	14.2	95.4		81.2	81.2	
Total Lost Time (s)	6.5	6.5			6.5	6.5	6.5	6.5			6.5	
Act Effct Green (s)	10.8	10.8				10.6	98.8	100.1			82.0	
Actuated g/C Ratio	0.09	0.09				0.09	0.82	0.83			0.68	
v/c Ratio	0.51	0.13				0.00	0.67	0.32			0.92	
Control Delay	64.7	0.7				0.0	39.3	3.8			22.5	
Queue Delay	0.0	0.0				0.0	0.0	0.0			0.0	
Total Delay	64.7	0.7				0.0	39.3	3.8			22.5	
LOS	E	A				A	D	A			C	
Approach Delay		37.5						11.8			22.5	
Approach LOS		D						B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 19.8		Intersection LOS: B	
Intersection Capacity Utilization 103.1%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 4: Falls Rd & Clarkview Rd

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	175	315	377	722	395	166
Future Volume (vph)	175	315	377	722	395	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	220	130			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Satd. Flow (prot)	1770	1583	1770	1863	1788	0
Flt Permitted	0.950		0.294			
Satd. Flow (perm)	1770	1583	548	1863	1788	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		342			24	
Link Speed (mph)	30			40	40	
Link Distance (ft)	948			872	1048	
Travel Time (s)	21.5			14.9	17.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	342	410	785	609	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Total Split (s)	26.0	26.0	33.0	94.0	61.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)	17.5	17.5	93.5	93.5	71.9	
Actuated g/C Ratio	0.15	0.15	0.78	0.78	0.60	
v/c Ratio	0.74	0.66	0.68	0.54	0.56	
Control Delay	65.9	11.1	12.4	5.0	18.9	
Queue Delay	0.0	0.0	0.0	0.2	0.0	
Total Delay	65.9	11.1	12.4	5.2	18.9	
LOS	E	B	B	A	B	
Approach Delay	30.6			7.7	18.9	
Approach LOS	C			A	B	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 15.8	Intersection LOS: B

Intersection Capacity Utilization 72.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Falls Rd & Old Pimlico Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	170	1	122	3	0	5	51	901	3	3	645	84
Future Volume (vph)	170	1	122	3	0	5	51	901	3	3	645	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	0		0
Storage Lanes	1		0	0		1	1		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	1585	0	0	1770	1583	1770	1863	0	0	1835	0
Flt Permitted	0.756				0.548		0.315				0.998	
Satd. Flow (perm)	1408	1585	0	0	1021	1583	587	1863	0	0	1831	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		133				95					11	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		536			303			288			872	
Travel Time (s)		12.2			6.9			4.9			14.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	185	134	0	0	3	5	55	982	0	0	795	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	27.0	27.0		27.0	27.0	27.0	9.5	83.5		9.5	83.5	
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5			4.5	
Act Effct Green (s)	19.5	19.5			19.5	19.5	91.5	91.5			83.4	
Actuated g/C Ratio	0.16	0.16			0.16	0.16	0.76	0.76			0.70	
v/c Ratio	0.81	0.36			0.02	0.01	0.11	0.69			0.62	
Control Delay	74.0	10.0			40.3	0.0	4.5	11.0			7.3	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0			0.1	
Total Delay	74.0	10.0			40.3	0.0	4.5	11.0			7.4	
LOS	E	B			D	A	A	B			A	
Approach Delay		47.1			15.1			10.6			7.4	
Approach LOS		D			B			B			A	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 14.9	Intersection LOS: B

Intersection Capacity Utilization 72.4% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: Falls Rd & Clarkview Rd

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	232	428	160	378	701	86
Future Volume (vph)	232	428	160	378	701	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	220	130			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Satd. Flow (prot)	1805	1615	1805	1900	1872	0
Flt Permitted	0.950		0.139			
Satd. Flow (perm)	1805	1615	264	1900	1872	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		304			8	
Link Speed (mph)	30			40	40	
Link Distance (ft)	948			872	1048	
Travel Time (s)	21.5			14.9	17.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	252	465	174	411	855	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Total Split (s)	32.0	32.0	17.3	88.0	70.7	
Total Lost Time (s)	7.0	7.0	6.0	7.5	7.5	
Act Effct Green (s)	21.3	21.3	85.7	84.2	68.9	
Actuated g/C Ratio	0.18	0.18	0.71	0.70	0.57	
v/c Ratio	0.79	0.87	0.56	0.31	0.79	
Control Delay	64.5	33.3	23.0	6.1	28.1	
Queue Delay	0.0	0.5	0.0	0.0	1.2	
Total Delay	64.5	33.8	23.0	6.1	29.2	
LOS	E	C	C	A	C	
Approach Delay	44.6			11.1	29.2	
Approach LOS	D			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 13 (11%), Referenced to phase 2:NBTL and 6:SBT, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.87			
Intersection Signal Delay: 29.4		Intersection LOS: C	
Intersection Capacity Utilization 80.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Falls Rd & Old Pimlico Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	0	44	30	0	25	134	462	25	30	801	268
Future Volume (vph)	60	0	44	30	0	25	134	462	25	30	801	268
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	0		0	75		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1805	1615	0	0	1805	1615	1805	1885	0	1805	1828	0
Flt Permitted	0.736				0.726		0.047			0.461		
Satd. Flow (perm)	1398	1615	0	0	1379	1615	89	1885	0	876	1828	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		232				91		5			27	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		536			303			288			872	
Travel Time (s)		12.2			6.9			4.9			14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	65	48	0	0	33	27	146	529	0	33	1162	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	24.6	24.6		24.6	24.6	24.6	14.2	83.8		11.6	81.2	
Total Lost Time (s)	6.5	6.5			6.5	6.5	6.5	6.5		6.5	6.5	
Act Effct Green (s)	10.9	10.9			10.8	10.8	97.8	92.3		88.1	82.1	
Actuated g/C Ratio	0.09	0.09			0.09	0.09	0.82	0.77		0.73	0.68	
v/c Ratio	0.52	0.13			0.27	0.12	0.68	0.36		0.05	0.92	
Control Delay	65.2	0.8			54.5	1.1	40.9	7.7		4.0	22.4	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	65.2	0.8			54.5	1.1	40.9	7.7		4.0	22.4	
LOS	E	A			D	A	D	A		A	C	
Approach Delay		37.8			30.5			14.8			21.9	
Approach LOS		D			C			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.92			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 92.1%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Falls Rd & Clarkview Rd

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	175	336	404	742	416	166
Future Volume (vph)	175	336	404	742	416	166
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12
Grade (%)	0%			0%	0%	
Storage Length (ft)	0	220	130			0
Storage Lanes	1	1	1			0
Taper Length (ft)	25		25			
Satd. Flow (prot)	1770	1583	1770	1863	1792	0
Flt Permitted	0.950		0.265			
Satd. Flow (perm)	1770	1583	494	1863	1792	0
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		365			22	
Link Speed (mph)	30			40	40	
Link Distance (ft)	948			872	1048	
Travel Time (s)	21.5			14.9	17.9	
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	365	439	807	632	0
Turn Type	Prot	Perm	pm+pt	NA	NA	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			
Total Split (s)	25.0	25.0	35.0	95.0	60.0	
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	
Act Effct Green (s)	17.2	17.2	93.8	93.8	69.0	
Actuated g/C Ratio	0.14	0.14	0.78	0.78	0.58	
v/c Ratio	0.75	0.68	0.73	0.55	0.61	
Control Delay	67.2	11.4	17.8	4.9	21.9	
Queue Delay	0.0	0.0	0.0	0.3	0.0	
Total Delay	67.2	11.4	17.8	5.2	21.9	
LOS	E	B	B	A	C	
Approach Delay	30.5			9.7	21.9	
Approach LOS	C			A	C	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 8 (7%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 17.6	Intersection LOS: B

Intersection Capacity Utilization 75.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Falls Rd & Old Pimlico Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	3	122	54	3	63	48	898	55	56	638	80
Future Volume (vph)	168	3	122	54	3	63	48	898	55	56	638	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	75		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	1589	0	0	1779	1583	1770	1846	0	1770	1831	0
Flt Permitted	0.717				0.564		0.232			0.151		
Satd. Flow (perm)	1336	1589	0	0	1051	1583	432	1846	0	281	1831	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		133				95		5			11	
Link Speed (mph)		30			30			40			40	
Link Distance (ft)		536			303			288			872	
Travel Time (s)		12.2			6.9			4.9			14.9	
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	136	0	0	62	68	52	1036	0	61	780	0
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8		8	2			6		
Total Split (s)	27.0	27.0		27.0	27.0	27.0	10.0	83.2		9.8	83.0	
Total Lost Time (s)	4.5	4.5			4.5	4.5	4.5	4.5		4.5	4.5	
Act Effct Green (s)	19.9	19.9			19.9	19.9	83.2	83.2		82.9	82.9	
Actuated g/C Ratio	0.17	0.17			0.17	0.17	0.69	0.69		0.69	0.69	
v/c Ratio	0.82	0.36			0.36	0.20	0.14	0.81		0.24	0.62	
Control Delay	76.6	10.4			49.4	5.0	8.0	20.8		7.4	6.9	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.1	
Total Delay	76.6	10.4			49.4	5.0	8.0	20.8		7.4	7.0	
LOS	E	B			D	A	A	C		A	A	
Approach Delay		48.3			26.1			20.2			7.1	
Approach LOS		D			C			C			A	

Intersection Summary	
Area Type:	Other
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.82	
Intersection Signal Delay: 19.7	Intersection LOS: B

Intersection Capacity Utilization 75.3% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 4: Falls Rd & Clarkview Rd

Intersection: 1: Falls Rd & Old Pimlico Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (ft)	653	245	150	179	750
Average Queue (ft)	324	206	71	78	459
95th Queue (ft)	728	296	124	146	871
Link Distance (ft)	912			786	1012
Upstream Blk Time (%)	3				4
Queuing Penalty (veh)	0				0
Storage Bay Dist (ft)		220	130		
Storage Blk Time (%)	3	28	1	0	
Queuing Penalty (veh)	13	64	5	1	

Intersection: 4: Falls Rd & Clarkview Rd

Movement	EB	EB	WB	NB	NB	B5	SB
Directions Served	L	TR	R	L	TR	T	LTR
Maximum Queue (ft)	116	64	22	167	112	4	767
Average Queue (ft)	39	27	1	74	33	0	614
95th Queue (ft)	87	56	11	144	86	3	927
Link Distance (ft)	482	482	257	206	206	1253	786
Upstream Blk Time (%)				0			2
Queuing Penalty (veh)				0			24
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Zone Summary

Zone wide Queuing Penalty: 106

Intersection: 1: Falls Rd & Old Pimlico Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (ft)	278	244	154	685	376
Average Queue (ft)	124	98	126	250	196
95th Queue (ft)	217	185	184	596	347
Link Distance (ft)	912			786	1012
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				2	
Storage Bay Dist (ft)		220	130		
Storage Blk Time (%)	1	0	18	6	
Queuing Penalty (veh)	4	1	129	21	

Intersection: 4: Falls Rd & Clarkview Rd

Movement	EB	EB	WB	WB	NB	NB	B5	SB
Directions Served	L	TR	LT	R	L	TR	T	LTR
Maximum Queue (ft)	241	118	20	33	68	258	43	276
Average Queue (ft)	112	46	2	4	20	129	4	112
95th Queue (ft)	199	87	12	21	47	254	37	230
Link Distance (ft)	482	482	257	257	206	206	1253	786
Upstream Blk Time (%)						2		
Queuing Penalty (veh)						0		
Storage Bay Dist (ft)								
Storage Blk Time (%)								
Queuing Penalty (veh)								

Zone Summary

Zone wide Queuing Penalty: 157

Intersection: 1: Falls Rd & Old Pimlico Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (ft)	672	245	139	174	866
Average Queue (ft)	344	212	73	79	544
95th Queue (ft)	755	293	128	147	1044
Link Distance (ft)	912			780	1012
Upstream Blk Time (%)	4				15
Queuing Penalty (veh)	0				0
Storage Bay Dist (ft)		220	130		
Storage Blk Time (%)	2	30	2	1	
Queuing Penalty (veh)	11	69	6	1	

Intersection: 4: Falls Rd & Clarkview Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	LT	R	L	TR	L	TR
Maximum Queue (ft)	110	70	62	42	168	166	98	792
Average Queue (ft)	40	26	20	16	77	54	16	621
95th Queue (ft)	87	57	52	40	143	131	63	929
Link Distance (ft)	482	482	250	250	207	207		780
Upstream Blk Time (%)					0	0		2
Queuing Penalty (veh)					0	0		23
Storage Bay Dist (ft)							75	
Storage Blk Time (%)								33
Queuing Penalty (veh)								10

Zone Summary

Zone wide Queuing Penalty: 119

Intersection: 1: Falls Rd & Old Pimlico Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (ft)	283	239	154	735	360
Average Queue (ft)	128	108	135	314	209
95th Queue (ft)	222	199	184	691	339
Link Distance (ft)	912			780	1012
Upstream Blk Time (%)				0	
Queuing Penalty (veh)				4	
Storage Bay Dist (ft)		220	130		
Storage Blk Time (%)	1	1	22	7	
Queuing Penalty (veh)	2	2	164	27	

Intersection: 4: Falls Rd & Clarkview Rd

Movement	EB	EB	WB	WB	NB	NB	B5	SB	SB
Directions Served	L	TR	LT	R	L	TR	T	L	TR
Maximum Queue (ft)	250	111	112	106	64	290	299	94	284
Average Queue (ft)	114	44	35	37	22	199	51	35	132
95th Queue (ft)	205	83	80	74	49	328	214	81	253
Link Distance (ft)	482	482	250	250	207	207	1253		780
Upstream Blk Time (%)						8			
Queuing Penalty (veh)						0			
Storage Bay Dist (ft)								75	
Storage Blk Time (%)								1	11
Queuing Penalty (veh)								8	6

Zone Summary

Zone wide Queuing Penalty: 213