1770 and 1820 Shea Road

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Strategy Report

Prepared for:

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PN: 2024-137

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1 Screening

This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines, incorporating the 2023 Revision to Transportation Impact Assessment Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for the TIA Study PM. As shown in the Screening Form, a TIA is required, and this study has been prepared to support this plan of development.

The lands were included within the W-4 Urban Expansion Area Lands (W-4 Lands) outlined in the City's Official Plan Schedule C17. The W-4 Lands are classified as Category 1 lands and identified for urban expansion through the Future Neighbourhood Overlay. To address the Official Plan process for urban expansion lands, the community design process has been initiated for the overall area and is anticipated to be completed in 2025. The following report reviews the plan of subdivision changes from the overall W-4 Transportation report, outlines the details of the plan of subdivision and aligns with the general TIA process.

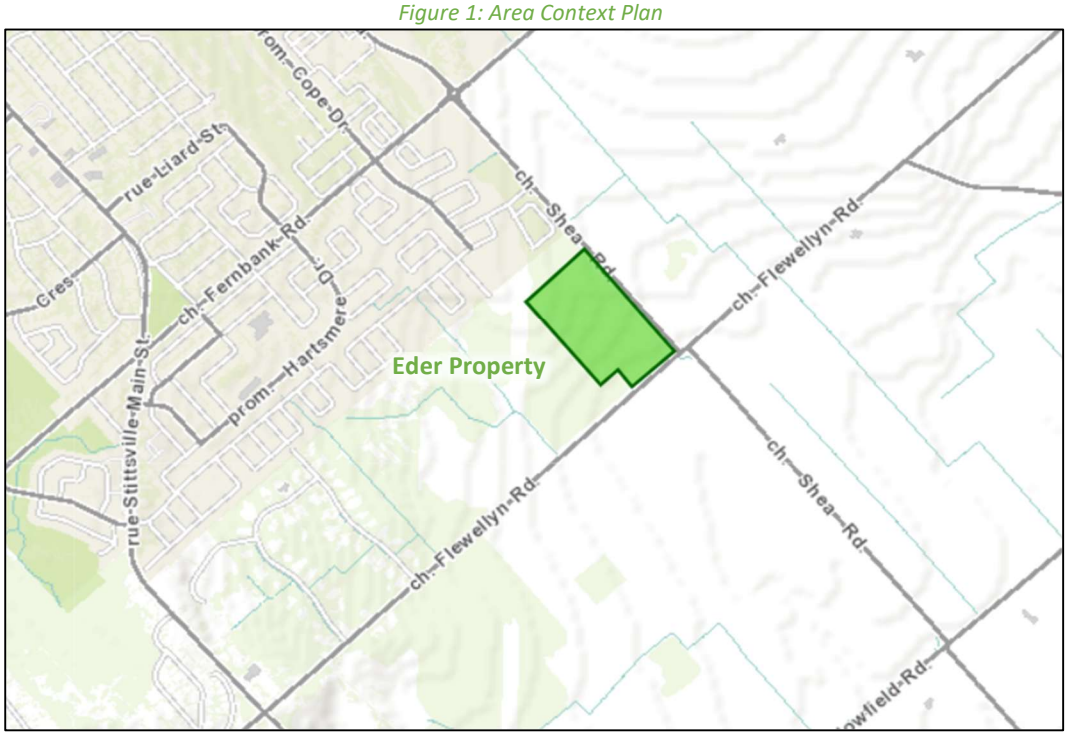
2 Existing and Planned Conditions

2.1 Proposed Development

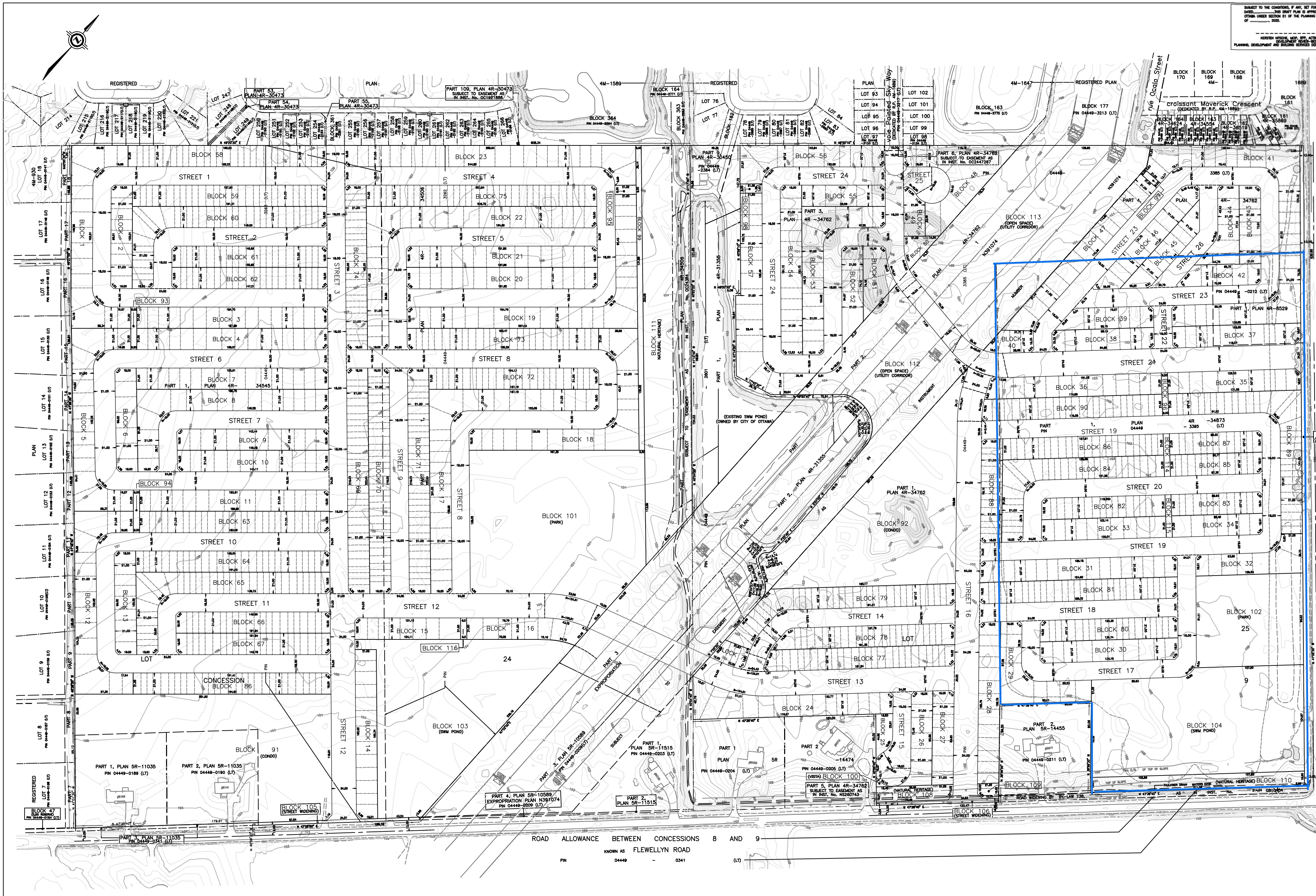
The proposed development is located within 1770 and 1820 Shea Road, also know as the Eder Property. The area is bounded by Shea Road, Flewellyn Road, the future W-4 development lands and the existing community to the north. The current zoning is Rural (RU). A total of 222 townhomes and 140 single detached homes are proposed within the proposed development. The adjacent W-4 subdivision collector road is planned to connect to Shea Road through the subject property and new local roads are proposed to connect internally to the adjacent subdivision collector roads. The anticipated build-out year is 2030 as a single phase.

Figure 1 illustrates the study area context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 20, 2025



Key plan (not to scale)

SITE

ROAD ALLOWANCE BETWEEN CONCESSIONS 8 AND 9 KNOWN AS FLEWELLYN ROAD

DRAFT PLAN OF SUBDIVISION OF PART OF LOTS 24 AND 25 CONCESSION 9

GEOGRAPHIC TOWNSHIP OF GOULBOURN
NOW IN THE
CITY OF OTTAWA

SCALE 1 : 1000

J.D. BARNES LIMITED

METRIC DISTANCES AND/OR COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

NOTES
ALL DISTANCES ON CURVES ARE ARC DISTANCES UNLESS OTHERWISE SPECIFIED

ADDITIONAL INFORMATION
As required under section 51(17) of the Planning Act R.S.O. 2001

(a)(b)(e)(f)(g)(j) and (l) – As shown on this Plan.
(c) – As shown on this Draft and Key Plan
(d) – Land to be used in accordance with the Schedule of Land Use.
(h)(k) – Full Municipal Services
(i) – See Soils Report

SURVEYOR'S CERTIFICATE
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ARE CORRECTLY SHOWN.

DATE — SHAWN LEROUX, ONTARIO LAND SURVEYOR

SCHEDULE OF LAND USE

LAND USE	BLOCK(S)	AREA (sq. m)
SINGLE DETACHED	BLOCKS 1 TO 56, BOTH INCLUSIVE	189,858.86
STANDARD TOWNHOUSE	BLOCKS 57 TO 90, BOTH INCLUSIVE	126,036.28
STACKED CONDOMINIUM BLOCKS	BLOCKS 91 AND 92	50,716.93
VISTA	BLOCKS 93 TO 100, BOTH INCLUSIVE, AND BLOCKS 114 TO 116, BOTH INCLUSIVE	3,593.93
PARK	BLOCKS 101 AND 102	33,952.26
SWM POND	BLOCKS 103 AND 104	42,820.94
ROAD WIDENING	BLOCKS 105 TO 107, BOTH INCLUSIVE	3027.81
NATURAL HERITAGE	BLOCKS 108 TO 111, BOTH INCLUSIVE	22,797.14
UTILITY CORRIDOR	BLOCKS 112 TO 113, BOTH INCLUSIVE	39,439.42
STREETS	STREETS 1 TO 26, BOTH INCLUSIVE	177,136.29
TOTAL:		688,976.96

OWNER'S CERTIFICATE
CAIVAN (STITTSVILLE WEST) LIMITED, BEING THE REGISTERED OWNER OF PINS 04449-0189(LT), 04449-0190(LT), AND 04449-3262(LT) HEREBY AUTHORIZES J.D. BARNES LIMITED TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

DATE — FRANK CAIRO, PRESIDENT
(I HAVE THE AUTHORITY TO BIND THE CORPORATION)
CAIVAN (STITTSVILLE WEST) LIMITED.

OWNER'S CERTIFICATE
CAIVAN (STITTSVILLE WEST 2) LIMITED, BEING THE REGISTERED OWNER OF PIN 04449-3262(LT) HEREBY AUTHORIZES J.D. BARNES LIMITED TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

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CAIVAN (STITTSVILLE SOUTH) INC., BEING THE REGISTERED OWNER OF PIN 04449-0212(LT) AND 04449-3395(LT) HEREBY AUTHORIZES J.D. BARNES LIMITED TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION FOR APPROVAL.

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DATE — FRANK CAIRO, PRESIDENT
(I HAVE THE AUTHORITY TO BIND THE CORPORATION)
CAIVAN (STITTSVILLE SOUTH 2) INC.

J.D. BARNES LIMITED
LAND INFORMATION SPECIALISTS

2.2 Existing Conditions

2.2.1 Area Road Network

Stittsville Main Street: Stittsville Main Street is a City of Ottawa arterial road with a rural cross-section including paved shoulders within the study area. The posted limit is 60 km/h within the study area, and the City-protected right of way is 42.5 metres. Stittsville Main Street is designated as a truck route.

Huntley Road: Huntley Road is a City of Ottawa arterial road with a two-lane rural cross-section including paved shoulders. Beyond 110 metres south of Flewellyn Road, the posted speed limit changes from 60 km/h to 70 km/h. Huntley Road is designated as a truck route. The existing right of way is 28.0 metres.

Fernbank Road: Fernbank Road is a City of Ottawa arterial road with a two-lane rural cross-section including paved shoulders. The posted speed limit is 60 km/h east of Cope Drive/Edenwylde Drive and 40 km/h between Cope Drive/Edenwylde Drive and West Ridge Drive. The City-protected right of way is 37.5 metres.

Flewellyn Road: Flewellyn Road is a City of Ottawa collector road with a two-lane rural cross-section including paved shoulders within the study area. The posted speed limit is 80 km/h, and the existing right of way is 26.0 metres.

Shea Road: Shea Road is a City of Ottawa collector road with a two-lane rural cross-section including gravel shoulders within the study area. Approximately 270.0 metres south of Fernbank Road, the posted speed limit transitions from 60 km/h to 80 km/h. The existing right of way is 20.0 metres.

Cosanti Drive: Cosanti Drive is a City of Ottawa local road with a two-lane urban cross-section. Sidewalks are expected to be constructed along both sides of the roadway. The unposted speed limit is 40 km/h, and the City-protected right of way is 22.0 metres.

2.2.2 Existing Intersections

The key intersections within one kilometre of the site have been summarized below:

Shea Road at Fernbank Road	The intersection of Shea Road at Fernbank Road is a four-legged roundabout intersection. Each leg consists of a shared all-movement lane. Pedestrian crossovers are provided on each leg and a MUP circulates the roundabout. No turn restrictions were noted.
Shea Road at Flewellyn Road	The intersection of Shea Road and Flewellyn Road is a stop-controlled intersection on the minor approaches of Shea Road, which are offset by approximately 33.0 metres. Each leg consists of a shared all-movement lane. No turn restrictions are noted.
Stittsville Main Street/ Huntley Road at Flewellyn Road	The intersection of Stittsville Main Street/ Huntley Road at Flewellyn Road is an all-way stop-controlled intersection. The northbound, eastbound, and westbound approaches each consist of a shared all-movement lane. The southbound approach consists of a shared left-turn/through and channelized right-turn lane. No turn restrictions are noted.
Shea Road at Cosanti Drive	The intersection of Shea Road at Cosanti Drive is a T-intersection with stop control on the minor approach of Cosanti Drive. The northbound approach consists of a left-turn/through lane, the southbound approach consists of a through/right-turn lane. The eastbound

approach consists of a left-turn/right-turn lane. No turn restrictions were noted.

2.2.3 Existing Driveways

Within 200 metres of the subdivision access, no driveways are present on Shea Road.

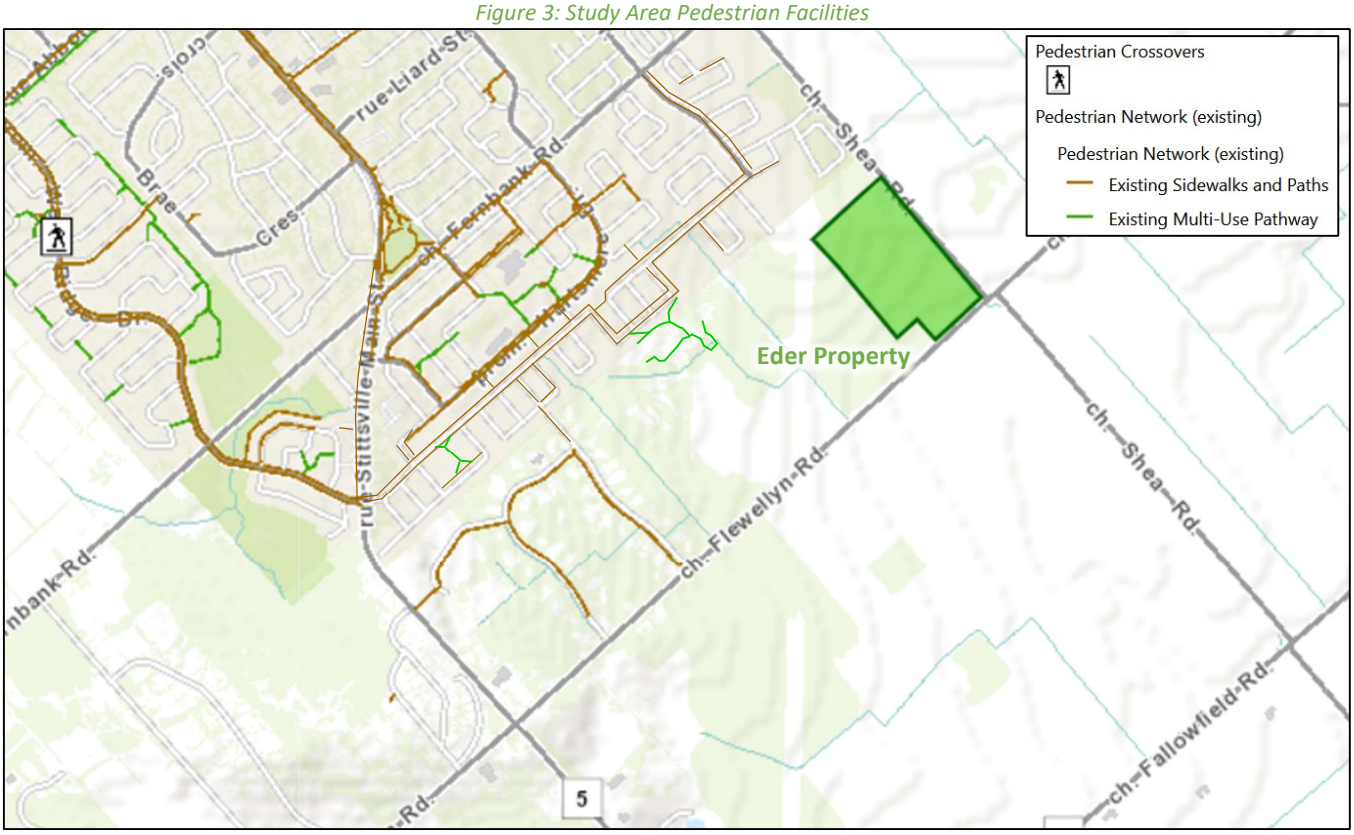
2.2.4 Cycling and Pedestrian Facilities

Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities. Considering the plans for other developments and the newly constructed pedestrian and cycling facilities, new community sidewalks and cycling pathways have been included in the figure, where possible, despite not being formalized within the City's pedestrian network in geoOttawa. As the area is still developing, these should not be considered a fulsome record of all facilities.

Sidewalks are present on Stittsville Main Street north of West Ridge Drive, West Ridge Drive, Upcountry Drive, Baywood Drive, Arrowwood Drive, Brightside Avenue between Fernbank Road and Baywood Drive, Edenwylde Drive, Hartsmere Drive, Hickstead Way, and Parade Drive.

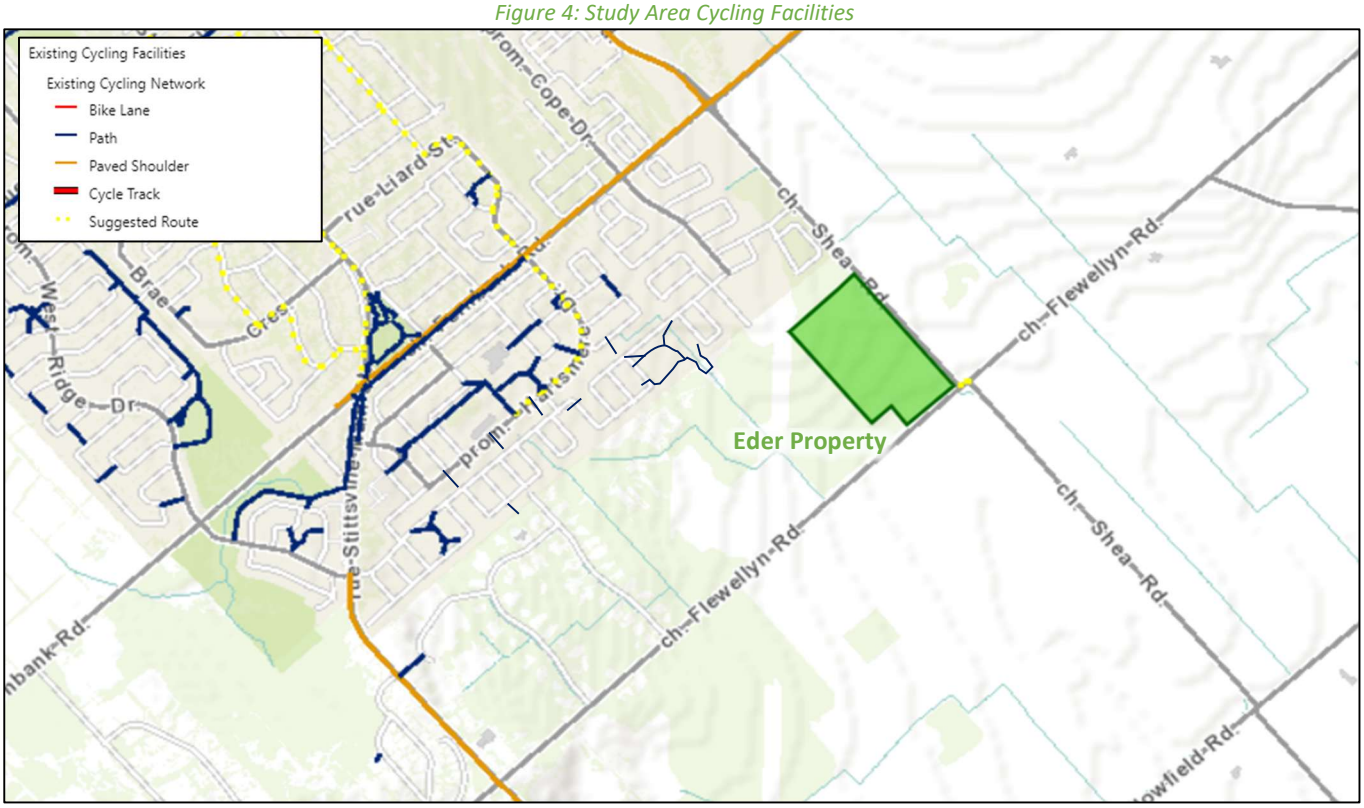
Paved shoulders are present on both sides along Stittsville Main Street south of Etta Street, Huntley Road, Fernbank Road, Shea Road north of Fernbank Road, Flewellyn Road, and on the west side along Stittsville Main Street between Etta Street and Upcountry Drive. A suggested route is noted at the offset Flewellyn Road and Shea Road intersection in the geoOttawa existing cycling network. Cycletracks are planned to be constructed on Cope Drive north of Fernbank Road as part of the 6041 Fernbank and 5957 and 5969 Fernbank subdivisions.

Figure 3: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 26, 2025

Figure 4: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 26, 2025

Pedestrian and cyclist volumes included in study area intersection counts, presented in Section 2.2.7, have been compiled and are illustrated in Figure 5 and Figure 6, respectively. It is noted that no pedestrian and cyclist volumes are available at the intersection of Shea Road at Cosanti Drive.

Figure 5: Existing Pedestrian Volumes

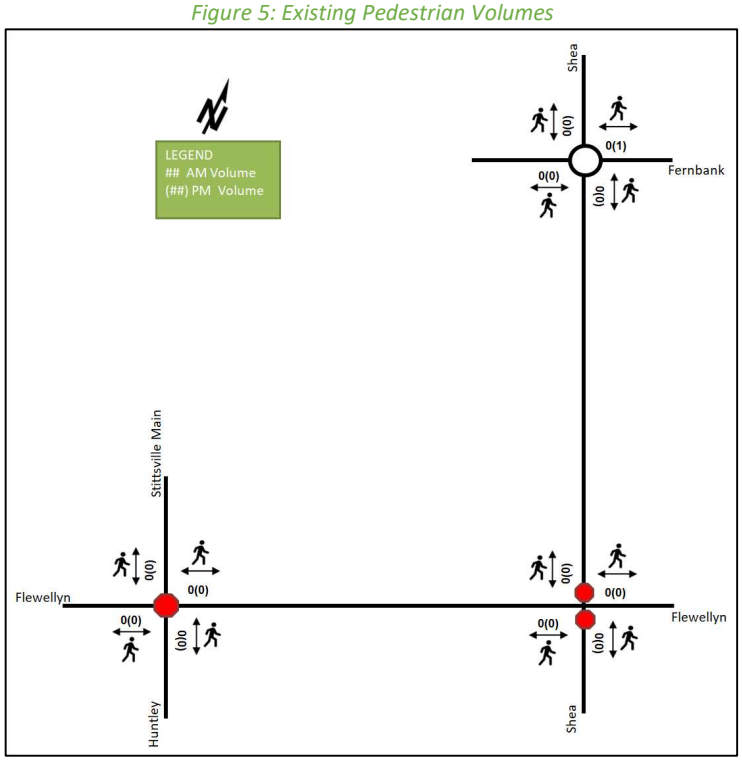
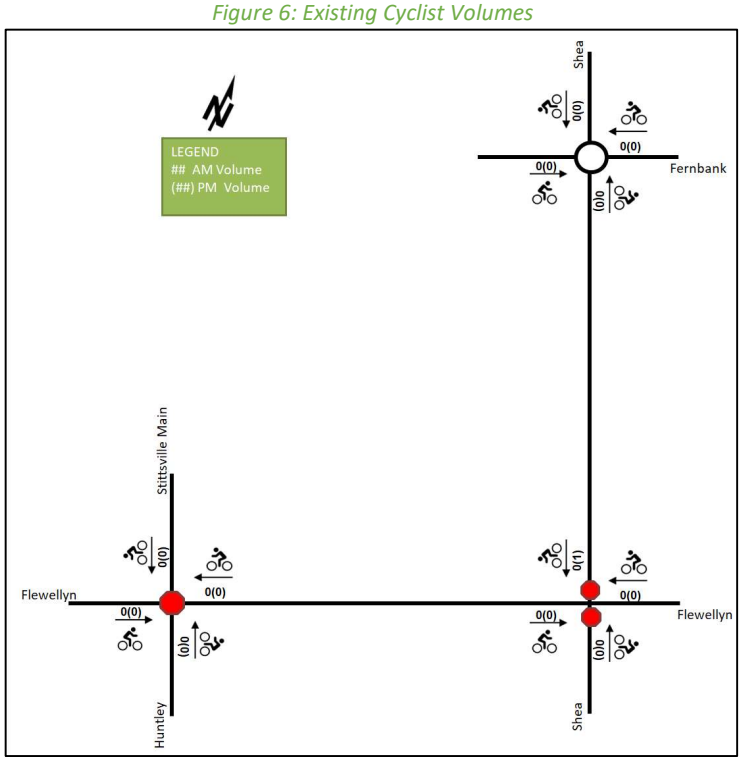


Figure 6: Existing Cyclist Volumes



2.2.5 Existing Transit

Figure 7 illustrates the transit system map in the study area and Figure 8 illustrates nearby transit stops. It is noted that no transit stops are present within 400 metres of the site.

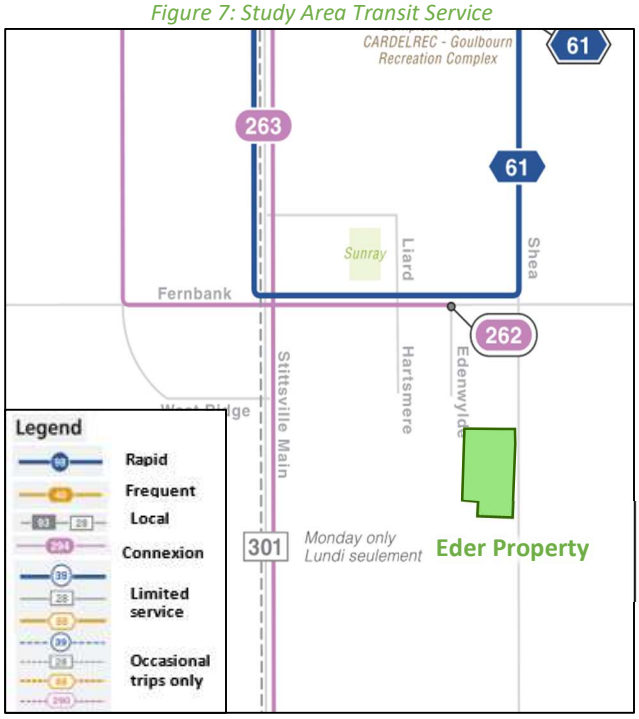
All transit information is from May 26, 2025, and is included for general information purposes and context to the surrounding area.

Route #61 currently travels along Shea Road, Fernbank Road, and Stittsville Main Street, Route #262 currently travels along Fernbank Road and West Ridge Drive, and Routes #263 and #301 currently travel along Stittsville Main Street. All these routes continue towards the northern Stittsville area.

The frequency of routes within proximity of the site based on May 26, 2025, service levels are:

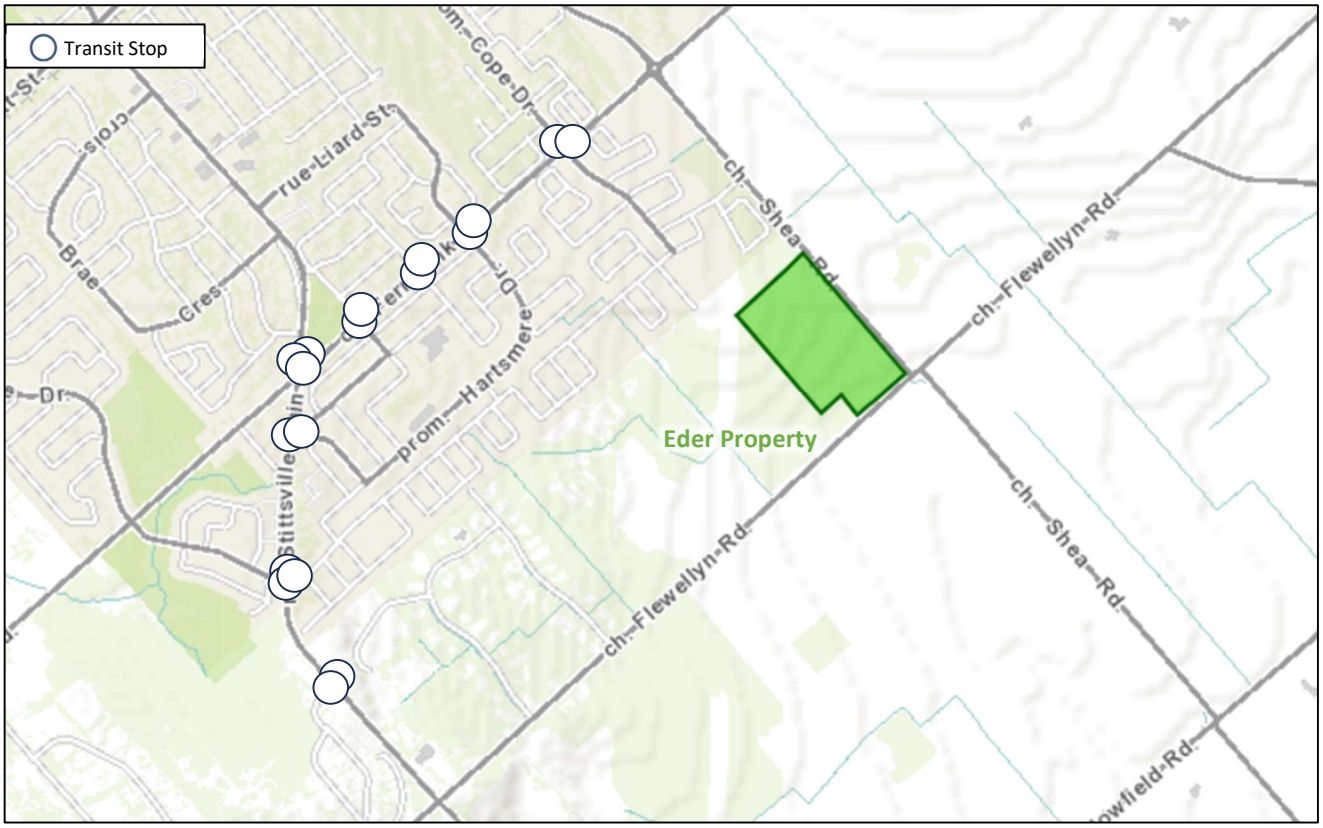
- Route # 61 – 30-minute service all day
- Route # 262 – Four morning buses and five evening buses per day
- Route # 263 – Three morning buses and four afternoon buses per day in the peak direction
- Route # 301 – One morning bus and one afternoon bus on Monday in the peak direction

Figure 7: Study Area Transit Service



Source: http://www.octranspo.com/ Accessed: May 26, 2025

Figure 8: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: October 7, 2024

2.2.6 Existing Area Traffic Management Measures

There are no existing area traffic management measures within the study area.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa, and third-party counts were collected by The Traffic Specialist. Table 1 summarizes the intersection count dates and sources. The volumes at the intersection of Shea Road at Cosanti Drive were estimated based on the 5993 Flewellyn TIA (IBI Group, 2015).

Table 1: Intersection Count Date

Intersection	Count Date	Source
Shea Road at Fernbank Road	Wednesday, March 02, 2022	City of Ottawa
Shea Road at Flewellyn Road	Wednesday, April 26, 2023	City of Ottawa
Stittsville Main Street/ Huntley Road at Flewellyn Road	Thursday, August 10, 2023	The Traffic Specialist
Shea Road at Cosanti Drive	-	5993 Flewellyn TIA (IBI Group, 2015)

Figure 9 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. Synchro 11 has been used to model the signalized and unsignalized intersections and Sidra 9 to model the study area roundabout. Level of service is based on HCM 2010 delay for stop-controlled intersection, and Sidra HCM 6 for roundabout intersections. Detailed turning movement count data is included in Appendix B and the synchro and sidra worksheets are provided in Appendix C.

Figure 9: Existing Traffic Counts

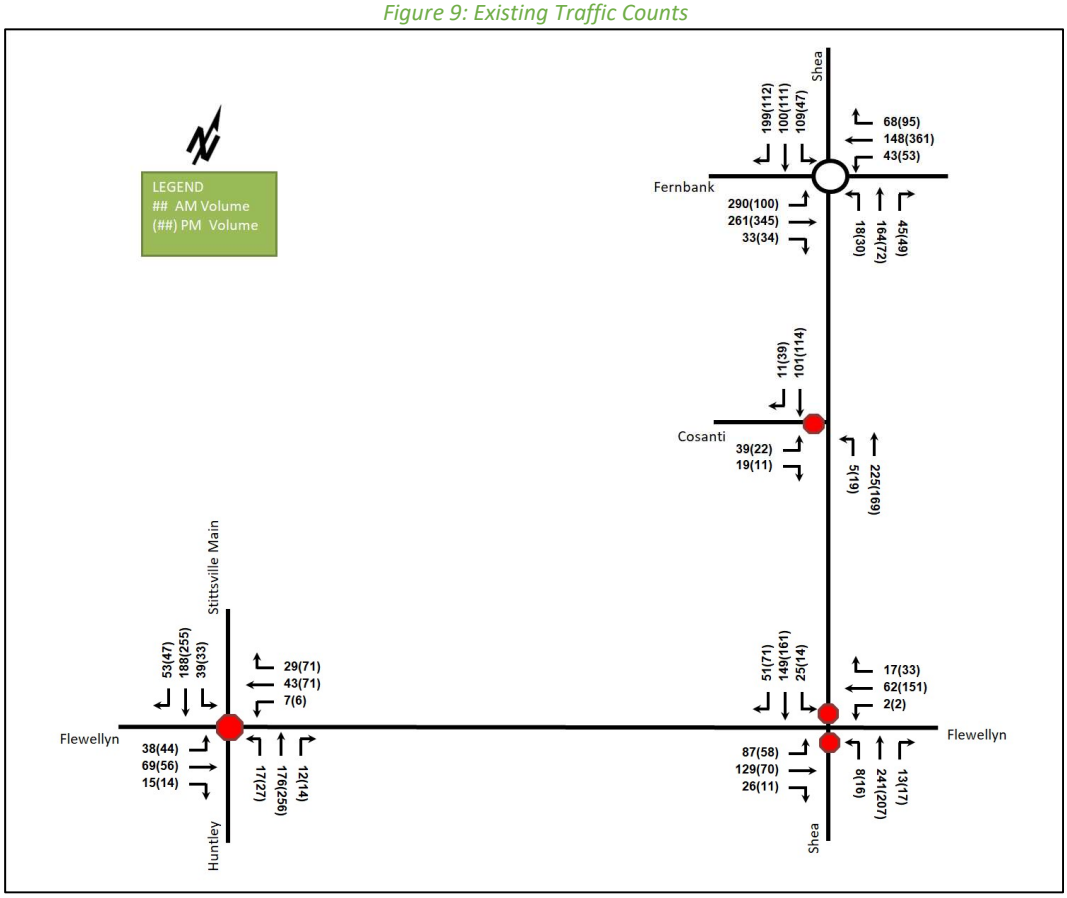


Table 2: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	B	0.65	10.2	42.7	A	0.50	6.7	23.7
	WB	A	0.37	8.4	13.2	A	0.53	6.2	26.0
	NB	B	0.42	10.8	15.1	A	0.22	8.1	6.8
	SB	A	0.44	6.9	18.8	A	0.38	8.2	13.7
	Overall	**A**	**0.65**	**9.0**	**42.7**	**A**	**0.53**	**7.0**	**26.0**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.07	7.6	1.5	A	0.05	7.8	0.8
	WB	A	0.00	7.6	0.0	A	0.00	7.4	0.0
	NB	C	0.62	24.5	31.5	C	0.54	20.8	24.0
	SB	C	0.54	21.6	24.0	C	0.50	18.2	21.0
	Overall	**B**	-	**14.8**	-	**B**	-	**12.3**	-
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	A	0.21	9.8	6.0	B	0.22	10.9	6.0
	WB	A	0.13	9.1	3.0	B	0.27	10.9	8.3
	NB	B	0.33	10.7	10.5	B	0.50	13.7	21.0
	SB	B	0.42	11.1	15.0	B	0.54	14.5	24.8
	Overall	**B**	-	**10.5**	-	**B**	-	**13.2**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Cosanti Drive ***Unsignalized***	EBL/R	B	0.09	10.7	2.3	B	0.05	10.6	1.5
	NBL/R	A	0.00	7.5	0.0	A	0.02	7.6	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.7**	**-**	**A**	**-**	**1.3**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 0.90
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections operate well. No capacity issues are noted.

All-way stop control warrant analysis was performed for the intersections of Shea Road at Flewellyn Road and Shea Road at Cosanti Drive for the existing conditions. The Shea Road at Flewellyn Road intersection met the all-way stop-control warrants. Although warrants are met, the City has stated an all-way stop-control cannot be implemented due to the offset condition. Moreover, the operations are acceptable to remain as a minor stop-control condition. All-way stop control warrant calculation sheets are provided in Appendix D.

Signal warrant analysis of Justifications 1 and 2 were performed for the intersections of Shea Road at Flewellyn Road and Stittsville Main Street / Huntley Road at Flewellyn Road for the existing conditions. The intersection of Shea Road at Flewellyn Road does not meet signal warrants. The Stittsville Main Street / Huntley Road at Flewellyn Road intersection met the Signal Justification 1, and as it has only met a single justification, it is recommended to remain as all-way stop-control. Signal warrant calculation sheets are provided in Appendix E.

The left-turn warrant analysis was performed for the intersections of Shea Road at Flewellyn Road, Stittsville Main Street / Huntley Road at Flewellyn Road, and Shea Road at Cosanti Drive for existing conditions, none of the intersections met a left-turn warrant for any approach. The left-turn warrant calculation sheets are provided in Appendix F.

2.2.8 Collision Analysis

Collision data have been acquired from the City of Ottawa open data website (data.ottawa.ca) for five years prior to the commencement of this TIA for the surrounding study area road network (2018-2022). Table 3 summarizes the collision types and conditions in the study area, Figure 10 illustrates the intersections and segments analyzed, and Table 4 summarizes the total collisions for each of these locations. Collision data are included in Appendix G.

Table 3: Study Area Collision Summary, 2018-2022

		Number	%
Total Collisions		**48**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	8	17%
	Property Damage Only	40	83%
Initial Impact Type	**Angle**	24	50%
	Rear end	8	17%
	SMV Other	15	31%
	Other	1	2%
Road Surface Condition	**Dry**	35	58%
	Wet	11	18%
	Loose Snow	4	7%
	Slush	1	2%
	Packed Snow	2	3%
	Ice	7	12%

	Number	%
Total Collisions	**48**	**100%**
Pedestrian Involved	0	0%
Cyclists Involved	0	0%

Figure 10: Study Area Collision Records, 2018-2022

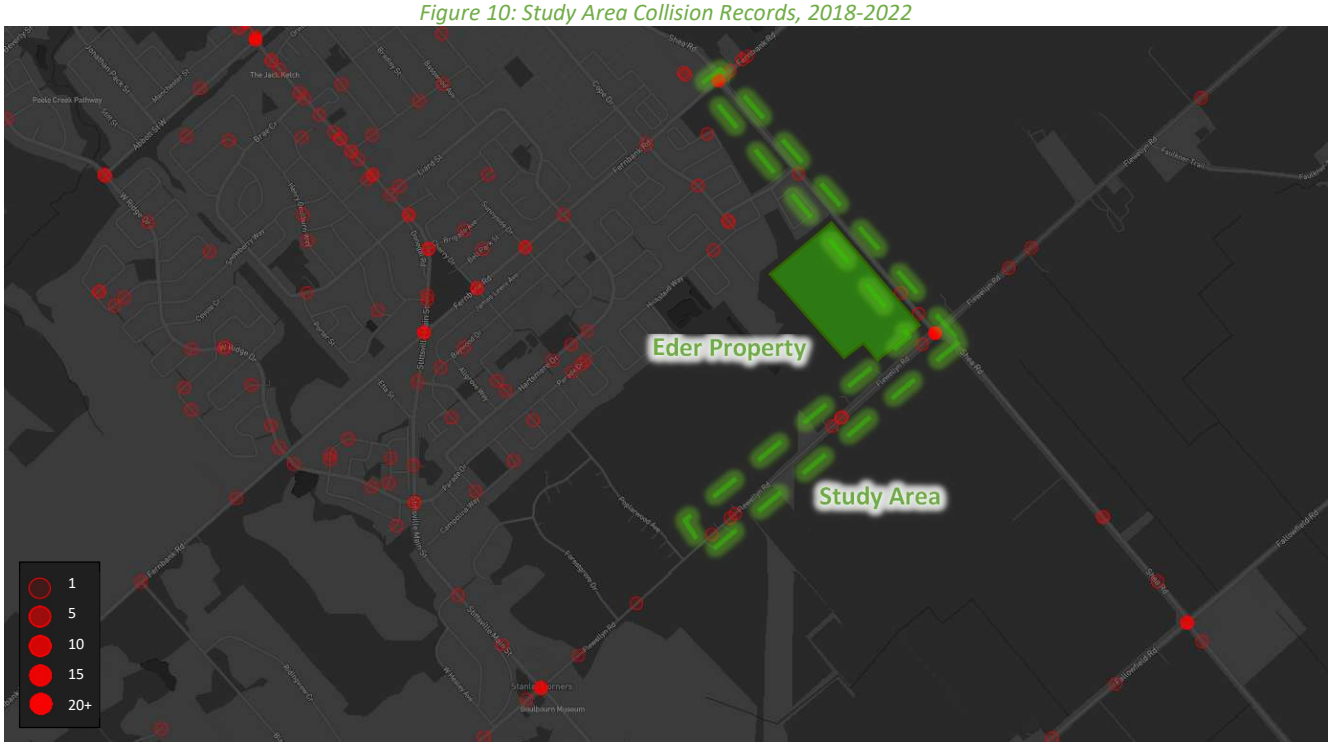


Table 4: Summary of Collision Locations, 2018-2022

	Number	%
Intersections / Segments	**48**	**100%**
Flewellyn Road at Shea Road	23	48%
Fernbank Road at Shea Road	15	31%
Flewellyn Road between Poplarwood Avenue and Shea Road	7	15%
Shea Road between Fernbank Road and Flewellyn Road	3	6%

Within the study area, the intersections of Flewellyn Road at Shea Road and Fernbank Road at Shea Road are noted to have experienced higher collisions than other locations listed in Table 4. Table 5 and Table 6 summarize the collision types and conditions for each location.

Table 5: Flewellyn Road at Shea Road Collision Summary, 2018-2022

		Number	%
Total Collisions		**23**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	7	30%
	Property Damage Only	16	70%
Initial Impact Type	**Angle**	17	74%
	Rear end	3	13%
	SMV Other	3	13%
Road Surface Condition	**Dry**	16	70%
	Wet	4	17%

		Number	%
Total Collisions		**23**	**100%**
	Loose Snow	1	4%
	Ice	2	9%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Flewellyn Road at Shea Road intersection had a total of 23 collisions during the 2018-2022 time period, with 16 involving property damage only and the remaining seven having non-fatal injuries. The collision types are most represented by angle with 17, followed by three collisions each for the rear end and SMV other. Weather conditions do not affect collisions at this location.

The latest detailed collision records for this intersection were received from the City for the data range of 2017-2021, which is a 5-year period shifted one year earlier than the open data. From this data, a total of 20 collisions were observed, including three single motor vehicles collisions, three rear end collisions, and 14 angled collisions.

Among the 14 angled collisions recorded between 2017 and 2021, most angle collisions were noted to have occurred in a clear condition during daylight (nine out of 14). Additionally, angled collisions predominantly involved southbound vehicles conflicting with westbound vehicles (10 out of 14), with six southbound movements turning left and four traversing the offset to travel south of Flewellyn Road. Two other collisions involve left-turning southbound vehicles conflicting with eastbound vehicles and two with northbound vehicles traversing the offset conflicting with eastbound vehicles. The offset configuration of this intersection is considered the primary cause of these angled collisions. The detailed collision data are included in Appendix G.

Due to the property ownership, no ability exists for the site to re-align Shea Road. The City is currently investigating safety improvements at this intersection until the additional property is acquired and potential long term geometric upgrades. Any mitigation that may reduce the east-west speeds would be the primary goal, as it would allow extra ability for collision avoidance and reduce the severity should a collision occur.

Table 6: Fernbank Road at Shea Road Collision Summary, 2018-2022

		Number	%
Total Collisions		**15**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	1	7%
	Property Damage Only	14	93%
Initial Impact Type	**Angle**	7	47%
	Rear end	4	27%
	SMV Other	3	20%
	Other	1	7%
Road Surface Condition	**Dry**	9	60%
	Wet	1	7%
	Packed Snow	1	7%
	Ice	4	27%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

The Fernbank Road at Shea Road intersection had a total of 15 collisions during the 2018-2022 time period, with 14 involving property damage only and the remaining one having non-fatal injuries. The collision types are most represented by angle with seven, followed by four rear end, three SMV other, and one other. It is noted that six out of 15 collisions are due to wet, packed snow, or ice surface conditions. Angle collisions mostly occurred during

daylight under clear and dry conditions (five out of seven), and all the angle collisions occurred during 2018-2019. All rear end collisions occurred under dark light conditions in the late afternoon/early evening, all occurred during fall or winter between October and March, and two of four collisions occurred during icy conditions. The surface conditions and dark conditions, despite available street lighting, appear to be contributing factors for collisions at this intersection. No further examination is required as part of this study.

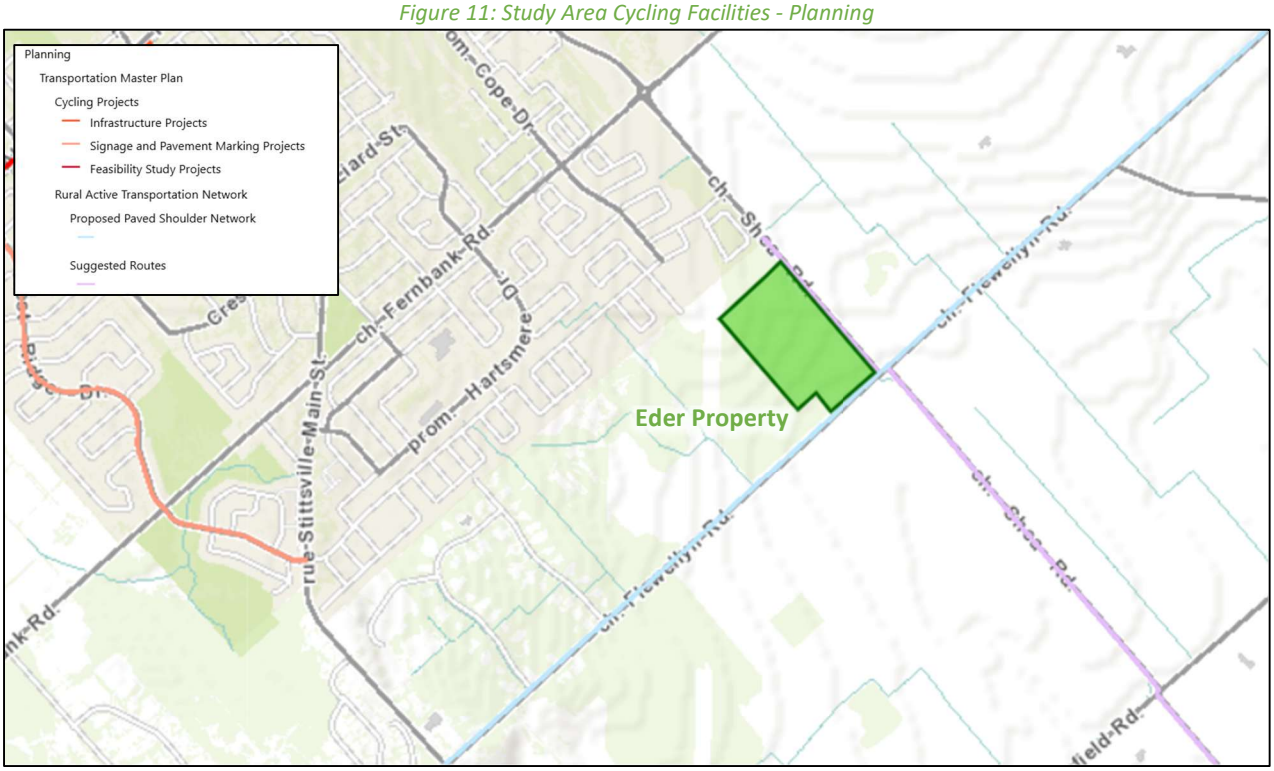
2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

2.3.1.1 Transportation Master Plan (TMP) Update – Part 1 (2023)

The Transportation Master Plan Part 1 provides the active transportation project list, which includes a suggested route from Shea Road, located 640 metres north of Fernbank Road, to the south, and paved shoulders are proposed along Flewellyn Road. Figure 11 illustrates the planned cycling facilities in the study area.

Figure 11: Study Area Cycling Facilities - Planning



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 26, 2025

2.3.1.2 Transportation Master Plan (TMP)– Part 2 (2025)

The Transportation Master Plan Part 2 is still in public consultation and has released a draft project list for road and transit projects, along with the draft capital infrastructure plan. Projects within the draft road and transit priority include Robert Grant Extension between Palladium Drive and Hazeldean Road, implementing new active transportation facilities on both sides of Fernbank Road from West Ridge Drive to Shea Road and improving connection to the existing pathway on the south side of Fernbank from Stittsville Main Street to Hartsmere Drive, implementing new sidewalks and cycletracks on both sides of Shea Road from Abbott Street to Cosanti Drive.

2.3.1.3 Robert Grant Avenue - Between Palladium Drive and Fernbank Road

Robert Grant Avenue is a 2-lane arterial roadway between Abbott Street and Fernbank Road and is being extended to northwards from Abbott Street to Hazeldean Road. The ultimate configuration of Robert Grant Avenue will be

a 4-lane roadway, supporting rapid transit, cycling facilities and pedestrian facilities between Palladium Drive and Fernbank Road. The nature of this corridor will evolve from the previously completed environmental assessment study, as City standards and guidelines have advanced during the intervening time. A transit station and park-and-ride facility are identified at the intersection of Robert Grant Avenue at Fernbank Road and Abbott Street at Hazeldean Road as part of the affordable network. The City's Affordable Network only identifies this corridor as a 2-lane roadway.

2.3.1.4 Isolated Transit Priority Measures

Transit priority measures in the Transportation Master Plan (2013) are identified in the affordable network as a loop along Fernbank Road from the future Fernbank transit station at Robert Grant Avenue to Stittsville Main Street, Hazeldean Road and back to Robert Grant Avenue. The affordable network only contains transit priority measures along Hazeldean Road and Robert Grant Avenue.

2.3.1.5 Transportation Master Plan (2013)

Fernbank Road widening from two to four lanes between Stittsville Main Street and Terry Fox Drive is identified in the Transportation Master Plan (2013) in the network concept; however, it is not in the 2031 affordable network concept. Since the timeline for this project is unknown, it is assumed that this project will be completed beyond 2031 and will not be included in the analysis. It is assumed that the widening will incorporate sidewalks, cycletracks and possible transit priority measures into the design once initiated by the City. The Part 2 update to the Transportation Master Plan will replace this document.

2.3.2 Other Study Area Developments

Figure 12 illustrates all the developments noted in the larger Stittsville context and Table 7 summarizes the details of each development.

Figure 12: Area Developments

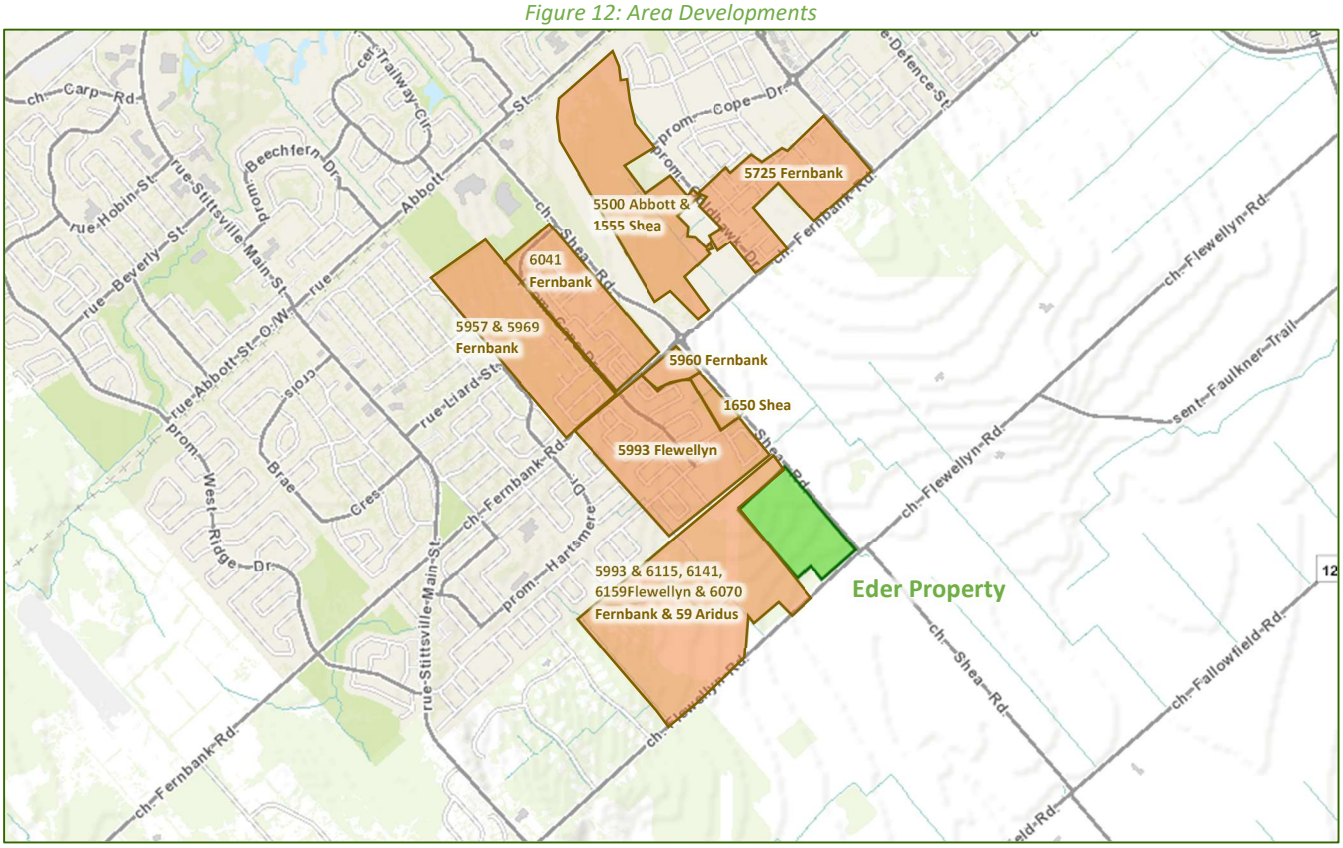


Table 7: Area Development Details

#	Address	Application Type	Size	Build-Out Date	Estimated Completion	TIA Author
1	5957 & 5969 Fernbank	• PoS • ZBA	• 98 single-family homes • 368 townhomes	2025	0%	Parsons, 2018 Addendum, 2020
2	6041 Fernbank	• PoS	• 234 single-family homes • 142 semi-detached homes • 262 townhomes	2023	0%	IBI Group, 2021
3	5993 Flewellyn (part of Area 6 lands)	• PoS	• 329 single-family homes • 230 semi-detached homes • 172 townhomes	2025	95%	IBI Group, 2015
4	1650 Shea (part of 5993 Flewellyn)	• SPA	• 13 low-rise buildings (a total of 116 units)	2024	0%	TIA is not required
5	5960 Fernbank (part of Area 6 lands)	• ZBA • SPA	• 40,000 sq. ft. grocery store • 19,250 sq. ft. retail • 5,900 sq. ft. restaurant	2024	0%	Parsons, 2016
6	5500 Abbott & 1555 Shea	• ZBA • PoS	• 286 single-family homes • 324 townhomes	2025	0%	IBI Group, 2022
7	5725 Fernbank	• ZBA • PoS	• 206 single family homes • 391 townhomes	2025	0%	IBI Group, 2021

#	Address	Application Type	Size	Build-Out Date	Estimated Completion	TIA Author
8	5993, 6115, 6141, 6159 Flewellyn & 6070 Fernbank	• POA • ZBA • PoS	• 615 townhomes • 527 single detached homes • 550 stacked condo units	2030	0%	CGH Transportation, Ongoing

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of:

- Shea Road at:
  - Fernbank Road
  - Flewellyn Road
  - Cosanti Drive
  - Street 21 (Future Conditions)
- Flewellyn Road at:
  - Street 16 (Planned collector road within adjacent subdivision)
  - Street 12 (Planned collector road within adjacent subdivision)
  - Stittsville Main Street/ Huntley Road

Street 16and Street 12 are planned collector roads within the adjacent subdivision. These road intersections will be included in future conditions. The boundary road will be Shea Road and Flewellyn Road, and Screenline 56 is present within proximity to the proposed development.

3.2 Time Periods

As the proposed development is composed entirely of residential units the AM and PM peak hours will be examined.

3.3 Horizon Years

The anticipated build-out year is 2030. As a result, the full build-out plus five years horizon year is 2035.

4 Development-Generated Travel Demand

4.1 Mode Shares

Examining the mode shares recommended in the TRANS Trip Generation Manual (2020) for the Kanata/Stittsville and Rural Southwest districts, derived from the most recent National Capital Region Origin-Destination survey (OD Survey), the existing average district mode shares by land use have been summarized in Table 8.

Table 8: TRANS Trip Generation Manual Recommended Mode Shares – Kanata/Stittsville and Rural Southwest

Travel Mode	Kanata/Stittsville				Rural Southwest			
	Single Detached		Multi-Unit (Low-Rise)		Single Detached		Multi-Unit (Low-Rise)	
	AM	PM	AM	PM	AM	PM	AM	PM
Auto Driver	52%	56%	52%	58%	60%	67%	66%	62%
Auto Passenger	15%	19%	14%	17%	14%	17%	13%	19%
Transit	20%	14%	22%	17%	24%	14%	21%	16%
Cycling	1%	1%	0%	0%	2%	2%	1%	3%
Walking	12%	9%	11%	8%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Examining the above mode shares for the adjacent districts, a combined modal share for the subject development has been developed as a baseline for the expected travel modes of the development. Table 9 summarizes the expected modes shares for the development area.

Table 9: Expected Development Baseline Mode Shares

Travel Mode	Single Detached		Multi-Unit (Low-Rise)	
	AM	PM	AM	PM
Auto Driver	51%	59%	55%	58%
Auto Passenger	15%	19%	15%	19%
Transit	24%	14%	21%	16%
Cycling	2%	2%	2%	2%
Walking	8%	6%	7%	5%
Total	**100%**	**100%**	**100%**	**100%**

4.2 Trip Generation

This TIA has been prepared using the person trip rates for the residential dwellings using the TRANS Trip Generation Manual (2020). Table 10 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 10: Trip Generation Person Trip Rates by Peak Period

Land Use	Land Use Code	Peak Period	Person Trip Rates
Single-Detached	210 (TRANS)	AM	2.05
		PM	2.48
Multi-Unit (Low-Rise)	220 (TRANS)	AM	1.35
		PM	1.58

Using the above person trip rates, the total person trip generation has been estimated. Table 11 summarizes the total person trip generation for the residential land uses.

Table 11: Total Residential Person Trip Generation by Peak Period

Land Use	Units	AM Peak Period			PM Peak Period		
		In	Out	Total	In	Out	Total
Single-Detached	140	86	201	287	215	132	347
Multi-Unit (Low-Rise)	222	90	210	300	197	154	351

Using the above mode share targets and the person trip rates, the person trips by mode have been projected. Trip generation by peak hour has been forecasted using the prescribed peak period conversion factors presented in the TRANS Trip Generation Manual (2020) for the residential component. Table 12 summarizes the residential trip generation.

Table 12: Trip Generation by Mode

Travel Mode		AM Peak Hour				PM Peak Hour			
		Mode Share	In	Out	Total	Mode Share	In	Out	Total
Single-Detached	Auto Driver	**51%**	21	49	70	**59%**	56	34	90
	Auto Passenger	**15%**	6	15	21	**19%**	18	11	29
	Transit	**24%**	11	27	38	**14%**	14	9	23
	Cycling	**2%**	1	2	3	**2%**	2	1	3
	Walking	**8%**	4	9	13	**6%**	7	4	11
	Total	**100%**	**43**	**102**	**145**	**100%**	**97**	**59**	**156**
Multi-Unit (Low-Rise)	Auto Driver	**55%**	24	55	79	**58%**	50	40	90
	Auto Passenger	**15%**	7	15	22	**19%**	16	13	29
	Transit	**21%**	11	25	35	**16%**	15	11	26
	Cycling	**2%**	1	2	3	**2%**	2	1	3
	Walking	**7%**	4	8	12	**5%**	5	4	9
	Total	**100%**	**47**	**105**	**151**	**100%**	**88**	**69**	**157**
Total	Auto Driver	-	45	104	149	-	106	74	180
	Auto Passenger	-	13	30	43	-	34	24	58
	Transit	-	22	52	73	-	29	20	49
	Cycling	-	2	4	6	-	4	2	6
	Walking	-	8	17	25	-	12	8	20
	Total	-	**90**	**207**	**296**	-	**185**	**128**	**313**

As shown above, a total of 149 AM and 180 PM new peak hour two-way vehicle trips are projected as a result of the proposed development.

4.3 Trip Distribution

To understand the travel for the subject development, the OD Survey has been reviewed to determine the travel patterns for the Kanata/Stittsville and Rural Southwest districts. Based on the screenline review in Section 12, Fernbank Road, east of Shea Road, during the PM peak hour in the westbound direction is expected to be over the TRANS capacity in the future background conditions, therefore, no trip assignments are distributed along Fernbank Road during the PM peak hour in the westbound direction. Table 13 below summarizes the expected distribution of trips from the proposed subdivision lands. While not explicitly detailed, it is expected that an amount of cut-through travel between the existing subdivision area and the proposed subdivision will occur, and it is assumed that the interaction of those trips on the area road network will balance through the proposed subdivision.

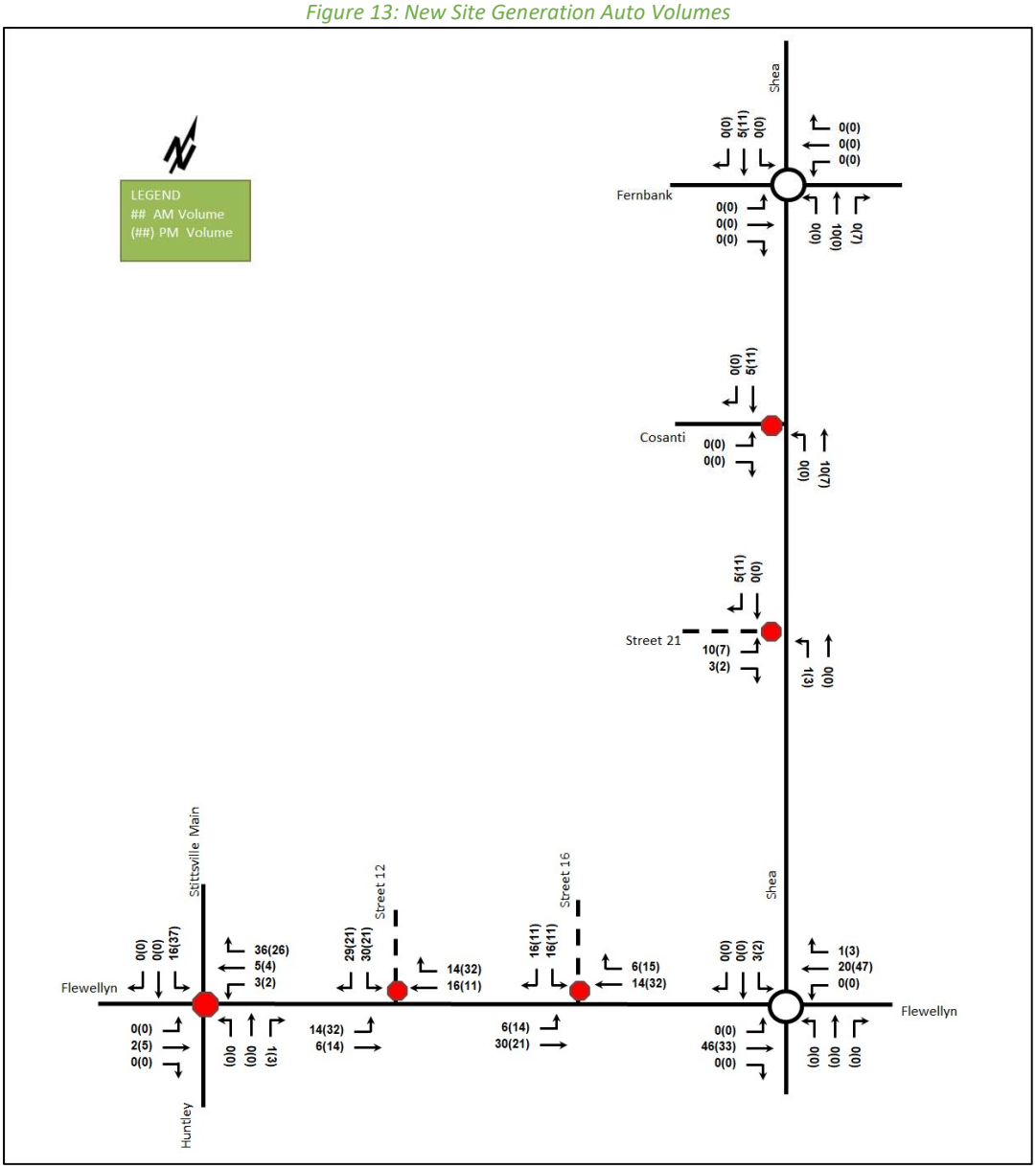
Table 13: OD Survey Distribution

To/From	Residential % of Trips	Inbound Via	Outbound Via
North	80%	35% via Flewellyn to Stittsville Main north 10% via Shea north 35% via Flewellyn east	35% via Stittsville Main north 10% via Shea North (AM)/10% via Fernbank east (PM) 35% via Flewellyn east
South	3%	3% via Flewellyn to Huntley	3% via Huntley
East	12%	12% via Flewellyn	12% via Flewellyn
West	5%	5% via Flewellyn	5% via Flewellyn
Total	100%	100%	100%

4.4 Trip Assignment

Using the distribution outlined in Section 4.3, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the study area road network. Figure 13 illustrates the new site-generated volumes.

Figure 13: New Site Generation Auto Volumes



5 Exemption Review

Table 14 summarizes the exemptions for this TIA.

Table 14: Exemption Review

Module	Element	Explanation	Exempt/Required
Site Design and TDM			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plan and zoning by-law applications	Exempt

Module	Element	Explanation	Exempt/Required
	4.1.3 New Street Networks	Only required for plans of subdivision	Required
4.2 Parking	4.2.1 Parking Supply	Only required for site plan and zoning by-law applications	Exempt
4.3 Boundary Street Design		All applications	Required
4.5 Transportation Demand Management	All Elements	Only required when the development generates more than 60 person-trips	Required
Network Impact			
3.2 Background Network Travel Demand	All Elements	Only required when one or more other Network Impact Modules are triggered	Required
3.3 Demand Rationalization		Only required when one or more other Network Impact Modules are triggered	Required
4.6 Neighbourhood Traffic Calming	4.6.1 Adjacent Neighbourhoods	If the development meets all of the following criteria along the route(s) site generated traffic is expected to utilize between an arterial road and the site's access: 1. Access to Collector or Local; 2. "Significant sensitive land use presence" exists, where there is at least two of the following adjacent to the subject street segment: • School (within 250m walking distance); • Park; • Retirement / Older Adult Facility (i.e. long-term care and retirement homes); • Licenced Child Care Centre; • Community Centre; or • 50%, or greater, of adjacent property along the route(s) is occupied by residential • lands and a minimum of 10 occupied residential units are present on the route. 3. Application is for Zoning By-Law Amendment or Draft Plan of Subdivision; 4. At least 75 site-generated auto trips; 5. Site Trip Infiltration is expected. Site traffic will increase peak hour vehicle volumes along the route by 50% or more.	Exempt
4.7 Transit	4.7.1 Transit Route Capacity	Only required when the development generates more than 75 transit trips	Exempt

Module	Element	Explanation	Exempt/Required
	4.7.2 Transit Priority Requirements	Only required when the development generates more than 75 auto trips	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Required
4.9 Intersection Design	4.9.1 Intersection Control	Only required when the development generates more than 75 auto trips	Required
	4.9.2 Intersection Design	Only required when the development generates more than 75 auto trips	Required

6 Development Design

6.1 Design for Sustainable Modes

The proposed development is a residential subdivision featuring driveways for each dwelling and garages for typical townhomes. Bicycle parking is assumed to be within the individual units. Sidewalks are provided on the new collector road and key local roads, ensuring connectivity within the proposed development and to the adjacent subdivision. Figure 14 illustrates the conceptual pedestrian network.

Figure 14: Conceptual Pedestrian Network

Transit services are planned along the collector road and through the adjacent subdivision.

6.2 New Street Networks

The new collector road is proposed to connect Shea Road and serve as potential transit route. The new 24.0-metre-wide collector road is proposed with 2.0-meter-wide sidewalk with a 1.7-metre-wide boulevard on a single side and a 3.0-metre-wide MUP with a 0.7-metre-wide boulevard on the other side. On-street parking is proposed on one side of the road, and the proposed speed limit will be 40 km/h.

All the new local roadways are 18.0-metre-wide and on-street parking along one side of the road, with key connections including 2.0-metre-wide sidewalks on one side. The new internal local roads are proposed to connect to the collector roads, Street 21 and Street 16, with Street 21 located within the subject lands and Street 16 within the adjacent subdivision. The proposed speed limit will be 30 km/h.

Street 21 is located approximately 410 meters north of the intersection of Shea Road and Flewellyn Road, and approximately 510 meters south of the intersection of Shea Road and Cosanti Drive. The intersection offsets exceed the TAC's minimum corner clearance requirement of 25 meters from major intersections.

To support the pedestrian and cycling connectivity within the subdivision, traffic calming elements have been illustrated on the conceptual traffic calming plan, adhering to the philosophies of the Traffic Calming Guidelines and preliminary input from the City. The plan has not been coordinated or reconciled with the civil design, utility requirements, grading requirements or streetscaping elements such as trees. The features include bulb-outs to narrow approaches to intersections (e.g. reduced crossing distance) and speed humps, midblock narrowing to reduce vehicle speeds and lateral roadway shifts. It is noted that the lateral shifts have potential impacts to transit service and maintenance operations, as well as the removal of 45 metres or more of on-street parking. The lateral shifts also are considered to have limited traffic calming benefits as they are designed for smooth and comfortable travel at the direction of City Staff. Traffic calming elements for connections to the existing roadways will be coordinated with the adjacent existing roadway during the detailed design phase. The future transit stops are proposed within the adjacent subdivision, matching previous consultation with Transit Services.

Conceptually, corner triangles have been illustrated based in preliminary City feedback for overlapping 5x15 metre corner triangles at the collector-to-collector road intersections, 3x9 metre corner triangles for local-to-collector intersections and 3x3 metre corner triangles for local-to-local intersections. These are not intended to be the corner triangles ultimately provided, they are illustrative only to address City commentary. Servicing and landscape designs for the subdivision will determine if these protections are required. A conceptual traffic calming plan has been provided in Appendix H.

7 Boundary Street Design

Table 15 summarizes the MMLOS analysis for the boundary streets of Shea Road and Flewellyn Road, and the internal roads of new local road. As Shea Road and Flewellyn Road are within “General Rural Area”, no MMLOS targets for the existing conditions. The future conditions assume all roadways are within the “General Urban Area”. The MMLOS worksheets have been provided in Appendix I.

Table 15: Boundary Street MMLOS Analysis

	Segment	Condition	Pedestrian LOS		Bicycle LOS		Transit LOS	
			PLOS	Target	BLOS	Target	TLOS	Target
Boundary Roadways	Shea Road	Existing	F	N/A	F	N/A	-	N/A
		Future	**F**	C	**F**	D	**E**	D
	Flewellyn Road	Existing	F	N/A	E	N/A	-	N/A
		Future	**F**	C	**E**	D	**E**	D

	Segment	Condition	Pedestrian LOS		Bicycle LOS		Transit LOS	
			PLOS	Target	BLOS	Target	TLOS	Target
Internal Roadways	New local road (w sidewalk)	Future	A	C	B	D	-	-
	New local road (w/o sidewalk)	Future	C	C	B	D	-	-
	New collector road	Future	A	C	A	D	-	-

Both Shea Road and Flewellyn Road have a level of service (LOS) F for pedestrian mode in the existing conditions. Shea Road has a level of service (LOS) F and Flewellyn Road has LOS E for bicycle mode in the existing conditions. No future improvements are noted along either roadway frontage.

To meet the theoretical pedestrian LOS target on Shea Road, various combinations can be considered:

- a speed reduction to 30 km/h, or
- a speed reduction to 30-50 km/h and a 2.0 metre sidewalk adjacent to the road edge; or
- a speed reduction to 50-60 km/h and 2.0 metre sidewalk with a 2.0 metre boulevard

To meet the theoretical pedestrian LOS target on Flewellyn Road, various combinations can be considered:

- a speed reduction to 30 km/h, or
- a speed reduction to 50-60 km/h and a 2.0 metre sidewalk adjacent to the road edge; or
- a 2.0 metre sidewalk with a 0.5-2.0 metre boulevard

To meet the theoretical bicycle LOS target on Shea Road and Flewellyn Road, various combinations can be considered:

- a speed reduction to 40 km/h, or
- a speed reduction to 50-70 km/h and an on-road facility, or
- a physically separated cycle facility (it is noted this condition defaults the BLOS to A regardless of the road conditions or separation, potentially overestimating the BLOS)

The existing cross-section and right-of-way of Shea Road would not permit the continuation of active mode facilities beyond the frontage of the subdivision. The Transportation Master Plan Part 2 draft projects include the urbanization of Shea Road from Fernbank Road to Cosanti Road, the timing is unknown and leaves a gap between the planned project and the subdivision frontage. Therefore, providing a sidewalk or cycling facilities would not have functional use beyond meeting the MMLOS targets. Instead, internal pedestrian and cycling connectivity within the subdivision will provide parallel and more convenient routes.

The presence of the Faulkner Municipal Drain along Flewellyn Road prevents the inclusion of a sidewalk or off-road cycling facilities for over 600 metres west of Shea Road. The paved shoulders provide cycling along the corridor in both directions, and the incorporation of speed limit reductions would bring the condition into alignment with the MMLOS targets.

The internal local roads with a sidewalk will have an LOS of A for pedestrian and LOS B for bicycle, and the local roads without a sidewalk will have an LOS of C for pedestrian and LOS B for bicycle. The collector road will have LOS of A for both pedestrian and bicycle. It is expected that the internal local roads will meet the MMLOS targets.

Both Shea Road and Flewellyn Road would have a level of service (LOS) E for transit mode in the future conditions. The truck LOS is not applicable for the boundary roads and internal roadways, per the application of the MMLOS Guidelines.

8 Transportation Demand Management

8.1 Context for TDM

The mode shares used within the TIA represent the unmodified district mode shares for a combined modal share of the Kanata/Stittsville and Rural Southwest districts. These mode shares include a maximum of 24% for transit, 2% for cycling, and 8% for walking. Considering the context of the proposed development, post-occupancy TDM measures will be recommended to support achieving the mode share targets for the proposed development.

8.2 Need and Opportunity

The subject site has been assumed to rely predominantly on auto travel, followed by transit, walking, and cycling, and those assumptions have been carried through the analysis. Although the intersections in the study area are anticipated to have residual capacity, Fernbank Road is expected to reach capacity in the future background conditions reviewed in Section 12. It is anticipated that future pedestrian facilities and cycling facilities provided within the adjacent subdivision to connect to northern communities, along with transit service within the adjacent subdivision providing local service through the subject site, will be the primary methods of supporting the community. Supporting TDM measures are recommended to encourage shifts toward sustainable modes and mitigate the risks associated with failing to meet mode share targets.

8.3 TDM Program

The "suite of post occupancy TDM measures" has been summarized in the TDM checklists for the residential land uses. The checklist is provided in Appendix J. The key TDM measures recommended include:

- Provide a multimodal travel option information package to new residents
- Provide transit incentives for new residents
- Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels

9 Background Network Travel Demands

9.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3 and will be considered in the analysis.

9.2 Background Growth

A review of the background projections from the City's TRANS Regional Model for the 2011 and 2031 horizons was completed to determine the background growth for each of the study area roadways. The background TRANS model growth rates are summarized in Table 16 and the TRANS model plots are provided in Appendix L.

Table 16: TRANS Regional Model Projections – Study Area Growth Rates – AM Peak Hour

Street	TRANS 2011 to 2031	
	Eastbound	Westbound
Flewellyn Rd	-	-
Fernbank Rd	-0.88%	1.47%
	Northbound	**Southbound**
Shea Rd	2.36%	4.84%

Street	TRANS 2011 to 2031	
	Eastbound	Westbound
Stittsville Main St	0.56%	0.54%
Huntley Rd	0.56%	0.56%

The volumes along Fernbank Road and Shea Road are noted to be underestimated when compared to traffic existing counts. The explicit developments identified within this report would form the primary local growth for the existing volumes and the background growth rates would be subject to regional travel through the area. This background growth would be related to rural development and planned development in Richmond Village. Given these factors, Table 17 summarizes the suggested growth rates applied for the background road network. It is noted that no TRANS Rates are provided for Flewellyn Road, and the growth rates are assumed to be the same as Fernbank Road.

Table 17: Recommended Area Growth Rates

Street	AM Peak Hour		PM Peak Hour	
	Eastbound	Westbound	Eastbound	Westbound
Flewellyn Rd	0%	2%	2%	0%
Fernbank Rd	0%	2%	2%	0%
	Northbound	**Southbound**	**Northbound**	**Southbound**
Shea Rd	2.5%	4.75%	4.75%	2.5%
Stittsville Main St	0.5%	0.5%	0.5%	0.5%
Huntley Rd	0.5%	0.5%	0.5%	0.5%

9.3 Other Developments

The background developments explicitly considered in the background conditions (Section 9.2) include:

- 5957 & 5969 Fernbank Road
- 6041 Fernbank Road
- 5993 Flewellyn Road
- 5960 Fernbank Road
- 5500 Abbott Street & 1555 Shea Road
- 5725 Fernbank Road
- 5993, 6115, 6141, 6159 Flewellyn Road & 6070 Fernbank Road

The total background development volumes and the development volumes for each development within the study area have been provided in Appendix L. The developments at 5957 and 5969 Fernbank Road, 6041 Fernbank Road, and 5500 Abbott Street and 1555 Shea Road trip generation are noted to be updated to the TRANS 2020 methodology.

10 Demand Rationalization

10.1 2030 Future Background Intersection Operations

The intersections of Shea Road at Street 21, and the planned intersections within the adjacent subdivision, including Flewellyn Road at Street 16 and at Street 12 are planned as stop-controlled on the minor approach, allowing for full movements. The intersections of Shea Road at Street 21 and Flewellyn Road at Street 16 and Street 12 each consists of a shared all-movement lane on each leg.

The area network volumes have been balanced along the road network, having the most recent intersections counts with the highest priority/reference to adjust adjacent intersections. Figure 15 illustrates the 2030

background volumes and Table 18 summarizes the 2030 background intersection operations. Volumes have been balanced along the study area roadways. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. Level of service is based on HCM 2010 delay for stop-controlled intersection, and Sidra HCM 6 for roundabout intersections. The synchro and sidra worksheets for the 2030 future background horizon are provided in Appendix M.

Figure 15: 2030 Future Background Volumes

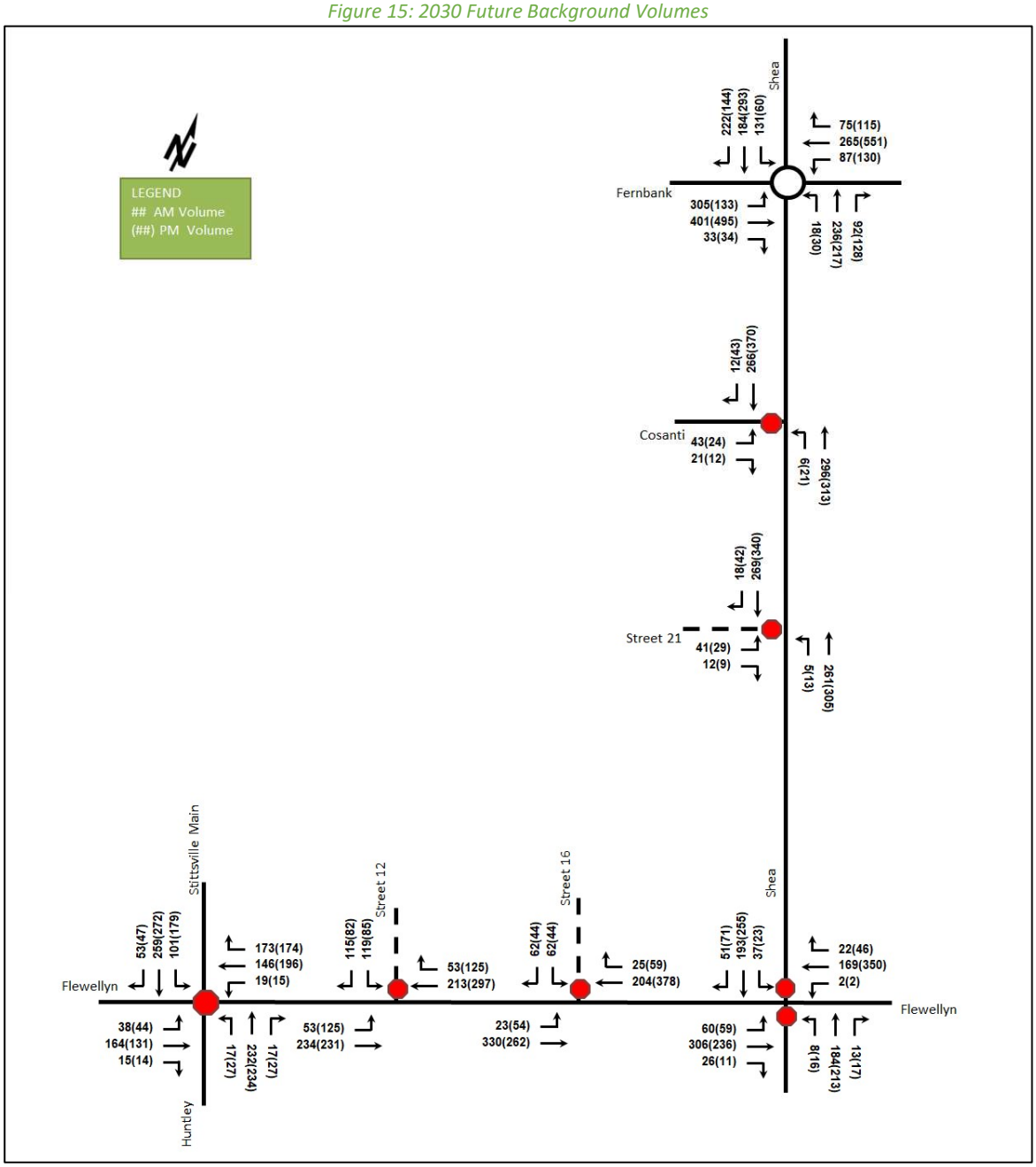


Table 18: 2030 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	D	0.84	26.8	130.6	D	0.82	26.1	99.9
	WB	B	0.58	14.1	32.5	D	0.88	31.9	175.4
	NB	C	0.66	23.6	31.5	C	0.58	15.9	28.7
	SB	B	0.60	12.8	42.7	D	0.79	28.9	59.5
	Overall	**C**	**0.84**	**19.7**	**130.6**	**D**	**0.88**	**27.1**	**175.4**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.04	7.8	0.8	A	0.05	8.3	1.5
	WB	A	0.00	7.9	0.0	A	0.00	7.7	0.0
	NB	D	0.56	26.8	24.8	**F**	**0.91**	**74.1**	**61.5**
	SB	E	0.77	40.9	46.5	**F**	**1.09**	**112.5**	**99.8**
	Overall	**B**	**-**	**16.3**	**-**	**F**	**-**	**44.6**	**-**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	C	0.44	15.8	16.5	C	0.43	17.3	15.8
	WB	C	0.62	20.0	31.5	D	0.76	30.8	51.8
	NB	C	0.53	18.2	23.3	C	0.61	22.0	30.0
	SB	D	0.75	27.5	50.3	**F**	**0.97**	**58.1**	**93.0**
	Overall	**C**	**-**	**21.4**	**-**	**E**	**-**	**37.1**	**-**
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.12	12.5	3.0	B	0.08	14.0	2.3
	NBL/R	A	0.01	7.8	0.0	A	0.02	8.2	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.3**	**-**	**A**	**-**	**0.9**	**-**
Shea Road at Street 21 *Unsignalized*	EB	B	0.10	12.4	2.3	B	0.09	13.8	2.3
	NB	A	0.00	7.8	0.0	A	0.01	8.1	0.0
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.1**	**-**	**A**	**-**	**0.8**	**-**
Flewellyn Road at Street 16 *Unsignalized*	EBL	A	0.02	7.7	0.8	A	0.05	8.4	1.5
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.21	12.7	6.0	B	0.20	14.9	5.3
	Overall	**A**	**-**	**2.5**	**-**	**A**	**-**	**2.1**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL	A	0.04	7.9	0.8	A	0.11	8.6	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.40	15.4	14.3	C	0.41	19.6	14.3
	Overall	**A**	**-**	**5.1**	**-**	**A**	**-**	**4.6**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections are anticipated to operate well except for the northbound and southbound movement at Shea Road at Flewellyn Road intersection during the PM peak hour and the southbound movement at Stittsville Main Street / Huntley Road at Flewellyn Road during the PM peak hour.

As noted in the existing conditions, the intersection of Shea Road at Flewellyn Road met the all-way stop control warrant in the existing condition. The intersection was assumed to remain as minor stop-control conditions. All-way stop control warrant calculation sheets are provided in Appendix D.

The Shea Road at Flewellyn Road intersection met Signal Justification 7 in 2030 future background conditions. Signal warrant calculation sheets are provided in Appendix E. Given the existing geometric offset at the

intersection, it is recommended that the City expedite the acquisition of land to facilitate intersection improvements and a higher order of intersection control. This control could be signalization or a roundabout, depending on the property acquisition and funding allocation.

The southbound left turns met the warrant for consideration in 2030 future background conditions during both peak hours at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road and will require additional property to be acquired for implementation and would be required to address the operation constraints in the southbound direction. The eastbound left turns at Shea Road at Flewellyn Road intersection met the left-turn warrant for consideration, although implementation of additional lanes is not recommended until the offset configuration has been addressed. The eastbound left turns at Flewellyn Road at Street 12 during both peak hours and at Flewellyn Road at Street 16 during the PM peak hour met the warrant for consideration in the 2030 future background conditions. Although the warrants were met, the operations are acceptable without the turn lane. The Municipal Drain also constrains the ability to provide a left-turn lane for Street 16. The left-turn warrant calculation sheets are provided in Appendix F.

Right turn lanes have been reviewed for Shea Road at Street 21, Flewellyn Road at Street 12 and Flewellyn Road at Street 16. The right turn volumes at the new intersections are expected to be greater 10% of the through volumes for Shea Road at Street 21 and above 20% for the Flewellyn Road intersections. Operationally, no issues are noted along either Shea Road or Flewellyn Road at these locations to require auxiliary turn lanes and they are not recommended.

Based on the operational analysis and the warrants provided, geometric improvements and upgrading to a roundabout/signal are recommended at the intersection of Shea Road at Flewellyn Road, and a 45 metres auxiliary southbound left turn lane is recommended at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road. Table 19 summarizes the 2030 future background operations of possible mitigation measures for the intersections of Shea Road at Flewellyn Road and Stittsville Main Street/Huntley Road at Flewellyn Road. The Synchro worksheets are provided in Appendix N.

Table 19: 2030 Future Background - Mitigation Measures

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Flewellyn Road ***Roundabout***	EB	A	0.37	7.2	14.8	A	0.30	6.6	11.1
	WB	A	0.19	5.1	6.1	A	0.40	7.8	15.7
	NB	A	0.24	6.6	7.7	A	0.25	6.2	8.6
	SB	A	0.25	5.5	9.1	A	0.38	8.1	14.1
	Overall	**A**	**0.37**	**6.3**	**14.8**	**A**	**0.40**	**7.3**	**15.7**
Stittsville Main Street / Huntley Road at Flewellyn Road ***Unsignalized***	EB	C	0.42	15.1	15.8	C	0.40	15.5	14.3
	WB	C	0.60	18.7	29.3	C	0.71	24.5	42.8
	NB	C	0.53	17.8	22.5	C	0.58	19.8	27.0
	SBL	B	0.21	12.3	6.0	C	0.39	15.5	13.5
	SBT/R	C	0.60	19.7	29.3	C	0.63	21.4	32.3
	Overall	**C**	**-**	**17.6**	**-**	**C**	**-**	**20.3**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

10.2 2035 Future Background Intersection Operations

As noted in 2030 future background conditions, geometric improvements and upgrading to a roundabout/signal is recommended at the intersection of Shea Road at Flewellyn Road, and a 45 metres auxiliary southbound left turn lane would be required at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road to

address operation constraints. These improvements have been included in the analysis of the 2035 future total conditions.

Figure 16 illustrates the 2035 background volumes and Table 20 summarizes the 2035 background intersection operations. Volumes have been balanced along the study area roadways. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and Sidra HCM 6 was used for roundabout intersection operations. The synchro worksheets have been provided in Appendix O.

Figure 16: 2035 Future Background Volumes

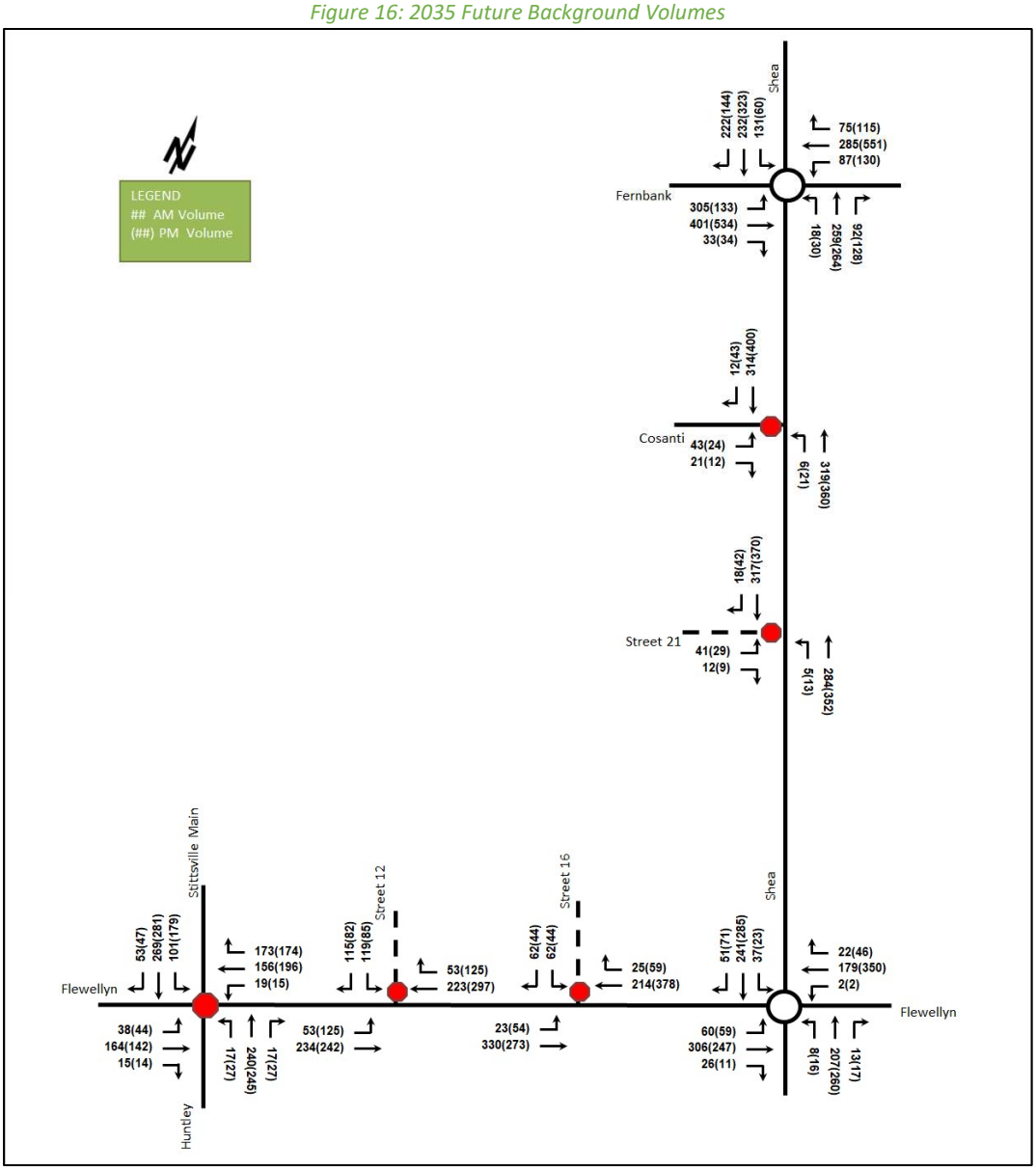


Table 20: 2035 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
	EB	D	0.89	34.5	152.4	E	0.89	37.7	142.7
	WB	C	0.62	15.9	37.5	E	0.93	42.7	210.3

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	NB	C	0.70	24.9	36.2	C	0.68	20.9	38.9
	SB	C	0.67	15.3	57.2	D	0.83	34.5	73.1
	Overall	**C**	**0.89**	**23.7**	**152.4**	**E**	**0.93**	**35.8**	**210.3**
Shea Road at Flewellyn Road *Roundabout*	EB	A	0.39	7.7	15.4	A	0.32	7.0	11.9
	WB	A	0.20	5.4	6.6	A	0.41	8.4	16.4
	NB	A	0.26	6.9	8.7	A	0.30	6.9	10.9
	SB	A	0.30	6.1	11.3	A	0.41	8.5	15.7
	Overall	**A**	**0.39**	**6.7**	**15.4**	**A**	**0.41**	**7.8**	**16.4**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	C	0.43	15.6	15.8	C	0.43	16.5	15.8
	WB	C	0.63	20.0	32.3	D	0.73	27.0	46.5
	NB	C	0.55	18.8	24.8	C	0.61	21.5	30.8
	SBL	B	0.22	12.5	6.0	C	0.40	15.9	14.3
	SBT/R	C	0.63	21.1	32.3	C	0.67	23.8	36.8
	Overall	**C**	**-**	**18.6**	**-**	**C**	**-**	**22.1**	**-**
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.13	13.3	3.0	C	0.09	15.0	2.3
	NBL/R	A	0.01	7.9	0.0	A	0.02	8.3	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**0.8**	**-**
Shea Road at Street 21 *Unsignalized*	EB	B	0.11	13.2	3.0	B	0.09	14.8	2.3
	NB	A	0.00	8.0	0.0	A	0.01	8.2	0.0
	SB	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.1**	**-**	**A**	**-**	**0.8**	**-**
Flewellyn Road at Street 16 *Unsignalized*	EBL	A	0.02	7.8	0.8	A	0.05	8.4	1.5
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.21	12.9	6.0	C	0.20	15.0	5.3
	Overall	**A**	**-**	**2.5**	**-**	**A**	**-**	**2.1**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL	A	0.04	7.9	0.8	A	0.11	8.5	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.41	15.6	15.0	C	0.41	19.8	15.0
	Overall	**A**	**-**	**5.1**	**-**	**A**	**-**	**4.6**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections are anticipated to operate well.

The new intersections along Shea Road and Flewellyn Road are assumed to be a minor stop-control condition. All-way stop control warrant calculation sheets are provided in Appendix D.

No additional signal warrants were met in 2035 future total conditions. Signal warrant calculation sheets are provided in Appendix E.

No additional left turn warrants were met in 2035 future background conditions. The left-turn warrant calculation sheets are provided in Appendix F.

10.3 Network Rationalization

Given the existing geometric offset at the intersection of Shea Road and Flewellyn Road, it is recommended that the City expedite the acquisition of land to facilitate intersection improvements and a higher order of intersection

control by 2030. This control could be signalization or a roundabout, depending on the property acquisition and funding allocation.

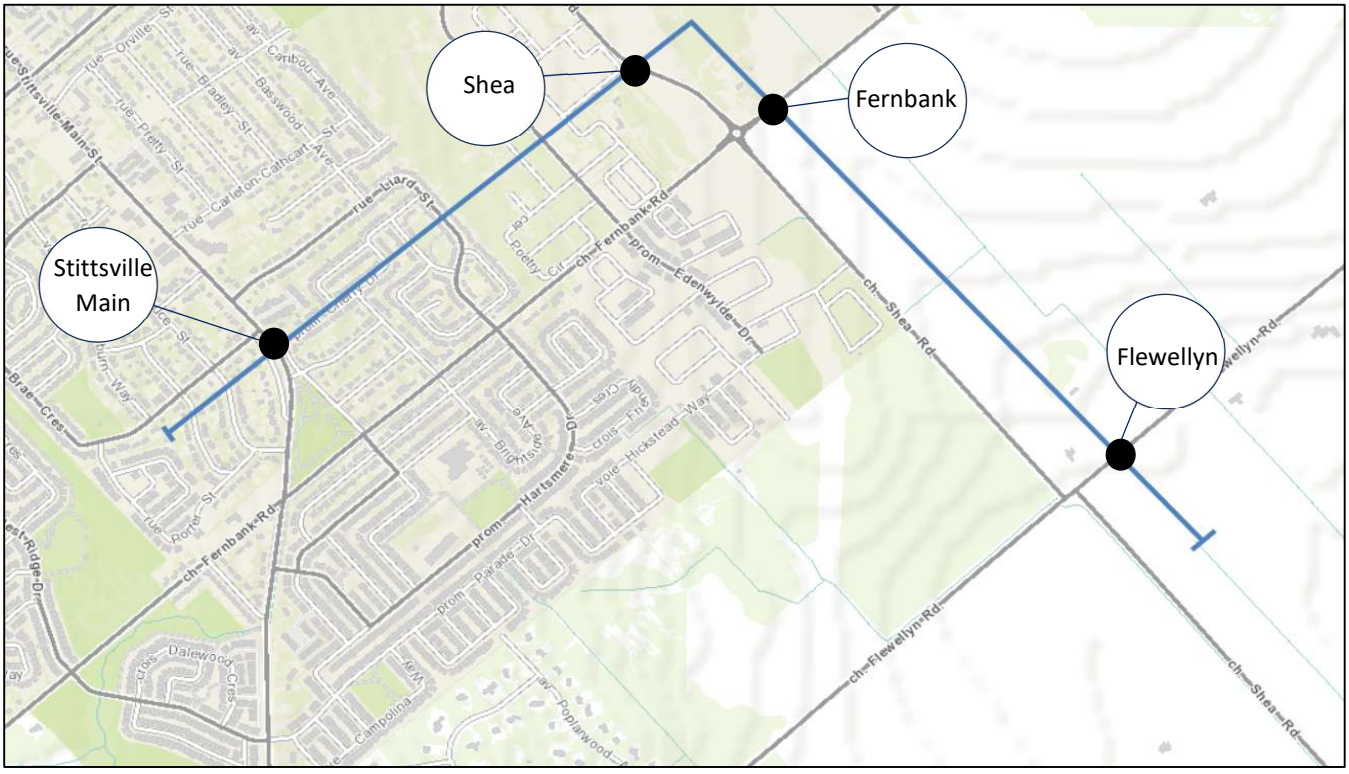
Given that the southbound left turn lane met the warrants at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road in 2030 future background conditions, it is recommended that the City explore the possible implementation of a southbound left-turn lane and acquisition of the property.

11 Network Concept

A high-level review of the key roadway lane capacities and utilizations was completed to assess the networks' ability to accommodate additional growth. The lane capacity estimates are assembled from a review of the TRANS Regional Model and Screenline 44, which is located between Stittsville and Kanata from Richardson Side to Flewellyn Road in a north-south direction. The screenline capacity has applied the City's peak period conversion factors, 0.84 and 0.92 for the morning and afternoon peak periods respectively, to calculate the peak period volumes and percent utilization.

To assess the capacity of the area network, a local screenline was created around the study area and has been illustrated in Figure 17. Table 21 summarizes the high-level capacity, existing and future volumes, and utilization of the roadway corridors in the immediate study area, and the existing volumes are included in Appendix B.

Figure 17: Local Screenline



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: May 14, 2024

Table 21: Local Area Screenline Road Capacity

Horizon	Roadway	Classification	Estimated Lane Capacity	Volumes	Percent Utilization
Existing	**Stittsville Main Street**	Arterial	1000 cars/hour	228-439	23-44%
	Shea Road	Collector	800 cars/hour	246-522	31-65%
	Fernbank Road	Arterial	800 cars/hour	218-509	27-64%

Horizon	Roadway	Classification	Estimated Lane Capacity	Volumes	Percent Utilization
	Flewellyn Road	Collector	800 cars/hour	68-186	9-23%
2030 Future Background	**Stittsville Main Street**	Arterial	1000 cars/hour	286-597	29-60%
	Shea Road	Collector	800 cars/hour	428-616	54-77%
	Fernbank Road	Arterial	800 cars/hour	359-796	45-**100%**
	Flewellyn Road	Collector	800 cars/hour	162-398	20-50%
2035 Future Background	**Stittsville Main Street**	Arterial	1000 cars/hour	291-606	29-61%
	Shea Road	Collector	800 cars/hour	471-639	59-80%
	Fernbank Road	Arterial	800 cars/hour	375-796	47-**100%**
	Flewellyn Road	Collector	800 cars/hour	171-398	21-50%
2030 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	299-634	30-63%
	Shea Road	Collector	800 cars/hour	428-626	54-78%
	Fernbank Road	Arterial	800 cars/hour	359-796	45-**100%**
	Flewellyn Road	Collector	800 cars/hour	180-448	23-56%
2035 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	304-643	30-64%
	Shea Road	Collector	800 cars/hour	471-649	59-81%
	Fernbank Road	Arterial	800 cars/hour	375-796	47-**100%**
	Flewellyn Road	Collector	800 cars/hour	188-448	24-56%

Notes:
Lane Capacity = single lane estimate
Volumes = directional volume range during AM or PM peak hours
Percent Utilization = utilization range based on Volume for lane

Based on the percent utilization, Stittsville Main Street, Shea Road, and Flewellyn Road have the residual capacity in both the background and total conditions

Fernbank Road, east of Shea Road, is expected to reach the TRANS capacity during the PM peak hour in the westbound direction in all of the future conditions. Based on the capacity review, no site-generated trips have been assigned to travel via Fernbank Road east of Shea Road in the westbound direction during the PM peak hour. Ultimately, the widening of Fernbank Road will address the capacity issue.

12 Intersection Design

12.1 Intersection Control

The new roadway intersection from the subdivision to Shea Road (Street 21 at Shea Road) is proposed as stop-controlled on the minor approach, allowing for full movements. Internal road intersections are recommended to be stop-controlled on the minor approaches. All-way stop control warrant analysis was performed for the new intersection along Shea Road and the warrants were not met. All-way stop control warrant calculation sheets are provided in Appendix D.

12.2 Intersection Design

12.2.1 2030 Future Total Intersection Operations

As noted in 2030 future background conditions, the intersection of Shea Road at Flewellyn Road will be analyzed as a roundabout intersection and an auxiliary southbound left turn lane at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road will be analyzed in 2030 future total conditions. Based on TAC calculations, it is estimated that a 55-metre storage length on southbound left turn would be required for the future total conditions. Other intersections will remain the same as the 2030 future background conditions.

The 2030 future total intersection volumes are illustrated in Figure 18 and the intersection operations are summarized below in Table 22. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and Sidra HCM 6 was used for roundabout intersection operations. The synchro worksheets have been provided in Appendix P.

Figure 18: 2030 Future Total Volumes

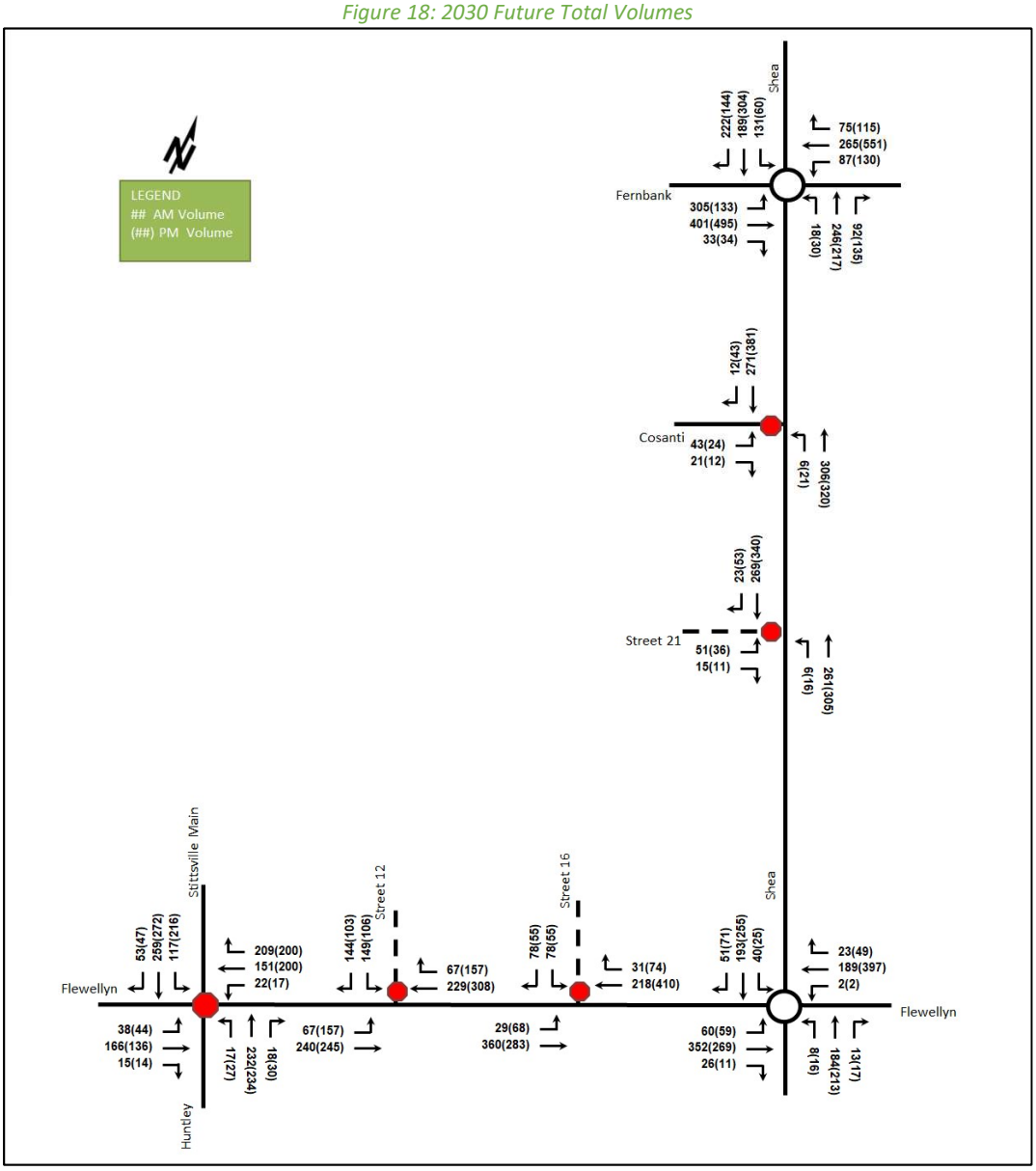


Table 22: 2030 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
	EB	D	0.85	27.5	132.5	D	0.83	27.4	102.7
	WB	B	0.58	14.5	33.1	**D**	**0.88**	**31.9**	**175.3**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	NB	C	0.67	23.4	33.5	C	0.59	16.3	29.8
	SB	B	0.60	12.9	43.8	D	0.81	30.8	64.0
	Overall	**C**	**0.85**	**20.6**	**133.7**	**D**	**0.88**	**27.9**	**175.3**
Shea Road at Flewellyn Road *Roundabout*	EB	A	0.41	7.8	17.4	A	0.34	7.0	12.7
	WB	A	0.21	5.4	6.9	A	0.44	8.6	18.6
	NB	A	0.25	7.0	8.0	A	0.26	6.5	8.9
	SB	A	0.26	5.7	9.4	A	0.40	8.7	14.8
	Overall	**A**	**0.41**	**6.7**	**17.4**	**A**	**0.44**	**7.9**	**18.6**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	C	0.45	16.2	17.3	C	0.43	16.7	15.8
	WB	C	0.70	23.7	41.3	D	0.79	32.5	57.8
	NB	C	0.55	19.5	24.8	C	0.61	21.8	30.0
	SBL	B	0.26	13.3	7.5	C	0.49	18.3	19.5
	SBT/R	C	0.63	21.7	32.3	C	0.66	23.7	35.3
	Overall	**C**	**-**	**20.1**	**-**	**C**	**-**	**24.1**	**-**
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.12	12.7	3.0	B	0.09	14.3	2.3
	NBL/R	A	0.01	7.8	0.0	A	0.02	8.2	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.3**	**-**	**A**	**-**	**0.9**	**-**
Shea Road at Street 21 *Unsignalized*	EBL/R	B	0.12	12.7	3.0	B	0.11	14.2	3.0
	NBL/T	A	0.01	7.8	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.4**	**-**	**A**	**-**	**0.9**	**-**
Flewellyn Road at Street 16 *Unsignalized*	EBL	A	0.02	7.8	0.8	A	0.06	8.6	1.5
	EBT	A	-	0.0	-	A	-	0.0	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.28	14.0	9.0	C	0.27	17.3	8.3
	Overall	**A**	**-**	**3.0**	**-**	**A**	**-**	**2.6**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL	A	0.05	8.0	1.5	A	0.14	8.8	3.8
	EBT	A	-	0.0	-	A	-	0.0	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.55	19.5	24.8	C	0.59	29.1	27.0
	Overall	**A**	**-**	**7.0**	**-**	**A**	**-**	**6.9**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane; Queue is measured in metres; Peak Hour Factor = 1.00; Delay = average vehicle delay in seconds; m = metered queue; # = volume for the 95th %ile cycle exceeds capacity

During both the AM and PM peak hours, the study area intersections are anticipated to operate well.

The intersection of Flewellyn Road at Street 12 is anticipated to meet three-way stop control warrants for consideration. Although the warrants will be met, the operation is acceptable to remain as a minor stop control condition. All-way stop control warrant calculation sheets are provided in Appendix D.

As noted in the future background conditions, the eastbound left turns at Flewellyn Road at Street 12 during both peak hours and at Flewellyn Road at Street 16 during the PM peak hour met the warrant for consideration. Although the warrants were met, the operations are acceptable without the turn lane. No additional left turn warrants were met in 2035 future background conditions. The left-turn warrant calculation sheets are provided in Appendix F.

12.2.2 2035 Future Total Intersection Operations

As noted in 2035 future background conditions, the intersection of Shea Road at Flewellyn Road will be analyzed as a roundabout intersection and an auxiliary southbound left turn lane at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road will be analyzed in 2035 future total conditions. Based on TAC calculations, it is estimated that a 55-metre storage length on southbound left turn would be required for the future total conditions. Other intersections will remain the same as the 2030 future background conditions.

The 2035 future total intersection volumes are illustrated in **Error! Reference source not found.** and the intersection operations are summarized below in Table 23. Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout. HCM 2010 methodology was used for unsignalized intersection operations and Sidra HCM 6 was used for roundabout intersection operations. The synchro worksheets have been provided in Appendix Q.

Figure 19: 2035 Future Total Volumes

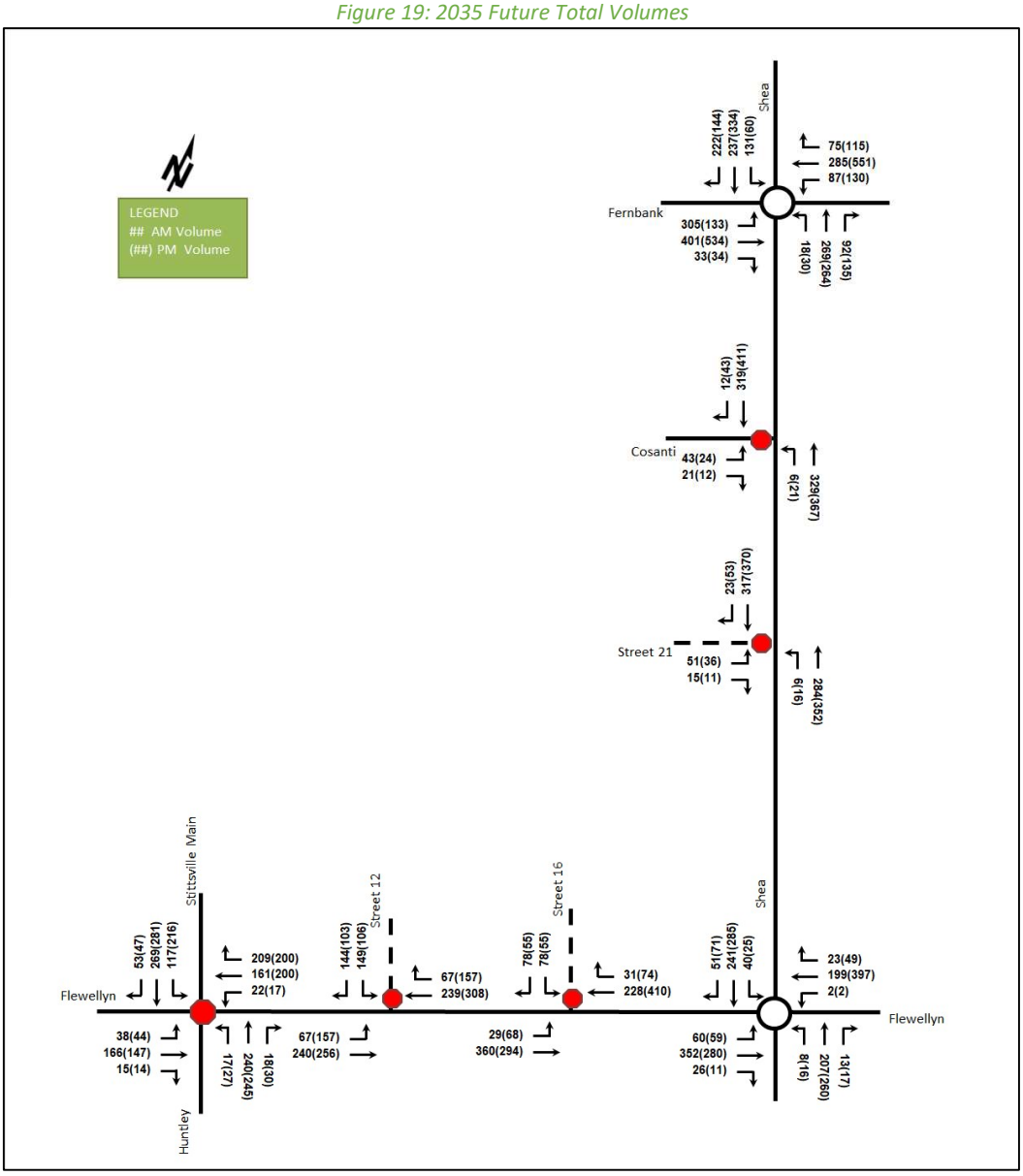


Table 23: 2035 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	E	0.89	35.5	155.3	E	0.90	40.2	148.8
	WB	C	0.63	16.2	38.1	E	0.93	42.7	210.3
	NB	D	0.72	26.2	38.5	C	0.69	21.6	40.5
	SB	C	0.67	15.5	58.7	E	0.85	37.1	79.3
	Overall	**C**	**0.89**	**24.4**	**155.3**	**E**	**0.93**	**37.1**	**210.3**
Shea Road at Flewellyn Road *Roundabout*	EB	A	0.44	8.4	18.1	A	0.36	7.5	13.6
	WB	A	0.22	5.6	7.4	A	0.47	9.3	21.0
	NB	A	0.28	7.4	9.1	A	0.32	7.2	11.2
	SB	A	0.31	6.3	11.6	A	0.43	9.3	18.1
	Overall	**A**	**0.44**	**7.1**	**18.1**	**A**	**0.47**	**8.4**	**21.0**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	C	0.46	16.8	18.0	C	0.46	17.8	18.0
	WB	D	0.73	26.2	46.5	D	0.81	34.6	59.3
	NB	C	0.58	20.8	27.0	C	0.65	23.9	33.8
	SBL	B	0.26	13.5	7.5	C	0.50	18.8	20.3
	SBT/R	C	0.66	23.4	35.3	D	0.70	26.0	39.8
	Overall	**C**	**-**	**21.7**	**-**	**D**	**-**	**25.8**	**-**
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.13	13.6	3.8	C	0.09	15.4	2.3
	NBL/R	A	0.01	8.0	0.0	A	0.02	8.3	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.2**	**-**	**A**	**-**	**0.8**	**-**
Shea Road at Street 21 *Unsignalized*	EBL/R	B	0.14	13.5	3.8	C	0.12	15.3	3.0
	NBL/T	A	0.01	8.0	0.0	A	0.01	8.2	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.4**	**-**	**A**	**-**	**1.0**	**-**
Flewellyn Road at Street 16 *Unsignalized*	EBL	A	0.02	7.8	0.8	A	0.06	8.6	1.5
	EBT	A	-	0.0	-	A	-	0.0	-
	WB	-	-	-	-	-	-	-	-
	SB	B	0.29	14.2	9.0	C	0.28	17.5	8.3
	Overall	**A**	**-**	**3.0**	**-**	**A**	**-**	**2.6**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL	A	0.05	8.0	1.5	A	0.14	8.8	3.8
	EBT	A	-	0.0	-	A	-	0.0	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.55	19.8	24.8	D	0.60	29.7	27.8
	Overall	**A**	**-**	**7.0**	**-**	**A**	**-**	**7.0**	**-**

Notes:
Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.00
Delay = average vehicle delay in seconds
m = metered queue
# = volume for the 95th %ile cycle exceeds capacity

Similar to the 2035 future background conditions, the study area intersections are anticipated to operate well during both the AM and PM peak hours.

The new intersections along Shea Road and Flewellyn Road are assumed to be a minor stop-control condition. All-way stop control warrant calculation sheets are provided in Appendix D.

No additional signal warrants were met in 2035 future total conditions. Signal warrant calculation sheets are provided in Appendix E.

Similar to the 2030 future total conditions, the turn lanes are not required operationally on the eastbound left turns at Flewellyn Road at Street #12 and at Street #16.

12.2.3 Recommended Design Elements

It is recommended that the intersection of Shea Road at Flewellyn Road be realigned by the City to provide a higher order intersection control and the City explore the possible implementation of a southbound left-turn lane at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road.

The context of Shea Road at Flewellyn Road will be evolving as the adjacent lands are developed. The City should explore potential speed limit reductions for more appropriate travel adjacent residential lands and supportive of cycling routes along Flewellyn Road. The speed reductions for Shea Road may be dependent on intersection alignment at Flewellyn Road, and Flewellyn Road reductions may be paired with the interim safety improvements at this intersection.

13 Summary of Improvements Indicated and Modifications Options

The following summarizes the analysis and results presented in this TIA report:

Proposed Site and Screening

- The proposed site includes 222 townhomes and 140 single detached homes
- A new collector roadway is proposed to connect to Shea Road, and new local roads are proposed to internally connect to the adjacent subdivision.
- The anticipated build-out year is 2030 with construction occurring in a single phase

TIA Screening and Exemptions

- The TIA Screening form indicated a full TIA was required due to trip generation and safety triggers
- The exemption review for the TIA did not require parking, neighbourhood traffic calming, and transit route capacity

Existing Conditions

- Stittsville Main Street, Huntley Road, and Fernbank Road are arterial roads, Shea Road is a collector road in the study area, and Cosanti Drive is a local road
- Sidewalks are present on Stittsville Main Street north of West Ridge Drive, West Ridge Drive, Upcountry Drive, Baywood Drive, Arrowwood Drive, Brightside Avenue between Fernbank Road and Baywood Drive, Edenwylde Drive, Hartsmere Drive, Hickstead Way, and Parade Drive
- Paved shoulders are present on both sides along Stittsville Main Street south of Etta Street, Huntley Road, Fernbank Road, Shea Road north of Fernbank Road, Flewellyn Road, and on the west side along Stittsville Main Street between Etta Street and Upcountry Drive
- No transit stops are present within 400 metres of the proposed site
- During both the AM and PM peak hours, the study area intersections operate well
- The intersections of Shea Road at Flewellyn Road met the all-way stop-control warrant, and the operation is acceptable to remain as a minor stop-control condition
- The Stittsville Main Street / Huntley Road at Flewellyn Road intersection met the Signal Justification 1, and as it has only met a single justification, it is recommended to remain as all-way stop-control
- Within the study area, the intersections of Flewellyn Road at Shea Road and Fernbank Road at Shea Road are noted to have experienced higher collisions than other locations

- The offset configuration of Flewellyn Road at Shea Road intersection is considered the primary cause of the angled collisions, and the surface conditions and dark conditions are likely to cause the collisions at Fernbank Road at Shea Road intersection
- The City is currently investigating the implementation of pavement markings, flashers and signage to reduce collisions at Flewellyn Road at Shea Road intersection until the additional property is acquired. Any mitigation that may reduce the east-west speeds would be the primary goal, as it would allow extra ability for collision avoidance and reduce the severity should a collision occur

Planned Conditions

- Within the 2023 Transportation Master Plan – Part 1, there is a suggested route from Shea Road, located 640 metres north of Fernbank Road, to the south, and paved shoulders are proposed along Flewellyn Road
- 2023 Transportation Master Plan – Part 2 identifies the extension of Robert Grant Avenue between Palladium Drive and Hazeldean Road, implementing new active transportation facilities on both sides of Fernbank Road from West Ridge Drive to Shea Road, improving connections to the existing pathway on the south side of Fernbank from Stittsville Main Street to Hartsmere Drive, and implementing new sidewalks and cycletracks on both sides of Shea Road from Abbott Street to Cosanti Drive
- Robert Grant Avenue is being extended northwards from Abbott Street to Hazeldean Road
- Transit priority measures in the Transportation Master Plan (2013) are identified as a loop along Fernbank Road from the future Fernbank transit station at Robert Grant Avenue to Stittsville Main Street, Hazeldean Road, and back to Robert Grant Avenue

Development Generated Travel Demand

- The proposed development is forecasted to produce 587 two-way people trips during the AM peak hour and 698 two-way people trips during the PM peak hour
- Of the forecasted people trips, 149 two-way trips will be vehicle trips during the AM peak hour and 180 two-way trips will be vehicle trips during the PM peak hour
- Of the forecasted people trips, 73 two-way trips will be transit trips during the AM peak hour and 49 two-way trips will be transit trips during the PM peak hour
- Of the forecasted trips, 80 % are anticipated to travel north, 3 % to the south, 12% to the east, and 5 % to the west

Development Design

- The proposed development is a residential subdivision featuring driveways for each dwelling and garages for typical townhomes
- Bicycle parking is assumed to be within the individual units
- The new collector road will have a sidewalk on one side and a multi-use pathway on the other side
- Key local roads will have a sidewalk on one side
- The future transit stops are proposed within the adjacent subdivision, and the proposed pedestrian facilities within the subdivision will connect to both the planned pedestrian facilities and future transit services within the adjacent subdivision

New Street Networks

- The new 24.0-metre-wide collector road are proposed with 2.0-metre-wide sidewalk with a 1.7-metre-wide boulevard on one side and a 3.0-metre-wide MUP with a 0.7-metre-wide boulevard on the other side
- All the new local roadways are 18.0-metre-wide and on-street parking along one side of the road, with key connections including 2.0-metre-wide sidewalks on one side
- The proposed speed limit for new collector roads will be 40 km/h and for new local roads will be 30 km/h
- Street 21 exceeds the TAC's minimum corner clearance of 25 meters from major intersections Conceptual traffic calming elements have been illustrated for the subdivision, adhering to the philosophies of the Traffic Calming Guidelines and preliminary input from the City
- The features include bulb-outs to narrow approaches to intersections (e.g. reduced crossing distance), speed humps, and midblock narrowing to reduce vehicle speeds and lateral roadway shifts
- Traffic calming elements for connections to the existing roadways will be coordinated with the adjacent existing roadway during the subdivision detailed design
- Conceptual corner triangles have been illustrated based in preliminary City feedback for overlapping 5x15 metre corner triangles at the collector-to-collector road intersections, 3x9 metre corner triangles for local-to-collector intersections and 3x3 metre corner triangles for local-to-local intersections
- Subdivision detailed design will be required to confirm all corner triangles

Boundary Street Design

- Both boundary roads of Shea Road and Flewellyn Road will have a LOS of F for pedestrian LOS in the existing and future conditions
- Shea Road will have a LOS F and Flewellyn Road will have a LOS E for bicycle LOS in the existing and future conditions
- Speed reduction to 30 km/h, or speed reduction to 30-50 km/h and a 2.0 metres sidewalk, or speed reduction to 50-60 km/h and 2.0 metre sidewalk with a 2.0 metre would be needed to meet the future theoretical PLOS target on Shea Road and Flewellyn Road
- Physically separated cycling facilities or operating speed lower or equal to 40 km/h, or operating speed between 50-70 km/h and an on-road facility would be needed to meet the future theoretical BLOS target on Shea Road and Flewellyn Road
- Barriers to implementation of the sidewalk include the rural cross-sections of both roadways, the hydro transmission poles along Shea Road and the Faulkner Municipal Drain along a significant portion of Flewellyn Road. The lowering of speed limits would need transition zones to facilitate the lowering of the posted speed from 80 km/h to 50 km/h, and coordination through speed reduction programs to ensure compliance
- The internal local roads are expected to meet the MMLOS targets

TDM

- Supportive TDM measures to be included within the proposed development should include:
  - Provide a multimodal travel option information package to new residents
  - Provide transit incentives for new residents
  - Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels

Background Conditions

- The background developments were explicitly included in the background conditions, along with background growth applied on study area roadways along the mainline volumes
- During both the AM and PM peak hours, the study area intersections are anticipated to operate well during both peak hours except for the northbound and southbound movement at Shea Road at Flewellyn Road intersection during the PM peak hour and the southbound movement at Stittsville Main Street/Huntley Road at Flewellyn Road during the PM peak hour
- The Shea Road at Flewellyn Road intersection met Signal Justification 7 in 2030 future background conditions. Given the existing geometric offset at the intersection, it is recommended that the City expedite the acquisition of land to facilitate intersection improvements and a higher order of intersection control
- The southbound left turns met the warrant in 2030 future background conditions during both peak hours at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road, and it is recommended that an auxiliary southbound left turn be provided at this intersection
- A 45 metres auxiliary southbound left turn lane would mitigate the operational constraints noted at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road by 2030 future background horizon
- Geometric improvements and upgrading to a roundabout/signal by the City are supported by this study at the intersection of Shea Road at Flewellyn Road
- Both of the above mitigation measures are in constrained existing property and cannot be investigated without land acquisition by the City
- The eastbound left turns at Shea Road at Flewellyn Road intersection met the left-turn warrant for consideration, although implementation of additional lanes is not recommended until the offset configuration has been addressed
- The eastbound left turns at Flewellyn Road at Street 12 during both peak hours and at Flewellyn Road at Street 16 during the PM peak hour met the warrant for consideration in the 2030 future background conditions; however, the operations are acceptable without the turn lane
- The study area intersections are anticipated to operate well during both peak hours in 2035 future background conditions with mitigation measures

Network Concept

- Stittsville Main Street, Shea Road, Flewellyn Road have the residual capacity in both the background and total conditions based on the percent utilization, therefore, site traffic can be accommodated from a regional network perspective
- Fernbank Road, east of Shea Road, is expected to reach the TRANS capacity during the PM peak hour in the westbound direction in all of the future conditions
- No site-generated trips have been assigned to travel via Fernbank Road east of Shea Road based on the capacity review

Intersection Design

- The new roadway intersection from the subdivision to Shea Road (Street 21 at Shea Road) is proposed as stop-controlled on the minor approach, allowing for full movements
- Internal road intersections are recommended to be stop-controlled on the minor approaches
- Although the intersection of Flewellyn Road at Street 12 is anticipated to meet three-way stop control warrants for consideration, the operation is acceptable to remain as a minor stop control condition

- Although eastbound left turns at Flewellyn Road at Street 12 during both peak hours and at Flewellyn Road at Street 16 during the PM peak hour met the warrant for consideration, no turn lane is recommended
- No left turn warrants were met at Shea Road at Street 21 at any horizon
- The study area intersections are anticipated to operate well during both peak hours in 2030 and 2035 future total conditions with mitigation measures
- Mitigation measures included a 55-metre auxiliary southbound left turn at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road and Geometric improvements and upgrading to a roundabout/signal by the City are supported by this study at the intersection of Shea Road at Flewellyn Road
- Both of the above mitigation measures are in constrained existing property and cannot be investigated without land acquisition by the City

14 Conclusion

It is recommended that, from a transportation perspective, the proposed development applications proceed.

Prepared By:

Reihaneh Azhdar
Transportation Engineering-Intern

Reviewed By:

Andrew Harte, P.Eng.
Senior Transportation Engineer

Appendix A

TIA Screening Form and PM Certification Form

6 Plaza Court
Ottawa, ON K2H 7W1

City of Ottawa 2023 Revisions to 2017 TIA Guidelines
Step 1 - Screening Form

Date: 7-Oct-24
Project Number: 2024-137
Project Reference: Eder Property

1.1 Description of Proposed Development	
Municipal Address	N/A
Description of Location	Part Lot 25, Concession 9 (Goulbourn). Bounded by Shea Road, Flewellyn Road, and the existing community south of Maverick Crescen
Land Use Classification	Rural (RU)
Development Size	A total of 284 townhomes, 63 single detached homes, and 338 stacked condo units
Accesses	A new local roadway is proposed to connect to Shea Road and internally to the adjacent subdivision collector roads
Phase of Development	Single
Buildout Year	2030
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger		
Land Use Type	Multi-Family (Low-Rise)	
Development Size	622	Units
Trip Generation Trigger	Yes	

1.3 Location Triggers		
Does the development propose a new driveway to a boundary street that is designated as part of the Transit Priority Network, Rapid Transit network or Cross-Town Bikeways?	No	
Is the development in a Hub, a Protected Major Transit Station Area (PMTSA), or a Design Priority Area (DPA)?	No	
Location Trigger	No	

1.4. Safety Triggers		
Are posted speed limits on a boundary street 80 km/hr or greater?	Yes	
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?	No	
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?	No	
Is the proposed driveway within auxiliary lanes of an intersection?	No	
Does the proposed driveway make use of an existing median break that serves an existing site?	No	
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?	No	High angle collisions (17) at Flewellyn Road and Shea Road intersection
Does the development include a drive-thru facility?	No	
Safety Trigger	Yes	

Certification Form for TIA Study PM

TIA Plan Reports

On April 14, 2022, the Province's Bill 109 received Royal Assent providing legislative direction to implement the More Homes for Everyone Act, 2022 aiming to increase the supply of a range of housing options to make housing more affordable. Revisions have been made to the TIA guidelines to comply with Bill 109 and streamline the process for applicants and staff.

Individuals submitting TIA reports will be responsible for all aspects of development-related transportation assessment and reporting, and undertaking such work, in accordance and compliance with the City of Ottawa's Official Plan, the Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines.

By submitting the attached TIA report (and any associated documents) and signing this document, the individual acknowledges that they meet the four criteria listed below.

CERTIFICATION

- ☑ I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines; (Update effective July 2023)
- ☑ I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;
- ☑ I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and
- ☑ I am either a licensed or registered[1] professional in good standing, whose field of expertise
  - ☑ is either transportation engineering
  - ☐ or transportation planning.

[1] License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

City Of Ottawa
Planning, Real Estate and Economic Development
110 Laurier Avenue West, 4th fl.
Ottawa, ON
K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Revision Date: June 2023

Dated at Ottawa (City) this 17 day of August , 20 23 .

Name : Andrew Harte

Professional title: Senior Transportation Engineer / Vice-President Ottawa

Signature of individual certifier that s/he/they meet the above criteria

Office Contact Information (Please Print)
Address: 6 Plaza Court
City / Postal Code: Ottawa, K2H 7W1
Telephone / Extension: 613-697-3797
Email Address: andrew.harte@cghtransportation.com

Stamp

LICENSED PROFESSIONAL ENGINEER
A. J. HARTE
100149314
PROVINCE OF ONTARIO

Revision Date: June 2023

Appendix B

Turning Movement Counts

Transportation Services - Traffic Services

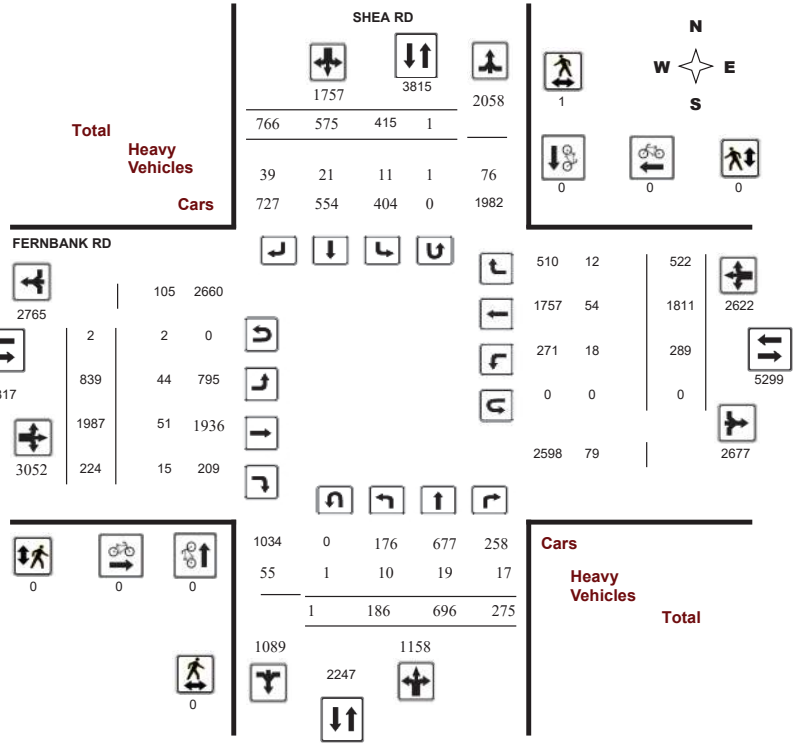
Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

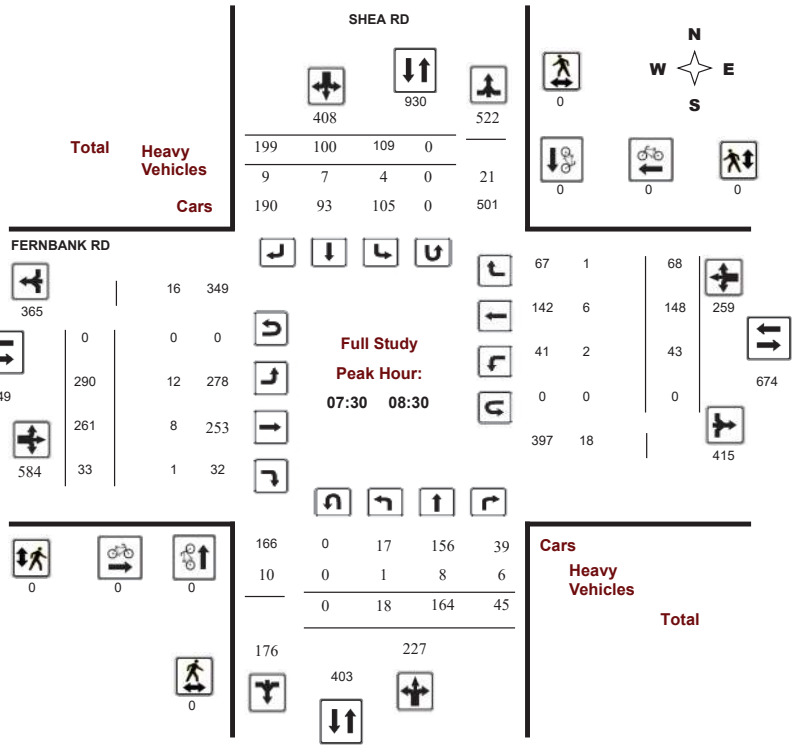
Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



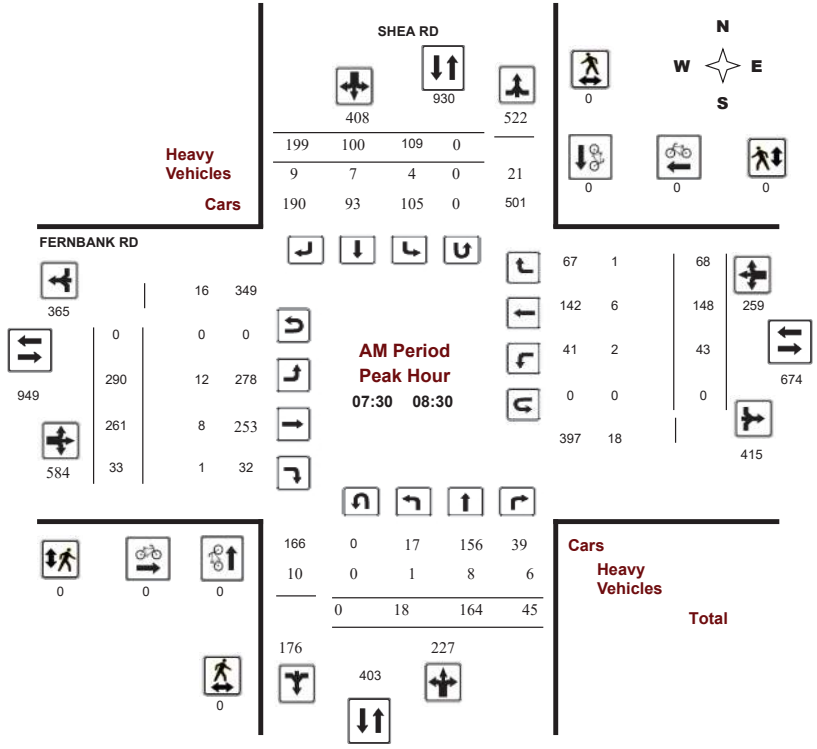
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision



Comments

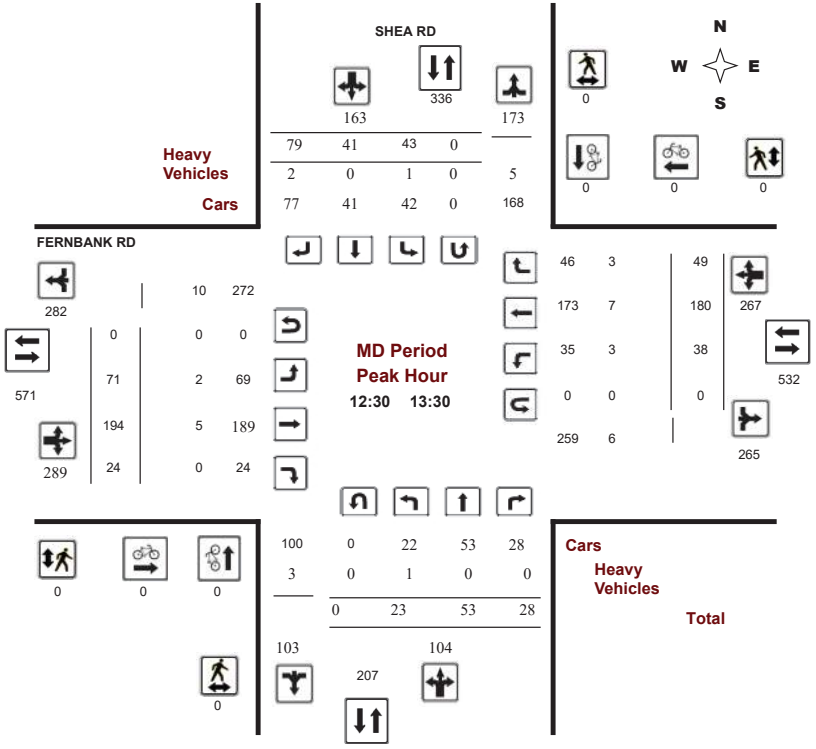
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision



Comments

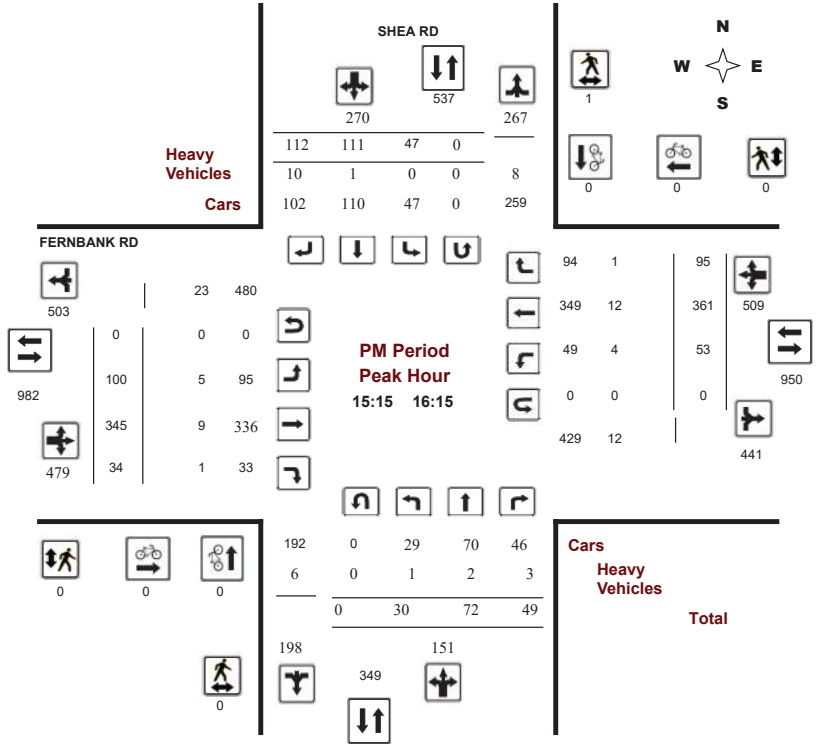
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, March 02, 2022

Total Observed U-Turns

Northbound: 1 Southbound: 1

Eastbound: 2 Westbound: 0

AADT Factor 1.00

	SHEA RD								FERNBANK RD								
	Northbound				Southbound				Eastbound				Westbound				
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	8	158	44	**210**	79	80	102	**261**	**471**	242	221	35	**498**	41	101	60	**202**	**700**	**1171**
08:00 09:00	20	109	39	**168**	68	66	143	**277**	**445**	115	254	25	**394**	26	219	51	**296**	**690**	**1135**
09:00 10:00	29	72	18	**119**	41	57	56	**154**	**273**	77	307	26	**410**	29	216	52	**297**	**707**	**980**
11:30 12:30	23	50	27	**100**	37	51	65	**153**	**253**	47	217	28	**292**	24	186	54	**264**	**556**	**809**
12:30 13:30	23	53	28	**104**	43	41	79	**163**	**267**	71	194	24	**289**	38	180	49	**267**	**556**	**823**
15:00 16:00	22	71	46	**139**	48	107	106	**261**	**400**	97	291	27	**415**	48	342	91	**481**	**896**	**1296**
16:00 17:00	27	102	47	**176**	46	89	109	**244**	**420**	101	272	39	**412**	45	297	83	**425**	**837**	**1257**
17:00 18:00	34	81	26	**141**	53	84	106	**243**	**384**	89	231	20	**340**	38	270	82	**390**	**730**	**1114**
Sub Total	186	696	275	**1157**	415	575	766	**1756**	**2913**	839	1987	224	**3050**	289	1811	522	**2622**	**5672**	**8585**
U Turns				**1**				**1**	**2**				**2**				**0**	**2**	**4**
Total	186	696	275	**1158**	415	575	766	**1757**	**2915**	839	1987	224	**3052**	289	1811	522	**2622**	**5674**	**8589**
EQ 12Hr	259	967	382	**1610**	577	799	1065	**2442**	**4052**	1166	2762	311	**4242**	402	2517	726	**3645**	**7887**	**11939**

Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

AVG 12Hr	259	967	382	**1610**	577	1047	1395	**2442**	**4052**	1166	2762	311	**4242**	402	2517	726	**3645**	**7887**	**11939**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **1.00**

AVG 24Hr	339	1267	500	**2109**	756	1372	1827	**3199**	**5308**	1527	3618	407	**5557**	527	3297	951	**4775**	**10332**	**15640**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		SHEA RD									FERNBANK RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	1	16	11	28	14	10	4	28	56	10	34	7	51	1	19	7	27	78	134
07:15	07:30	2	29	6	37	0	15	6	21	58	12	65	7	84	8	25	10	43	127	185
07:30	07:45	2	52	13	67	28	24	19	71	138	79	61	12	152	21	28	18	67	219	357
07:45	08:00	3	61	14	78	37	31	73	141	219	141	61	9	211	11	29	25	65	276	495
08:00	08:15	9	23	9	41	30	26	84	140	181	53	63	8	124	7	50	16	73	197	378
08:15	08:30	4	28	9	41	14	19	23	56	97	17	76	4	97	4	41	9	54	151	248
08:30	08:45	1	25	9	35	6	11	19	37	72	16	59	9	84	7	54	14	75	159	231
08:45	09:00	6	33	12	51	18	10	17	45	96	29	56	4	89	8	74	12	94	183	279
09:00	09:15	10	15	6	31	9	18	16	43	74	25	94	10	130	8	99	23	130	260	334
09:15	09:30	3	17	4	24	11	11	10	32	56	20	107	8	135	5	36	12	53	188	244
09:30	09:45	5	20	3	28	9	22	12	43	71	16	60	4	80	8	49	8	65	145	216
09:45	10:00	11	20	5	36	12	6	18	36	72	16	46	4	66	8	32	9	49	115	187
11:30	11:45	3	12	8	23	13	10	14	37	60	9	53	12	74	4	38	9	51	125	185
11:45	12:00	10	15	6	31	10	14	18	42	73	16	65	7	88	6	49	18	73	161	234
12:00	12:15	3	8	5	16	5	10	16	31	47	16	48	7	71	8	39	6	53	124	171
12:15	12:30	7	15	8	30	9	17	17	43	73	6	51	2	59	6	60	21	87	146	219
12:30	12:45	4	15	5	24	5	10	14	29	53	9	54	1	64	12	38	12	62	126	179
12:45	13:00	3	7	9	19	10	10	11	31	50	11	52	10	73	10	57	15	82	155	205
13:00	13:15	11	16	8	35	12	7	16	35	70	21	42	7	70	6	42	12	60	130	200
13:15	13:30	5	15	6	26	16	14	38	68	94	30	46	6	82	10	43	10	63	145	239
15:00	15:15	3	13	9	25	14	30	21	65	90	26	54	5	85	5	58	14	77	162	252
15:15	15:30	6	16	8	30	17	31	29	77	107	18	41	8	67	11	100	20	131	198	305
15:30	15:45	6	23	17	46	5	21	33	59	105	21	68	4	93	17	105	30	152	245	350
15:45	16:00	7	19	12	38	12	25	23	60	98	32	128	10	170	15	79	27	121	291	389
16:00	16:15	11	14	12	37	13	34	27	74	111	29	108	12	149	10	77	18	105	254	365
16:15	16:30	7	23	11	41	10	14	26	50	91	22	64	11	97	12	70	23	105	202	293
16:30	16:45	6	26	14	46	13	25	25	63	109	20	49	8	77	13	72	19	104	181	290
16:45	17:00	3	39	10	52	10	16	31	57	109	30	51	8	89	10	78	23	111	200	309
17:00	17:15	12	21	6	39	17	25	31	73	112	20	62	7	89	12	80	13	105	194	306
17:15	17:30	8	19	7	34	12	27	29	68	102	21	58	3	82	12	85	22	119	201	303
17:30	17:45	8	18	7	34	15	18	27	60	94	21	54	5	80	8	58	16	82	162	256
17:45	18:00	6	23	6	35	9	14	19	42	77	27	57	5	90	6	47	31	84	174	251
Total:		186	696	275	1158	415	575	766	1757	2915	839	1987	224	3052	289	1811	522	2622	5674	8,589

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

		SHEA RD			FERNBANK RD			
Time Period		Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	0	0	0	0	0	0	0
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		0	0	**0**	0	0	0	0

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

		SHEA RD			FERNBANK RD			
Time Period		NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	0	0	**0**	0	0	**0**	**0**
08:30	08:45	0	0	**0**	0	0	**0**	**0**
08:45	09:00	0	0	**0**	0	0	**0**	**0**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	1	**1**	0	0	**0**	**1**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	0	0	**0**	**0**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total	.....	0	1	**1**	0	0	**0**	**1**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		SHEA RD									FERNBANK RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	1	4	**8**	1	0	0	**4**	**12**	1	1	3	**6**	0	1	1	**8**	**14**	**13**
07:15	07:30	0	1	0	**4**	0	2	3	**6**	**10**	0	1	0	**7**	1	3	0	**5**	**12**	**11**
07:30	07:45	0	1	0	**4**	0	2	2	**12**	**16**	7	4	1	**15**	0	1	0	**5**	**20**	**18**
07:45	08:00	0	6	4	**12**	2	2	2	**13**	**25**	1	2	0	**6**	0	1	0	**9**	**15**	**20**
08:00	08:15	0	0	1	**2**	2	0	2	**8**	**10**	3	2	0	**9**	1	2	1	**9**	**18**	**14**
08:15	08:30	1	1	1	**7**	0	3	3	**8**	**15**	1	0	0	**7**	1	2	0	**4**	**11**	**13**
08:30	08:45	0	1	0	**2**	0	1	4	**10**	**12**	1	0	0	**5**	0	0	1	**1**	**6**	**9**
08:45	09:00	0	1	1	**3**	0	0	1	**4**	**7**	1	4	0	**9**	1	3	1	**10**	**19**	**13**
09:00	09:15	2	0	0	**6**	0	2	1	**8**	**14**	4	0	2	**17**	0	6	1	**7**	**24**	**19**
09:15	09:30	0	0	0	**1**	1	1	1	**4**	**5**	1	3	0	**7**	0	2	0	**6**	**13**	**9**
09:30	09:45	0	1	0	**3**	0	2	0	**4**	**7**	1	2	0	**6**	0	3	0	**5**	**11**	**9**
09:45	10:00	0	0	1	**2**	0	0	1	**1**	**3**	0	0	0	**1**	1	0	0	**2**	**3**	**3**
11:30	11:45	0	0	0	**2**	0	0	0	**1**	**3**	1	3	1	**6**	1	1	0	**5**	**11**	**7**
11:45	12:00	3	1	0	**6**	0	0	2	**3**	**9**	0	1	2	**9**	0	1	0	**2**	**11**	**10**
12:00	12:15	1	0	0	**4**	0	0	0	**1**	**5**	1	0	2	**8**	1	4	0	**5**	**13**	**9**
12:15	12:30	1	0	1	**2**	0	0	1	**2**	**4**	0	2	0	**4**	0	0	1	**4**	**8**	**6**
12:30	12:45	0	0	0	**1**	0	0	0	**2**	**3**	1	0	0	**1**	1	0	1	**2**	**3**	**3**
12:45	13:00	0	0	0	**1**	0	0	1	**1**	**2**	0	1	0	**5**	1	3	0	**5**	**10**	**6**
13:00	13:15	1	0	0	**2**	0	0	0	**3**	**5**	1	2	0	**6**	1	2	2	**7**	**13**	**9**
13:15	13:30	0	0	0	**0**	1	0	1	**2**	**2**	0	2	0	**5**	0	2	0	**5**	**10**	**6**
15:00	15:15	0	0	1	**2**	1	1	0	**4**	**6**	2	4	0	**8**	0	2	0	**8**	**16**	**11**
15:15	15:30	0	0	0	**0**	0	0	1	**1**	**1**	0	2	0	**4**	0	1	0	**3**	**7**	**4**
15:30	15:45	0	1	0	**1**	0	0	7	**11**	**12**	3	0	0	**13**	0	3	0	**3**	**16**	**14**
15:45	16:00	0	1	2	**6**	0	0	2	**4**	**10**	0	1	0	**9**	3	6	1	**13**	**22**	**16**
16:00	16:15	1	0	1	**5**	0	1	0	**3**	**8**	2	6	1	**12**	1	2	0	**10**	**22**	**15**
16:15	16:30	0	0	0	**4**	0	1	1	**6**	**10**	3	4	2	**10**	1	0	1	**6**	**16**	**13**
16:30	16:45	0	2	0	**4**	0	1	1	**5**	**9**	1	0	0	**3**	1	1	0	**2**	**5**	**7**
16:45	17:00	0	1	0	**3**	1	0	1	**5**	**8**	2	1	0	**4**	2	0	0	**4**	**8**	**8**
17:00	17:15	0	0	0	**1**	0	0	0	**1**	**2**	1	0	1	**2**	0	0	0	**0**	**2**	**2**
17:15	17:30	0	0	0	**2**	0	2	0	**4**	**6**	2	0	0	**3**	0	1	0	**1**	**4**	**5**
17:30	17:45	0	0	0	**2**	2	0	1	**5**	**7**	1	0	0	**2**	0	0	1	**3**	**5**	**6**
17:45	18:00	0	0	0	**0**	0	0	0	**2**	**2**	2	3	0	**8**	0	1	0	**4**	**12**	**7**
Total:	None	10	19	17	**102**	11	21	39	**148**	**250**	44	51	15	**217**	18	54	12	**163**	**380**	**315**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FERNBANK RD @ SHEA RD

Survey Date: Wednesday, March 02, 2022 **WO No:** 40193

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

Time Period		SHEA RD Northbound U-Turn Total	SHEA RD Southbound U-Turn Total	FERNBANK RD Eastbound U-Turn Total	FERNBANK RD Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	1	0	0	1
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	1	0	1
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	1	0	0	0	1
17:45	18:00	0	0	1	0	1
Total		1	1	2	0	4

Transportation Services - Traffic Services

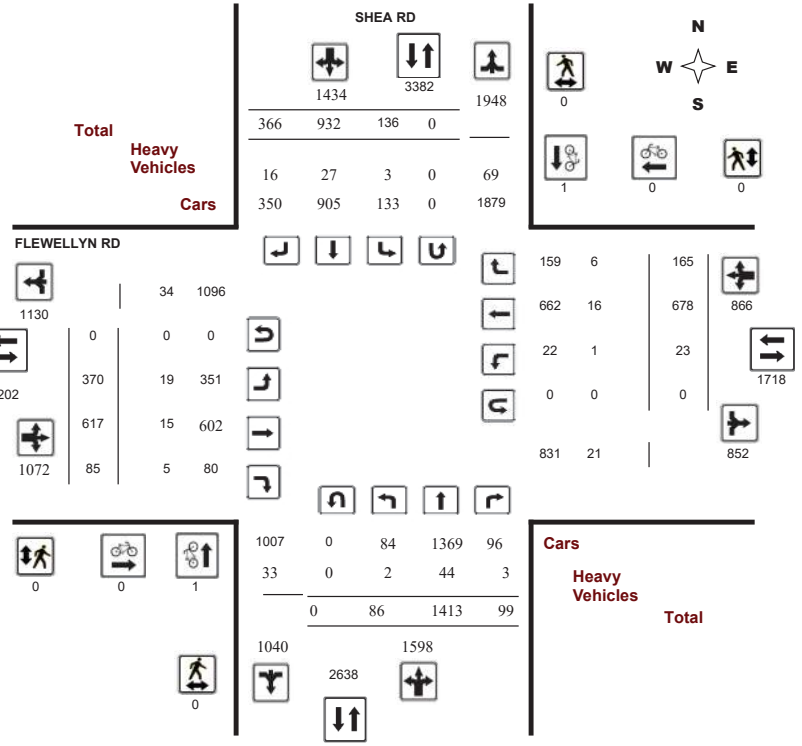
Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Diagram



Transportation Services - Traffic Services

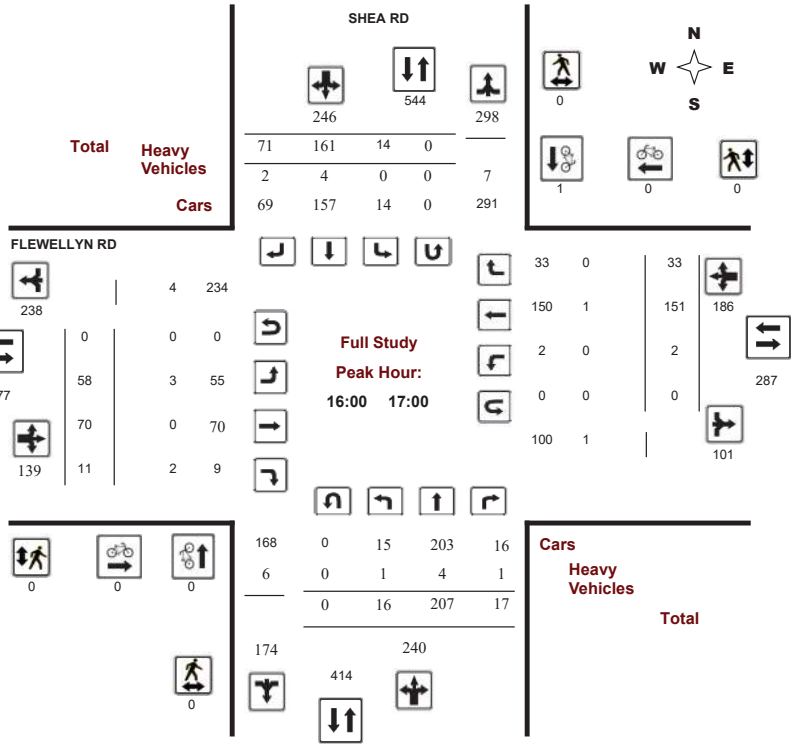
Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Peak Hour Diagram



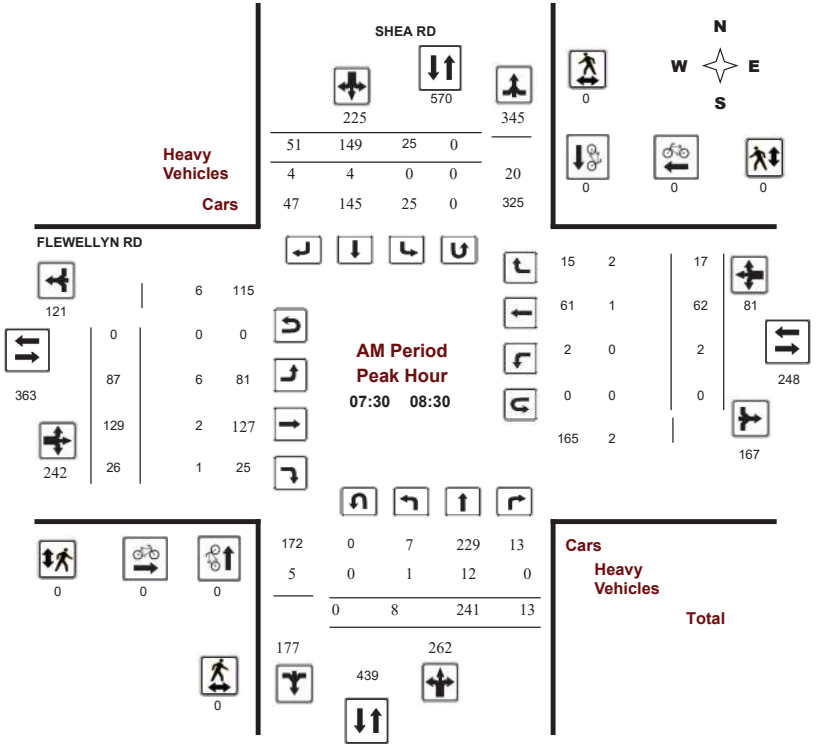
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision



Comments

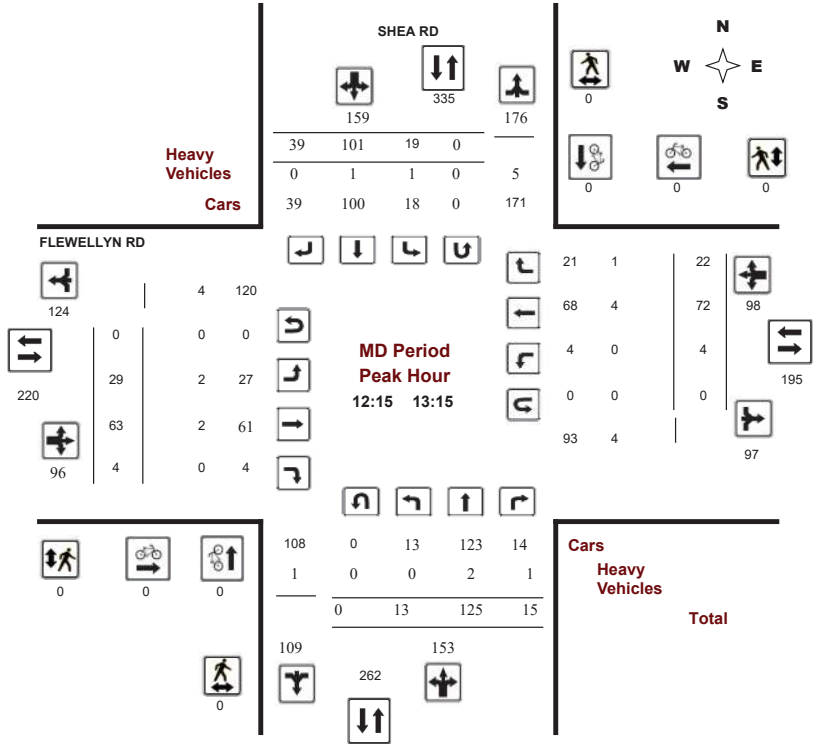
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision



Comments

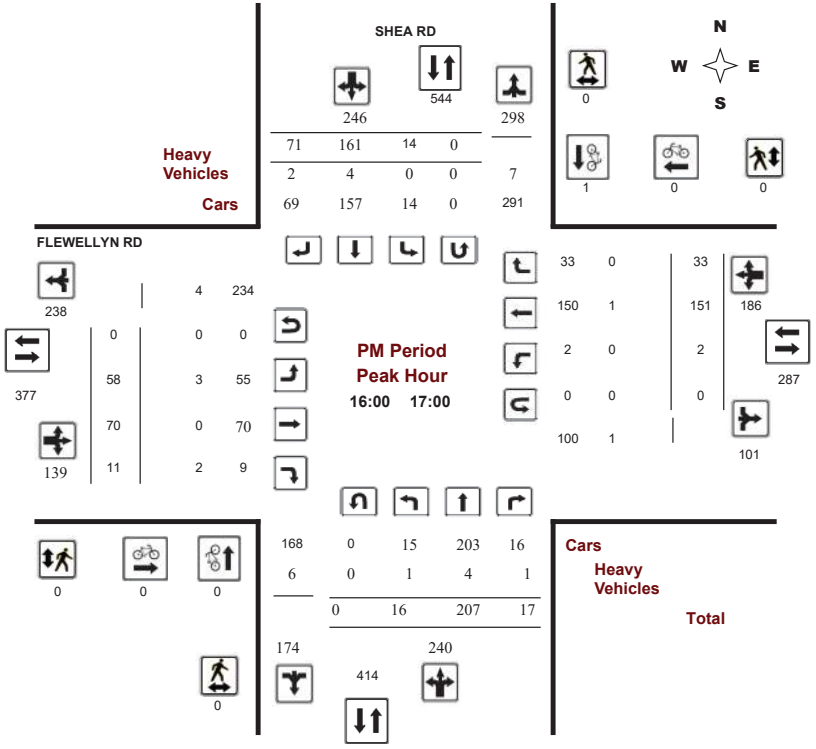
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision



Comments

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Summary (8 HR Standard)

Survey Date: Wednesday, April 26, 2023

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

	SHEA RD								FLEWELLYN RD									
	Northbound				Southbound				Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	9	214	12	**235**	21	116	42	**179**	**414**	76	118	26	**220**	3	59	17	**79**	**299**	**713**
08:00 09:00	7	206	15	**228**	26	140	47	**213**	**441**	58	100	14	**172**	1	60	16	**77**	**249**	**690**
09:00 10:00	6	179	14	**199**	14	73	30	**117**	**316**	38	89	6	**133**	0	49	17	**66**	**199**	**515**
11:30 12:30	11	123	16	**150**	16	66	25	**107**	**257**	26	54	3	**83**	7	56	16	**79**	**162**	**419**
12:30 13:30	12	121	12	**145**	16	94	39	**149**	**294**	31	52	5	**88**	1	78	22	**101**	**189**	**483**
15:00 16:00	11	185	7	**203**	16	129	60	**205**	**408**	46	64	14	**124**	4	110	12	**126**	**250**	**658**
16:00 17:00	16	207	17	**240**	14	161	71	**246**	**486**	58	70	11	**139**	2	151	33	**186**	**325**	**811**
17:00 18:00	14	178	6	**198**	13	153	52	**218**	**416**	37	70	6	**113**	5	115	32	**152**	**265**	**681**
Sub Total	86	1413	99	**1598**	136	932	366	**1434**	**3032**	370	617	85	**1072**	23	678	165	**866**	**1938**	**4970**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	86	1413	99	**1598**	136	932	366	**1434**	**3032**	370	617	85	**1072**	23	678	165	**866**	**1938**	**4970**
EQ 12Hr	120	1964	138	**2221**	189	1295	509	**1993**	**4214**	514	858	118	**1490**	32	942	229	**1204**	**2694**	**6908**

Note: These values are calculated by multiplying the totals by the appropriate expansion factor. **1.39**

AVG 12Hr	108	1768	124	**1999**	170	1527	600	**1794**	**3793**	463	772	106	**1341**	29	848	206	**1084**	**2425**	**6217**

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor. **.90**

AVG 24Hr	141	2316	162	**2619**	223	2000	786	**2350**	**4969**	607	1011	139	**1757**	38	1111	270	**1420**	**3177**	**8144**

Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor. **1.31**

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute Increments

		SHEA RD								FLEWELLYN RD									
		Northbound				Southbound				Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	2	30	7	39	4	19	8	31	70	10	25	4	39	1	11	5	17	56	126
07:15	07:30	2	45	1	48	5	29	8	42	90	10	26	7	43	0	16	2	18	61	151
07:30	07:45	2	58	4	64	6	31	9	46	110	23	30	8	61	1	14	4	19	80	190
07:45	08:00	3	81	0	84	6	37	17	60	144	33	37	7	77	1	18	6	25	102	246
08:00	08:15	2	53	6	61	7	42	12	61	122	15	31	6	52	0	13	5	18	70	192
08:15	08:30	1	49	3	53	6	39	13	58	111	16	31	5	52	0	17	2	19	71	182
08:30	08:45	4	45	2	51	6	29	14	49	100	13	22	1	36	0	16	4	20	56	156
08:45	09:00	0	59	4	63	7	30	8	45	108	14	16	2	32	1	14	5	20	52	160
09:00	09:15	1	50	5	56	3	12	9	24	80	14	23	2	39	0	17	5	22	61	141
09:15	09:30	3	50	3	56	2	21	11	34	90	12	21	0	33	0	15	5	20	53	143
09:30	09:45	0	48	3	51	5	20	7	32	83	8	24	2	34	0	12	3	15	49	132
09:45	10:00	2	31	3	36	4	20	3	27	63	4	21	2	27	0	5	4	9	36	99
11:30	11:45	2	32	3	37	2	19	3	24	61	7	14	2	23	1	15	3	19	42	103
11:45	12:00	3	32	3	38	5	18	6	29	67	9	13	0	22	2	14	3	19	41	108
12:00	12:15	2	22	2	26	2	9	8	19	45	5	10	0	15	1	15	5	21	36	81
12:15	12:30	4	37	8	49	7	20	8	35	84	5	17	1	23	3	12	5	20	43	127
12:30	12:45	3	29	1	33	7	25	8	40	73	6	17	2	25	0	23	8	31	56	129
12:45	13:00	1	23	3	27	2	25	13	40	67	10	15	0	25	1	13	5	19	44	111
13:00	13:15	5	36	3	44	3	31	10	44	88	8	14	1	23	0	24	4	28	51	139
13:15	13:30	3	33	5	41	4	13	8	25	66	7	6	2	15	0	18	5	23	38	104
15:00	15:15	4	31	2	37	0	28	8	36	73	19	21	6	46	0	20	2	22	68	141
15:15	15:30	3	47	3	53	8	28	16	52	105	9	15	4	28	2	18	1	21	49	154
15:30	15:45	2	44	1	47	4	38	16	58	105	8	15	0	23	1	37	2	40	63	168
15:45	16:00	2	63	1	66	4	35	20	59	125	10	13	4	27	1	35	7	43	70	195
16:00	16:15	3	46	3	52	4	38	19	61	113	9	16	4	29	0	43	8	51	80	193
16:15	16:30	3	55	2	60	3	56	22	81	141	18	13	2	33	0	32	5	37	70	211
16:30	16:45	4	46	5	55	6	32	11	49	104	12	22	3	37	1	38	10	49	86	190
16:45	17:00	6	60	7	73	1	35	19	55	128	19	19	2	40	1	38	10	49	89	217
17:00	17:15	5	46	0	51	4	36	18	58	109	8	23	4	35	2	32	6	40	75	184
17:15	17:30	2	46	2	50	3	52	7	62	112	14	21	1	36	1	44	12	57	93	205
17:30	17:45	4	39	2	45	3	35	20	58	103	6	11	1	18	1	19	7	27	45	148
17:45	18:00	3	47	2	52	3	30	7	40	92	9	15	0	24	1	20	7	28	52	144
Total:		86	1413	99	1598	136	932	366	1434	3032	370	617	85	1072	23	678	165	866	1938	4,970

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Cyclist Volume

Time Period		SHEA RD Northbound	SHEA RD Southbound	SHEA RD Street Total	FLEWELLYN RD Eastbound	FLEWELLYN RD Westbound	FLEWELLYN RD Street Total	Grand Total
07:00	07:15	0	0	0	0	0	0	0
07:15	07:30	0	0	0	0	0	0	0
07:30	07:45	0	0	0	0	0	0	0
07:45	08:00	0	0	0	0	0	0	0
08:00	08:15	0	0	0	0	0	0	0
08:15	08:30	0	0	0	0	0	0	0
08:30	08:45	0	0	0	0	0	0	0
08:45	09:00	0	0	0	0	0	0	0
09:00	09:15	0	0	0	0	0	0	0
09:15	09:30	0	0	0	0	0	0	0
09:30	09:45	0	0	0	0	0	0	0
09:45	10:00	0	0	0	0	0	0	0
11:30	11:45	0	0	0	0	0	0	0
11:45	12:00	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	0	0
12:45	13:00	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0
15:00	15:15	0	0	0	0	0	0	0
15:15	15:30	0	0	0	0	0	0	0
15:30	15:45	1	0	1	0	0	0	1
15:45	16:00	0	0	0	0	0	0	0
16:00	16:15	0	0	0	0	0	0	0
16:15	16:30	0	0	0	0	0	0	0
16:30	16:45	0	1	1	0	0	0	1
16:45	17:00	0	0	0	0	0	0	0
17:00	17:15	0	0	0	0	0	0	0
17:15	17:30	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0
17:45	18:00	0	0	0	0	0	0	0
Total		1	1	**2**	0	0	0	2

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Pedestrian Volume

Time Period		SHEA RD NB Approach (E or W Crossing)	SHEA RD SB Approach (E or W Crossing)	SHEA RD Total	FLEWELLYN RD EB Approach (N or S Crossing)	FLEWELLYN RD WB Approach (N or S Crossing)	FLEWELLYN RD Total	Grand Total
07:00	07:15	0	0	**0**	0	0	**0**	**0**
07:15	07:30	0	0	**0**	0	0	**0**	**0**
07:30	07:45	0	0	**0**	0	0	**0**	**0**
07:45	08:00	0	0	**0**	0	0	**0**	**0**
08:00	08:15	0	0	**0**	0	0	**0**	**0**
08:15	08:30	0	0	**0**	0	0	**0**	**0**
08:30	08:45	0	0	**0**	0	0	**0**	**0**
08:45	09:00	0	0	**0**	0	0	**0**	**0**
09:00	09:15	0	0	**0**	0	0	**0**	**0**
09:15	09:30	0	0	**0**	0	0	**0**	**0**
09:30	09:45	0	0	**0**	0	0	**0**	**0**
09:45	10:00	0	0	**0**	0	0	**0**	**0**
11:30	11:45	0	0	**0**	0	0	**0**	**0**
11:45	12:00	0	0	**0**	0	0	**0**	**0**
12:00	12:15	0	0	**0**	0	0	**0**	**0**
12:15	12:30	0	0	**0**	0	0	**0**	**0**
12:30	12:45	0	0	**0**	0	0	**0**	**0**
12:45	13:00	0	0	**0**	0	0	**0**	**0**
13:00	13:15	0	0	**0**	0	0	**0**	**0**
13:15	13:30	0	0	**0**	0	0	**0**	**0**
15:00	15:15	0	0	**0**	0	0	**0**	**0**
15:15	15:30	0	0	**0**	0	0	**0**	**0**
15:30	15:45	0	0	**0**	0	0	**0**	**0**
15:45	16:00	0	0	**0**	0	0	**0**	**0**
16:00	16:15	0	0	**0**	0	0	**0**	**0**
16:15	16:30	0	0	**0**	0	0	**0**	**0**
16:30	16:45	0	0	**0**	0	0	**0**	**0**
16:45	17:00	0	0	**0**	0	0	**0**	**0**
17:00	17:15	0	0	**0**	0	0	**0**	**0**
17:15	17:30	0	0	**0**	0	0	**0**	**0**
17:30	17:45	0	0	**0**	0	0	**0**	**0**
17:45	18:00	0	0	**0**	0	0	**0**	**0**
Total	.....	0	0	**0**	0	0	**0**	**0**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study Heavy Vehicles

		SHEA RD									FLEWELLYN RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	1	1	**3**	0	1	1	**5**	**8**	2	0	0	**4**	0	1	0	**2**	**6**	**7**
07:15	07:30	0	2	0	**3**	0	1	0	**3**	**6**	0	0	0	**1**	0	1	0	**1**	**2**	**4**
07:30	07:45	0	2	0	**5**	0	3	0	**8**	**13**	3	0	0	**3**	0	0	0	**0**	**3**	**8**
07:45	08:00	0	8	0	**8**	0	0	1	**13**	**21**	3	0	0	**4**	0	0	1	**1**	**5**	**13**
08:00	08:15	1	0	0	**2**	0	0	3	**3**	**5**	0	1	1	**6**	0	0	0	**1**	**7**	**6**
08:15	08:30	0	2	0	**3**	0	1	0	**4**	**7**	0	1	0	**2**	0	1	1	**3**	**5**	**6**
08:30	08:45	0	3	0	**5**	0	2	0	**5**	**10**	0	0	0	**0**	0	0	0	**0**	**0**	**5**
08:45	09:00	0	2	0	**4**	0	2	0	**5**	**9**	1	2	0	**3**	0	0	0	**2**	**5**	**7**
09:00	09:15	0	1	0	**1**	0	0	2	**4**	**5**	1	0	0	**3**	0	0	0	**0**	**3**	**4**
09:15	09:30	0	3	0	**4**	0	1	1	**6**	**10**	1	2	0	**4**	0	0	0	**2**	**6**	**8**
09:30	09:45	0	2	0	**3**	0	1	0	**4**	**7**	0	0	0	**0**	0	0	1	**1**	**1**	**4**
09:45	10:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**1**	0	1	0	**1**	**2**	**1**
11:30	11:45	0	1	0	**2**	1	0	1	**3**	**5**	0	0	1	**5**	0	3	0	**4**	**9**	**7**
11:45	12:00	0	2	0	**3**	0	1	0	**3**	**6**	0	1	0	**1**	0	0	0	**1**	**2**	**4**
12:00	12:15	0	1	0	**1**	0	0	0	**2**	**3**	0	1	0	**1**	0	0	1	**2**	**3**	**3**
12:15	12:30	0	1	1	**2**	1	0	0	**2**	**4**	0	0	0	**0**	0	0	0	**2**	**2**	**3**
12:30	12:45	0	0	0	**0**	0	0	0	**1**	**1**	1	0	0	**4**	0	3	0	**3**	**7**	**4**
12:45	13:00	0	1	0	**2**	0	1	0	**3**	**5**	0	0	0	**1**	0	1	1	**2**	**3**	**4**
13:00	13:15	0	0	0	**0**	0	0	0	**1**	**1**	1	2	0	**3**	0	0	0	**2**	**5**	**3**
13:15	13:30	0	3	0	**4**	0	1	0	**7**	**11**	2	1	0	**3**	0	0	1	**2**	**5**	**8**
15:00	15:15	0	1	0	**2**	0	1	0	**2**	**4**	0	1	0	**1**	0	0	0	**1**	**2**	**3**
15:15	15:30	0	1	0	**4**	0	2	1	**5**	**9**	1	0	1	**3**	0	0	0	**0**	**3**	**6**
15:30	15:45	0	1	0	**1**	1	0	1	**3**	**4**	0	0	0	**2**	0	1	0	**2**	**4**	**4**
15:45	16:00	0	2	0	**3**	0	1	2	**5**	**8**	0	0	0	**4**	0	2	0	**2**	**6**	**7**
16:00	16:15	1	1	0	**4**	0	0	0	**3**	**7**	2	0	2	**5**	0	0	0	**0**	**5**	**6**
16:15	16:30	0	1	0	**3**	0	2	1	**5**	**8**	1	0	0	**3**	0	1	0	**1**	**4**	**6**
16:30	16:45	0	2	0	**4**	0	2	1	**5**	**9**	0	0	0	**1**	0	0	0	**0**	**1**	**5**
16:45	17:00	0	0	1	**1**	0	0	0	**0**	**1**	0	0	0	**0**	0	0	0	**1**	**1**	**1**
17:00	17:15	0	0	0	**0**	0	0	1	**1**	**1**	0	0	0	**1**	0	0	0	**0**	**1**	**1**
17:15	17:30	0	0	0	**5**	0	4	0	**4**	**9**	0	2	0	**2**	1	0	0	**3**	**5**	**7**
17:30	17:45	0	0	0	**0**	0	0	0	**0**	**0**	0	1	0	**2**	0	1	0	**2**	**4**	**2**
17:45	18:00	0	0	0	**0**	0	0	0	**0**	**0**	0	0	0	**0**	0	0	0	**0**	**0**	**0**
Total:	None	2	44	3	**82**	3	27	16	**115**	**197**	19	15	5	**73**	1	16	6	**44**	**117**	**157**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

FLEWELLYN RD @ SHEA RD

Survey Date: Wednesday, April 26, 2023 **WO No:** 40938

Start Time: 07:00 **Device:** Miovision

Full Study 15 Minute U-Turn Total

		SHEA RD	FLEWELLYN RD			
Time Period		Northbound U-Turn Total	Southbound U-Turn Total	Eastbound U-Turn Total	Westbound U-Turn Total	Total
07:00	07:15	0	0	0	0	0
07:15	07:30	0	0	0	0	0
07:30	07:45	0	0	0	0	0
07:45	08:00	0	0	0	0	0
08:00	08:15	0	0	0	0	0
08:15	08:30	0	0	0	0	0
08:30	08:45	0	0	0	0	0
08:45	09:00	0	0	0	0	0
09:00	09:15	0	0	0	0	0
09:15	09:30	0	0	0	0	0
09:30	09:45	0	0	0	0	0
09:45	10:00	0	0	0	0	0
11:30	11:45	0	0	0	0	0
11:45	12:00	0	0	0	0	0
12:00	12:15	0	0	0	0	0
12:15	12:30	0	0	0	0	0
12:30	12:45	0	0	0	0	0
12:45	13:00	0	0	0	0	0
13:00	13:15	0	0	0	0	0
13:15	13:30	0	0	0	0	0
15:00	15:15	0	0	0	0	0
15:15	15:30	0	0	0	0	0
15:30	15:45	0	0	0	0	0
15:45	16:00	0	0	0	0	0
16:00	16:15	0	0	0	0	0
16:15	16:30	0	0	0	0	0
16:30	16:45	0	0	0	0	0
16:45	17:00	0	0	0	0	0
17:00	17:15	0	0	0	0	0
17:15	17:30	0	0	0	0	0
17:30	17:45	0	0	0	0	0
17:45	18:00	0	0	0	0	0
Total		0	0	0	0	0

Turning Movement Count
Summary Report Including Peak Hours, AADT and Expansion Factors
All Vehicles Except Bicycles

Flewellyn Road & Huntley Road/Stittsville Main Street — Stittsville, ON

Survey Date: Thursday, August 10, 2023 **Start Time:** 0700 **AADT Factor:** 0.9
Weather AM: Mostly Cloudy 18° C **Survey Duration:** 8 Hrs. **Survey Hours:** 0700-1000, 1130-1330 & 1500-1800
Weather PM: Light/Moderate Rain 18° C **Surveyor(s):** T. Carmody

	Flewellyn Rd.					Flewellyn Rd.						Huntley Rd.					Stittsville Main St.					
	Eastbound					Westbound						Northbound					Southbound					
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	29	72	20	0	121	7	48	16	0	71	192	6	145	7	0	158	52	130	25	0	207	365	557
0800-0900	38	69	15	0	122	7	43	29	0	79	201	17	176	12	0	205	39	188	53	0	280	485	686
0900-1000	36	69	8	0	113	4	38	26	0	68	181	14	170	10	0	194	29	171	37	0	237	431	612
1130-1230	41	46	15	0	102	5	43	32	0	80	182	18	202	16	0	236	31	241	50	0	322	558	740
1230-1330	35	63	13	0	111	5	51	29	0	85	196	13	158	10	0	181	27	212	51	0	290	471	667
1500-1600	28	66	15	0	109	8	63	43	0	114	223	24	195	9	0	228	37	203	55	0	295	523	746
1600-1700	39	50	10	0	99	7	72	66	0	145	244	21	248	12	0	281	31	263	46	0	340	621	865
1700-1800	39	50	19	0	108	6	69	41	0	116	224	13	180	13	0	206	43	200	64	0	307	513	737
Totals	285	485	115	0	885	49	427	282	0	758	1643	126	1474	89	0	1689	289	1608	381	0	2278	3967	5610

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor
Applicable to the Day and Month of the Turning Movement Count
Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

Equivalent 12-hour vehicle volumes. These volumes are calculated by multiplying the 8-hour totals by the 8 ➡12 expansion factor of 1.39

Equ. 12 Hr	396	674	160	0	1230	68	594	392	0	1054	2284	175	2049	124	0	2348	402	2235	530	0	3166	5514	7798

Average daily 12-hour vehicle volumes. These volumes are calculated by multiplying the equivalent 12-hour totals by the AADT factor of: 0.9

AADT 12-hr	357	607	144	0	1107	61	534	353	0	948	2055	158	1844	111	0	2113	362	2012	477	0	2850	4963	7018

24-Hour AADT. These volumes are calculated by multiplying the average daily 12-hour vehicle volumes by the 12 ➡24 expansion factor of 1.31

AADT 24 Hr	467	795	188	0	1450	80	700	462	0	1242	2693	206	2416	146	0	2768	474	2635	624	0	3733	6501	9194

AADT and expansion factors provided by the City of Ottawa

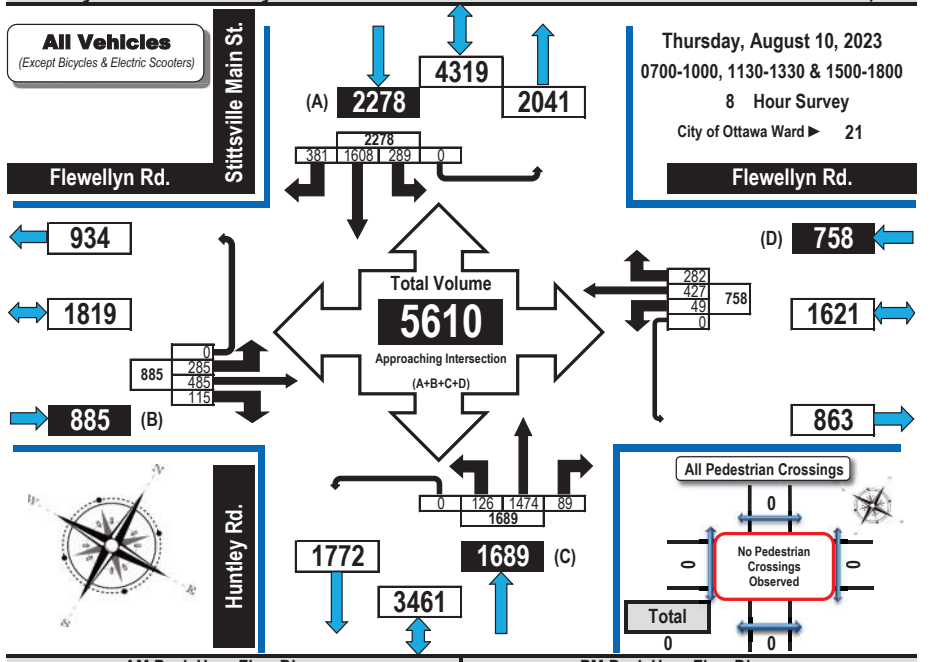
AM Peak Hour Factor ➡ 0.86												Highest Hourly Vehicle Volume Between 0700h & 1000h										
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0800-0900	38	69	15	0	122	7	43	29	0	79	201	17	176	12	0	205	39	188	53	0	280	485	686
OFF Peak Hour Factor ➡ 0.92												Highest Hourly Vehicle Volume Between 1130h & 1330h										
OFF Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1145-1245	39	50	15	0	104	3	42	27	0	72	176	16	201	17	0	234	33	250	51	0	334	568	744
PM Peak Hour Factor ➡ 0.91												Highest Hourly Vehicle Volume Between 1500h & 1800h										
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1545-1645	44	56	14	0	114	6	71	71	0	148	262	27	256	14	0	297	33	255	47	0	335	632	894

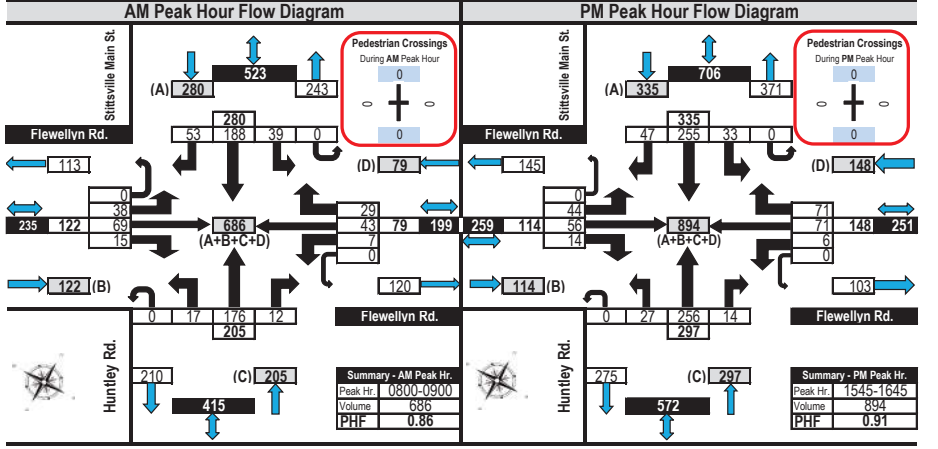
Comments:
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Notes:
1. Includes all vehicle types except bicycles, electric bicycles, and electric scooters.
2. When expansion and AADT factors are applied, the results will differ slightly due to rounding.

Turning Movement Count
Summary, AM and PM Peak Hour Flow Diagrams
All Vehicles Except Bicycles

Flewellyn Road & Huntley Road/Stittsville Main Street — Stittsville, ON



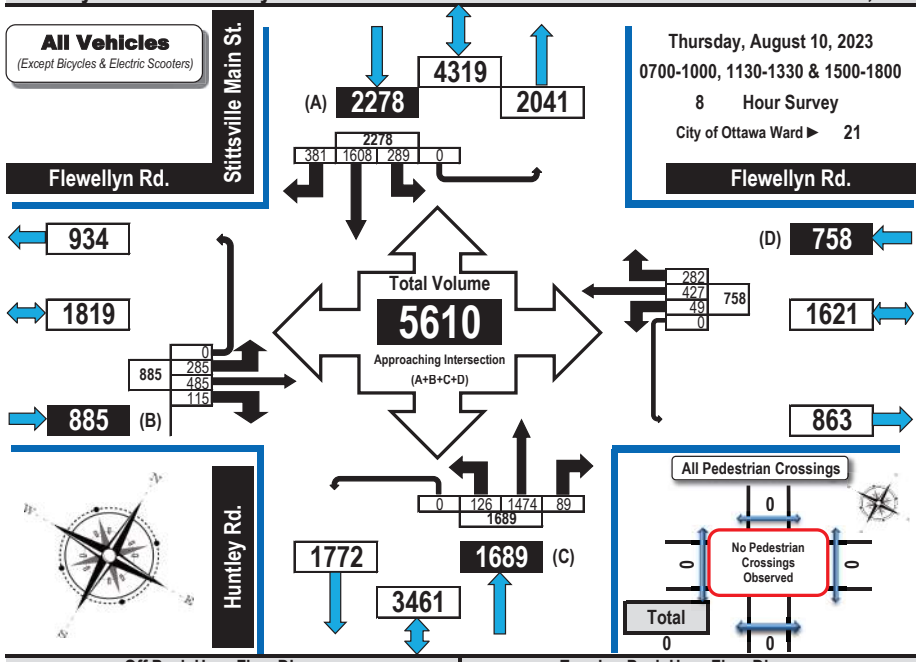


Turning Movement Count
Summary, OFF and EVENING Peak Hour Flow Diagrams
All Vehicles Except Bicycles

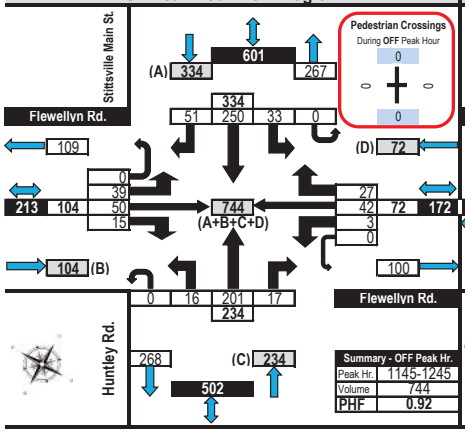
Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**

All Vehicles
(Except Bicycles & Electric Scooters)

Thursday, August 10, 2023
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 21

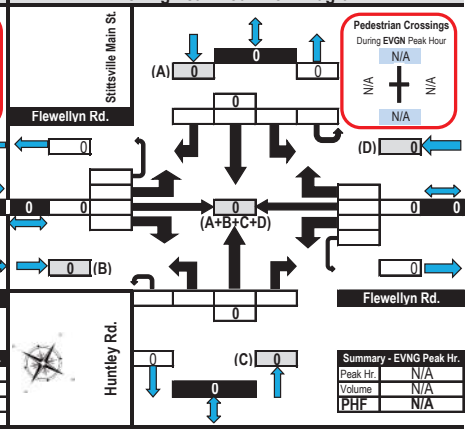


Off Peak Hour Flow Diagram



Summary - OFF Peak Hr.	
Peak Hr.	1145-1245
Volume	744
PHF	0.92

Evening Peak Hour Flow Diagram



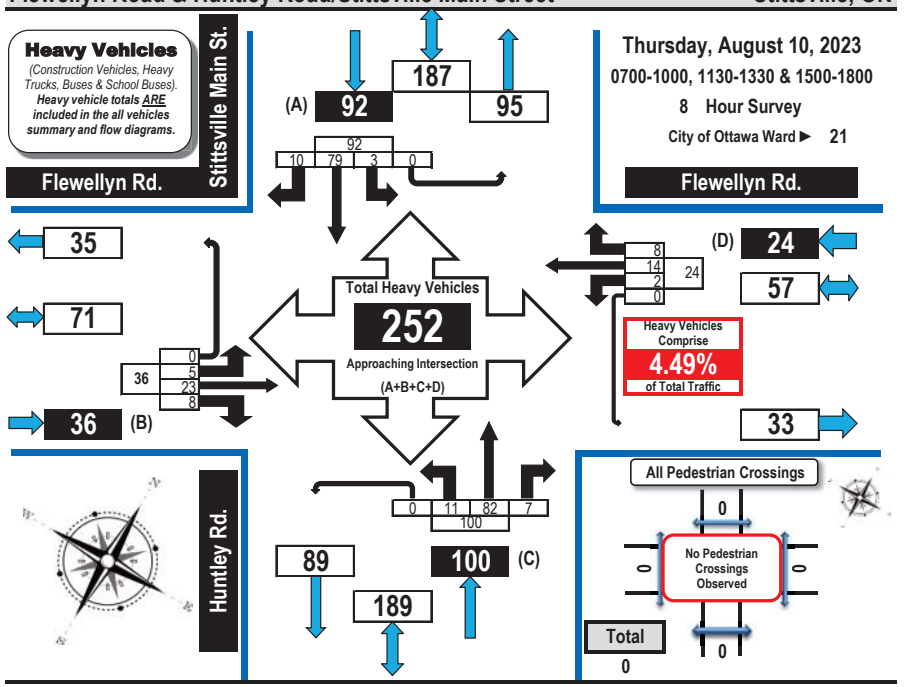
Summary - EVNG Peak Hr.	
Peak Hr.	N/A
Volume	N/A
PHF	N/A

Turning Movement Count
Heavy Vehicle Summary (FHWA Class 4-13)
Flow Diagram

Flewellyn Road & Huntley Road/Stittsville Main St. — **Stittsville, ON**

Heavy Vehicles
(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

Thursday, August 10, 2023
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ► 21

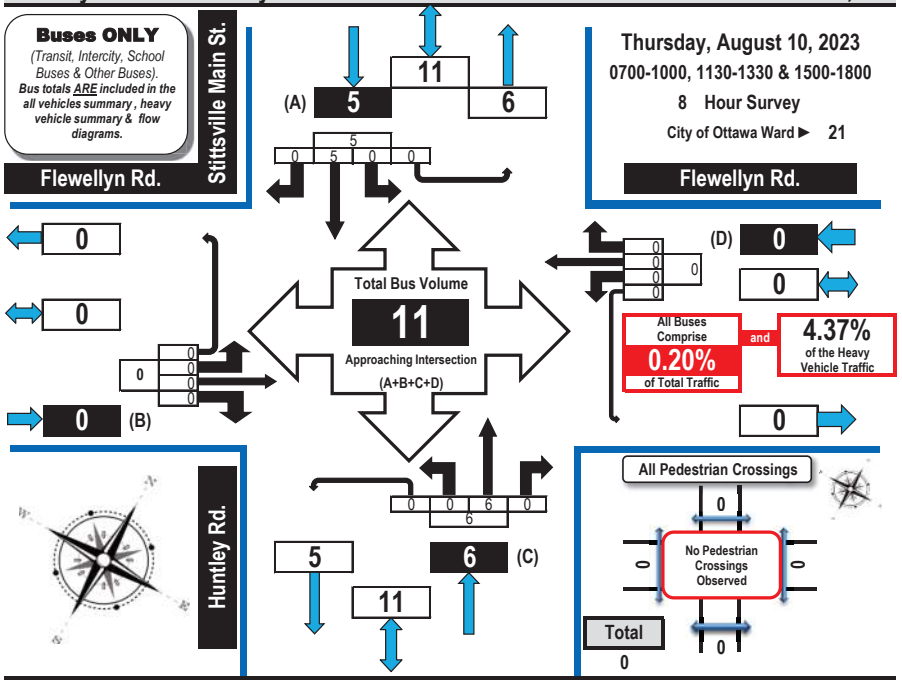


	Flewellyn Rd. Eastbound					Flewellyn Rd. Westbound					Huntley Rd. Northbound					Stittsville Main St. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	3	0	0	3	1	2	1	0	4	2	12	0	0	14	0	6	1	0	7	28
0800-0900	0	3	0	0	3	0	0	1	0	1	3	18	0	0	21	1	10	1	0	12	37
0900-1000	1	7	2	0	10	1	0	1	0	2	0	15	0	0	15	0	10	0	0	10	37
1130-1230	1	2	1	0	4	0	1	3	0	4	2	12	4	0	18	0	19	5	0	24	50
1230-1330	1	3	3	0	7	0	6	1	0	7	1	10	1	0	12	2	15	2	0	19	45
1500-1600	2	4	0	0	6	0	3	0	0	3	2	8	0	0	10	0	11	1	0	12	31
1600-1700	0	1	1	0	2	0	1	1	0	2	1	5	1	0	7	0	5	0	0	5	16
1700-1800	0	0	1	0	1	0	1	0	0	1	0	2	1	0	3	0	3	0	0	3	8
Totals	5	23	8	0	36	2	14	8	0	24	11	82	7	0	100	3	79	10	0	92	252

Comments:
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Turning Movement Count
All Buses Summary (FHWA Class 4 ONLY)
Flow Diagram

Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**



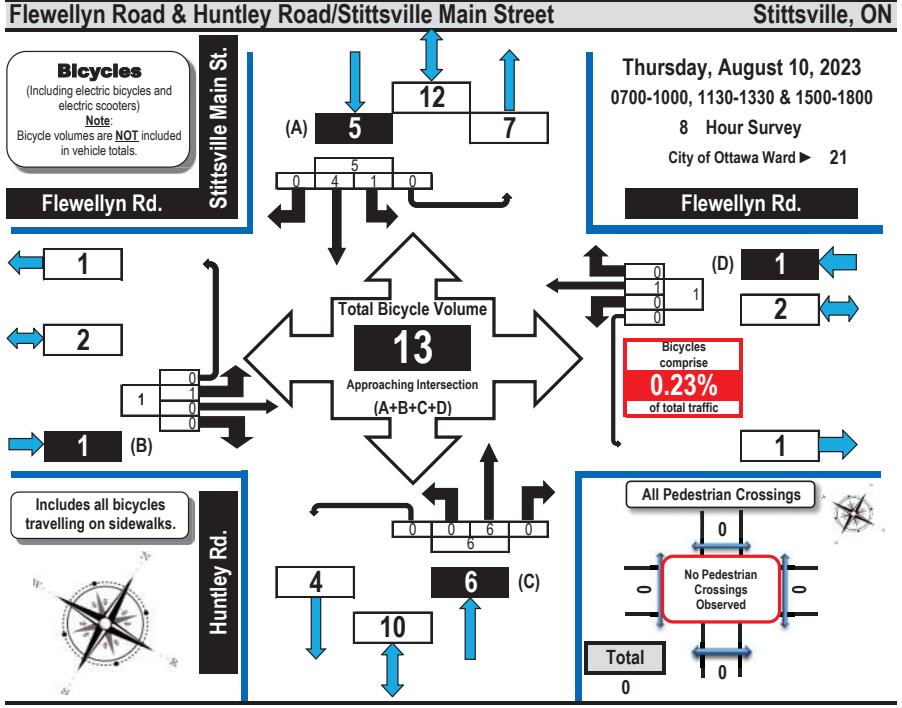
	Flewellyn Rd. Eastbound					Flewellyn Rd. Westbound					Huntley Rd. Northbound					Stittsville Main St. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
0800-0900	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
0900-1000	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
1130-1230	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1230-1330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1500-1600	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
1600-1700	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	2
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	2
Totals	0	0	0	0	0	0	0	0	0	0	0	6	0	0	6	0	5	0	0	5	11

Comments:

OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Turning Movement Count
Bicycle Summary
Flow Diagram

Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**



	Flewellyn Rd. Eastbound					Flewellyn Rd. Westbound					Huntley Rd. Northbound					Stittsville Main St. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	2	0	0	2	3
0900-1000	0	0	0	0	0	0	1	0	0	1	0	3	0	0	3	1	1	0	0	2	6
1130-1230	1	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
1230-1330	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
1500-1600	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
1600-1700	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	1	0	0	0	1	0	1	0	0	1	0	6	0	0	6	1	4	0	0	5	13

Comments:

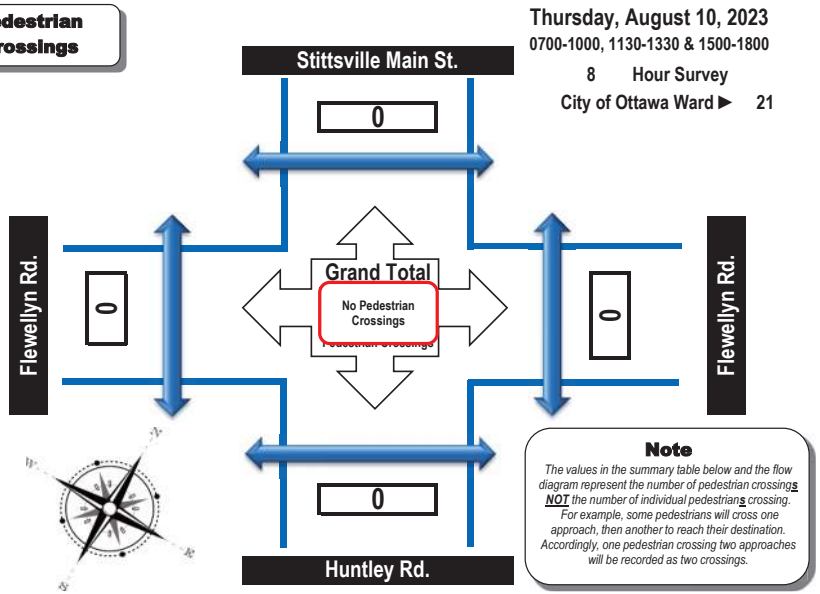
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Turning Movement Count
Pedestrian Crossings Summary and Flow Diagram

Flewellyn Road & Huntley Road/Stittsville Main Street — **Stittsville, ON**

Pedestrian Crossings

Thursday, August 10, 2023
0700-1000, 1130-1330 & 1500-1800
8 Hour Survey
City of Ottawa Ward ▶ 21



Note
*The values in the summary table below and the flow diagram represent the number of pedestrian crossings **NOT** the number of individual pedestrians crossing. For example, some pedestrians will cross one approach, then another to reach their destination. Accordingly, one pedestrian crossing two approaches will be recorded as two crossings.*

Time Period	West Side Crossing Flewellyn Rd.	East Side Crossing Flewellyn Rd.	Street Total	South Side Crossing Huntley Rd.	North Side Crossing Stittsville Main St.	Street Total	Grand Total
0700-0800	0	0	0	0	0	0	0
0800-0900	0	0	0	0	0	0	0
0900-1000	0	0	0	0	0	0	0
1130-1230	0	0	0	0	0	0	0
1230-1330	0	0	0	0	0	0	0
1500-1600	0	0	0	0	0	0	0
1600-1700	0	0	0	0	0	0	0
1700-1800	0	0	0	0	0	0	0
Totals	**0**	**0**	**0**	**0**	**0**	**0**	**0**

No Pedestrian Crossings

Comments:
OC Transpo and Para Transpo buses, private buses and school buses comprise 4.37% of the heavy vehicle traffic. No pedestrian crossings were observed.

Appendix C

Synchro Intersection Worksheets – Existing Conditions

Intersection	
Intersection Delay, s/veh	10.5
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	69	15	7	43	29	17	176	12	39	188	53
Future Vol, veh/h	38	69	15	7	43	29	17	176	12	39	188	53
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	42	77	17	8	48	32	19	196	13	43	209	59
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	9.8	9.1	10.7	11.1
HCM LOS	A	A	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	8%	31%	9%	14%
Vol Thru, %	86%	57%	54%	67%
Vol Right, %	6%	12%	37%	19%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	205	122	79	280
LT Vol	17	38	7	39
Through Vol	176	69	43	188
RT Vol	12	15	29	53
Lane Flow Rate	228	136	88	311
Geometry Grp	1	1	1	1
Degree of Util (X)	0.325	0.205	0.13	0.41
Departure Headway (Hd)	5.142	5.438	5.335	4.74
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	690	664	676	750
Service Time	3.24	3.438	3.34	2.83
HCM Lane V/C Ratio	0.33	0.205	0.13	0.415
HCM Control Delay	10.7	9.8	9.1	11.1
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	1.4	0.8	0.4	2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	261	33	43	148	68	18	164	45	109	100	199
Future Volume (vph)	290	261	33	43	148	68	18	164	45	109	100	199
Satd. Flow (prot)	0	1665	0	0	1642	0	0	1617	0	0	1559	0
Flt Permitted		0.976			0.992			0.996			0.987	
Satd. Flow (perm)	0	1665	0	0	1642	0	0	1617	0	0	1559	0
Lane Group Flow (vph)	0	649	0	0	288	0	0	252	0	0	453	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Control Type: Roundabout	
Intersection Capacity Utilization 99.8%	ICU Level of Service F
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	14.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	87	129	26	2	62	17	8	241	13	25	149	51
Future Vol, veh/h	87	129	26	2	62	17	8	241	13	25	149	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	7	2	4	2	2	12	13	5	2	2	3	8
Mvmt Flow	97	143	29	2	69	19	9	268	14	28	166	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	88	0	0	172	0	0	546	444	158	576	449	79
Stage 1	-	-	-	-	-	-	352	352	-	83	83	-
Stage 2	-	-	-	-	-	-	194	92	-	493	366	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.23	6.55	6.22	7.12	6.53	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.617	4.045	3.318	3.518	4.027	3.372
Pot Cap-1 Maneuver	1477	-	-	1405	-	-	432	504	887	428	504	965
Stage 1	-	-	-	-	-	-	643	626	-	925	824	-
Stage 2	-	-	-	-	-	-	783	813	-	558	621	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1477	-	-	1405	-	-	279	467	887	218	467	965
Mov Cap-2 Maneuver	-	-	-	-	-	-	279	467	-	218	467	-
Stage 1	-	-	-	-	-	-	596	580	-	857	823	-
Stage 2	-	-	-	-	-	-	588	812	-	274	576	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.7	0.2	24.5	21.6
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	468	1477	-	-	1405	-	-	462
HCM Lane V/C Ratio	0.622	0.065	-	-	0.002	-	-	0.541
HCM Control Delay (s)	24.5	7.6	0	-	7.6	0	-	21.6
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	4.2	0.2	-	-	0	-	-	3.2

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea Existing AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	20	6.0	20	6.0	0.423	15.4	LOS C	2.0	15.1	0.73	0.83	0.88	49.5
2	T1	All MCs	182	5.0	182	5.0	0.423	10.2	LOS B	2.0	15.1	0.73	0.83	0.88	50.4
3	R2	All MCs	50	13.0	50	13.0	0.423	10.8	LOS B	2.0	15.1	0.73	0.83	0.88	49.8
Approach			252	6.7	252	6.7	0.423	10.8	LOS B	2.0	15.1	0.73	0.83	0.88	50.2
East: Fernbank															
4	L2	All MCs	48	5.0	48	5.0	0.373	12.7	LOS B	1.8	13.2	0.66	0.71	0.68	50.9
5	T1	All MCs	164	4.0	164	4.0	0.373	7.6	LOS A	1.8	13.2	0.66	0.71	0.68	51.9
6	R2	All MCs	76	2.0	76	2.0	0.373	7.3	LOS A	1.8	13.2	0.66	0.71	0.68	51.6
Approach			288	3.6	288	3.6	0.373	8.4	LOS A	1.8	13.2	0.66	0.71	0.68	51.7
North: Shea															
7	L2	All MCs	121	4.0	121	4.0	0.435	10.6	LOS B	2.6	18.8	0.53	0.57	0.53	51.7
8	T1	All MCs	111	7.0	111	7.0	0.435	5.6	LOS A	2.6	18.8	0.53	0.57	0.53	52.6
9	R2	All MCs	221	5.0	221	5.0	0.435	5.4	LOS A	2.6	18.8	0.53	0.57	0.53	52.2
Approach			453	5.2	453	5.2	0.435	6.9	LOS A	2.6	18.8	0.53	0.57	0.53	52.2
West: Fernbank															
10	L2	All MCs	322	4.0	322	4.0	0.647	12.8	LOS B	5.9	42.7	0.75	0.68	0.86	49.7
11	T1	All MCs	290	3.0	290	3.0	0.647	7.6	LOS A	5.9	42.7	0.75	0.68	0.86	50.6
12	R2	All MCs	37	3.0	37	3.0	0.647	7.5	LOS A	5.9	42.7	0.75	0.68	0.86	50.3
Approach			649	3.5	649	3.5	0.647	10.2	LOS B	5.9	42.7	0.75	0.68	0.86	50.2
All Vehicles			1642	4.5	1642	4.5	0.647	9.0	LOS A	5.9	42.7	0.67	0.68	0.74	51.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	56	14	6	71	71	27	256	14	33	255	47
Future Vol, veh/h	44	56	14	6	71	71	27	256	14	33	255	47
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	49	62	16	7	79	79	30	284	16	37	283	52
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.9	10.9	13.7	14.5
HCM LOS	B	B	B	B

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	39%	4%	10%
Vol Thru, %	86%	49%	48%	76%
Vol Right, %	5%	12%	48%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	297	114	148	335
LT Vol	27	44	6	33
Through Vol	256	56	71	255
RT Vol	14	14	71	47
Lane Flow Rate	330	127	164	372
Geometry Grp	1	1	1	1
Degree of Util (X)	0.495	0.215	0.263	0.544
Departure Headway (Hd)	5.401	6.124	5.765	5.259
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	667	583	620	685
Service Time	3.453	4.195	3.832	3.309
HCM Lane V/C Ratio	0.495	0.218	0.265	0.543
HCM Control Delay	13.7	10.9	10.9	14.5
HCM Lane LOS	B	B	B	B
HCM 95th-tile Q	2.8	0.8	1.1	3.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	100	345	34	53	361	95	30	72	49	47	111	112
Future Volume (vph)	100	345	34	53	361	95	30	72	49	47	111	112
Satd. Flow (prot)	0	1687	0	0	1671	0	0	1620	0	0	1587	0
Flt Permitted		0.990			0.995			0.990			0.991	
Satd. Flow (perm)	0	1687	0	0	1671	0	0	1620	0	0	1587	0
Lane Group Flow (vph)	0	532	0	0	566	0	0	167	0	0	299	0
Sign Control		Yield			Yield			Yield			Yield	

Intersection Summary	
Control Type: Roundabout	
Intersection Capacity Utilization 74.6%	ICU Level of Service D
Analysis Period (min) 15	

Intersection	
Int Delay, s/veh	12.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	58	70	11	2	151	33	16	207	17	14	161	71
Future Vol, veh/h	58	70	11	2	151	33	16	207	17	14	161	71
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	5	2	18	2	2	2	6	2	6	2	2	3
Mvmt Flow	64	78	12	2	168	37	18	230	19	16	179	79

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	205	0	0	90	0	0	532	421	84	528	409	187
Stage 1	-	-	-	-	-	-	212	212	-	191	191	-
Stage 2	-	-	-	-	-	-	320	209	-	337	218	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.16	6.52	6.26	7.12	6.52	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.554	4.018	3.354	3.518	4.018	3.327
Pot Cap-1 Maneuver	1349	-	-	1505	-	-	452	524	964	461	532	852
Stage 1	-	-	-	-	-	-	781	727	-	811	742	-
Stage 2	-	-	-	-	-	-	683	729	-	677	723	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1349	-	-	1505	-	-	286	497	964	278	504	852
Mov Cap-2 Maneuver	-	-	-	-	-	-	286	497	-	278	504	-
Stage 1	-	-	-	-	-	-	742	691	-	770	741	-
Stage 2	-	-	-	-	-	-	469	728	-	421	687	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	3.3	0.1	20.8	18.2
HCM LOS			C	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	490	1349	-	-	1505	-	-	543
HCM Lane V/C Ratio	0.544	0.048	-	-	0.001	-	-	0.503
HCM Control Delay (s)	20.8	7.8	0	-	7.4	0	-	18.2
HCM Lane LOS	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	3.2	0.1	-	-	0	-	-	2.8

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea Existing PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	33	3.0	33	3.0	0.223	12.2	LOS B	0.9	6.8	0.60	0.69	0.60	51.2
2	T1	All MCs	80	3.0	80	3.0	0.223	7.1	LOS A	0.9	6.8	0.60	0.69	0.60	52.1
3	R2	All MCs	54	6.0	54	6.0	0.223	7.1	LOS A	0.9	6.8	0.60	0.69	0.60	51.7
Approach			168	4.0	168	4.0	0.223	8.1	LOS A	0.9	6.8	0.60	0.69	0.60	51.8
East: Fernbank															
4	L2	All MCs	59	8.0	59	8.0	0.530	10.9	LOS B	3.6	26.0	0.59	0.54	0.59	51.5
5	T1	All MCs	401	3.0	401	3.0	0.530	5.7	LOS A	3.6	26.0	0.59	0.54	0.59	52.6
6	R2	All MCs	106	2.0	106	2.0	0.530	5.5	LOS A	3.6	26.0	0.59	0.54	0.59	52.3
Approach			566	3.3	566	3.3	0.530	6.2	LOS A	3.6	26.0	0.59	0.54	0.59	52.4
North: Shea															
7	L2	All MCs	52	2.0	52	2.0	0.380	12.3	LOS B	1.9	13.7	0.65	0.70	0.67	51.1
8	T1	All MCs	123	2.0	123	2.0	0.380	7.2	LOS A	1.9	13.7	0.65	0.70	0.67	52.0
9	R2	All MCs	124	9.0	124	9.0	0.380	7.5	LOS A	1.9	13.7	0.65	0.70	0.67	51.5
Approach			300	4.9	300	4.9	0.380	8.2	LOS A	1.9	13.7	0.65	0.70	0.67	51.6
West: Fernbank															
10	L2	All MCs	111	5.0	111	5.0	0.504	10.8	LOS B	3.3	23.7	0.58	0.55	0.58	51.3
11	T1	All MCs	383	3.0	383	3.0	0.504	5.7	LOS A	3.3	23.7	0.58	0.55	0.58	52.3
12	R2	All MCs	38	3.0	38	3.0	0.504	5.5	LOS A	3.3	23.7	0.58	0.55	0.58	52.0
Approach			532	3.4	532	3.4	0.504	6.7	LOS A	3.3	23.7	0.58	0.55	0.58	52.1
All Vehicles			1566	3.7	1566	3.7	0.530	7.0	LOS A	3.6	26.0	0.60	0.59	0.60	52.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix D

All-Way Stop-Control Warrant Calculation

Warrant for AWSC at Shea Road at Flewellyn Road (existing)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
3032	1938	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	YES

Warrant for AWSC at Shea Road at Cosanti Drive (existing)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
2264	305	0
Control Required		
Total Vehicle Volume	NO	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Cosanti Drive (FB2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4376	335	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Cosanti Drive (FB2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4866	335	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Cosanti Drive (FT2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4485	335	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Cosanti Drive (FT2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4975	335	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street #21 (FB2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4134	304	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street #21 (FB2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4623	304	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street #21 (FT2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4199	377	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Shea Road at Street #21 (FT2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4689	377	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street #12 (FB2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4144	1240	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street #12 (FB2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4210	1240	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street #12 (FT2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4578	1552	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	NO

Warrant for AWSC at Fewlellyn Road at Street #12 (FT2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4643	1552	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	YES	
	3-Way Stop	4-Way Stop
Vehicle Split	YES	NO

Warrant for AWSC at Fewlellyn Road at Street #16 (FB2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4153	656	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street #16 (FB2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4219	656	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street #16 (FT2030)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4583	823	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Warrant for AWSC at Fewlellyn Road at Street #16 (FT2035)

Volume Criteria		
Major Street 2-Way Hourly Volume (per 8-hr period)	Minor Street 2-Way Hourly Volume (per 8-hr period)	Minor Street Pedestrian 2-Way Hourly Volume (per 8-hr period)
4649	823	0
Control Required		
Total Vehicle Volume	YES	
Minor Street Volume & Pedestrian Volume	NO	
	3-Way Stop	4-Way Stop
Vehicle Split	NO	NO

Appendix E

Signal Warrant Calculation

CGH TRANSPORTATION

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Flewellyn Road & Huntley Road/Stittsville Main Street

What is the direction of the Main Road street? North-South

When was the data collected? 2023-08-10

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Rural **Population < 10,000 AND Speed >= 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	6	145	7	29	72	20	52	130	25	7	48	16	0
8:00	17	176	12	38	69	15	39	188	53	7	43	29	0
9:00	14	170	10	36	69	8	29	171	37	4	38	26	0
10:00	18	202	16	41	46	15	31	241	50	5	43	32	0
15:00	13	158	10	35	63	13	27	212	51	5	51	29	0
16:00	24	195	9	28	66	15	37	203	55	8	63	43	0
17:00	21	248	12	39	50	10	31	263	46	7	72	66	0
18:00	13	180	13	39	50	19	43	200	64	6	69	41	0
Total	**126**	**1,474**	**89**	**285**	**485**	**115**	**289**	**1,608**	**381**	**49**	**427**	**282**	**0**

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Huntley Road/Stittsville Main Street Count Date: 2023-08-10

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
1A	480	720	600	900	557	686	612	740	667	746	865	737		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	120	170	120	170	192	201	181	182	196	223	244	224		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100

Free Flow
Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☑ No ☐

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☑ No ☐

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
2A	480	720	600	900	365	485	431	558	471	523	621	513		
	COMPLIANCE %				76	100	90	100	98	100	100	100	764	95
2B	50	75	50	75	108	114	109	92	103	102	118	114		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100

Free Flow
Signal Justification 2:

Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☑ No ☐

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Huntley Road/Stittsville Main Stree | Count Date: 2023-08-10

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☑	☐
	B	Crossing Volume	100	%		
2. Delay to Cross Traffic	A	Main Road	95	%	☐	☑
	B	Crossing Road	100	%		

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Flewellyn Road & Shea Road

What is the direction of the Main Road street? North-South

When was the data collected? 2023-04-26

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Rural **Population < 10,000 AND Speed >= 70 km/hr**

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	9	214	12	76	118	26	21	116	42	3	59	17	0
8:00	7	206	15	58	100	14	26	140	47	1	60	16	0
9:00	6	179	14	38	89	6	14	73	30	0	49	17	0
10:00	11	123	16	26	54	3	16	66	25	7	56	16	0
15:00	12	121	12	31	52	5	16	94	39	1	78	22	0
16:00	11	185	7	46	64	14	16	129	60	4	110	12	0
17:00	16	207	17	58	70	11	14	161	71	2	151	33	0
18:00	14	178	6	37	70	6	13	153	52	5	115	32	0
Total	**86**	**1,413**	**99**	**370**	**617**	**85**	**136**	**932**	**366**	**23**	**678**	**165**	**0**

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Shea Road

Count Date: 2023-04-26

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
1A	480	720	600	900	713	690	515	419	483	658	811	681		
	COMPLIANCE %				100	100	100	87	100	100	100	100	787	98
1B	120	170	120	170	299	249	199	162	189	250	325	265		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100

Free Flow

Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☑ No ☐

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	15:00	16:00	17:00	18:00		
2A	480	720	600	900	414	441	316	257	294	408	486	416		
	COMPLIANCE %				86	92	66	54	61	85	100	87	630	79
2B	50	75	50	75	197	159	127	89	110	160	211	157		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100

Free Flow

Signal Justification 2:

Both 2A and 2B 100% fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision

GO TO Justification:

Intersection: Flewellyn Road & Shea Road

Count Date: 2023-04-26

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	98	%	☐	☑
	B	Crossing Volume	100	%		
2. Delay to Cross Traffic	A	Main Road	79	%	☐	☑
	B	Crossing Road	100	%		

Shea Road at Flewellyn Road
FB 2030

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	593	123%	123%	Yes
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	322	269%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	270	56%	56%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	166	333%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Stittsville Main Street/ Huntley Road at Flewellyn Road
FB 2030

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	649	90%	90%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	282	166%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	366	51%	51%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	115	153%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Stittsville Main Street/ Huntley Road at Flewellyn Road
FB 2035

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	663	92%	92%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	288	169%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	376	52%	52%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	117	156%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Stittsville Main Street/ Huntley Road at Flewellyn Road
FT 2030

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	684	95%	95%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	303	178%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	381	53%	53%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	118	157%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Stittsville Main Street/ Huntley Road at Flewellyn Road
FT 2035

Justification #7

Justification	Description	Minimum Requirement 1 Lane Highway		Minimum Requirement 2 or More Lanes		Compliance Sectional		Compliance Entire %	Signal
		Free Flow	Restr. Flow	Free Flow	Restr. Flow	Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	480	720	600	900	698	97%	97%	No
	B. Vehicle volume, along minor streets (average hour)	120	170	120	170	308	181%		
2. Delay to Cross Traffic	A. Vehicle volumes, major street (average hour)	480	720	600	900	390	54%	54%	No
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	50	75	50	75	121	161%		

Notes
1. Refer to OTM Book 12, pg 92, Mar 2012
2. Lowest section percentage governs justification
3. Average hourly volumes estimated from peak hour volumes, AHV = PM/2 or (AM + PM) / 4, including amplifcation factors
4. T-intersection factor corrected, applies only to 1B

Appendix F

Left-Turn Warrant Calculation

CGH TRANSPORTATION

Shea Road at Flewellyn Road

Existing

Design Speed																	
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	Yes NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	87	129	26	2	62	17	8	241	13	25	149	51	3.1%	262	225
PM	58	70	11	2	151	33	16	207	17	14	161	71	6.7%	240	246

Future Background 2030

Design Speed																	
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	Yes NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	306	26	2	169	22	8	184	13	37	193	51	3.9%	205	281
PM	59	236	11	2	350	46	16	213	17	23	255	71	6.5%	246	349

Future Background 2035

Design Speed																	
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	Yes NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	306	26	2	179	22	8	207	13	37	241	51	3.5%	228	329
PM	59	247	11	2	350	46	16	260	17	23	285	71	5.5%	293	379

Future Total 2030

Design Speed																	
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	Yes NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	352	26	2	189	23	8	184	13	40	193	51	3.9%	205	284
PM	59	269	11	2	397	49	16	213	17	25	255	71	6.5%	246	351

Future Total 2035

Design Speed																	
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	Yes NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	60	352	26	2	199	23	8	207	13	40	241	51	3.5%	228	332
PM	59	280	11	2	397	49	16	260	17	25	285	71	5.5%	293	381

Existing

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	87	129	26	2	62	17	8	241	13	25	149	51	3.1%	262	225		
	PM	58	70	11	2	151	33	16	207	17	14	161	71	6.7%	240	246		

Future Background 2030

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	60	306	26	2	169	22	8	184	13	37	193	51	3.9%	205	281		
	PM	59	236	11	2	350	46	16	213	17	23	255	71	6.5%	246	349		

Future Background 2035

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	60	306	26	2	179	22	8	207	13	37	241	51	3.5%	228	329		
	PM	59	247	11	2	350	46	16	260	17	23	285	71	5.5%	293	379		

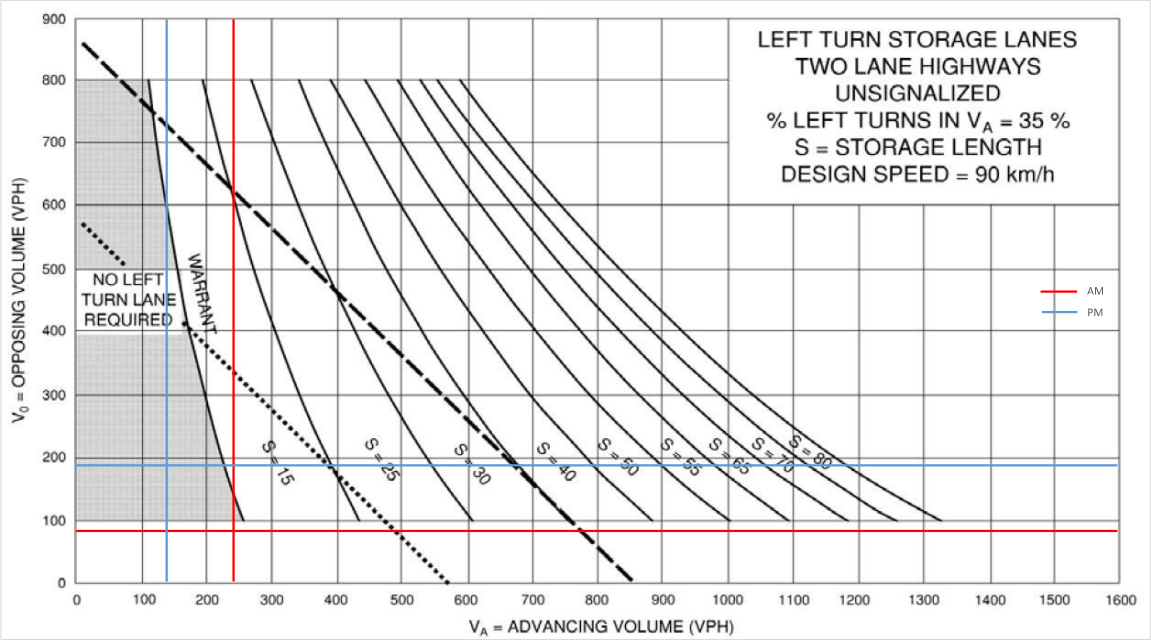
Future Total 2030

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	60	352	26	2	189	23	8	184	13	40	193	51	3.9%	205	284		
	PM	59	269	11	2	397	49	16	213	17	25	255	71	6.5%	246	351		

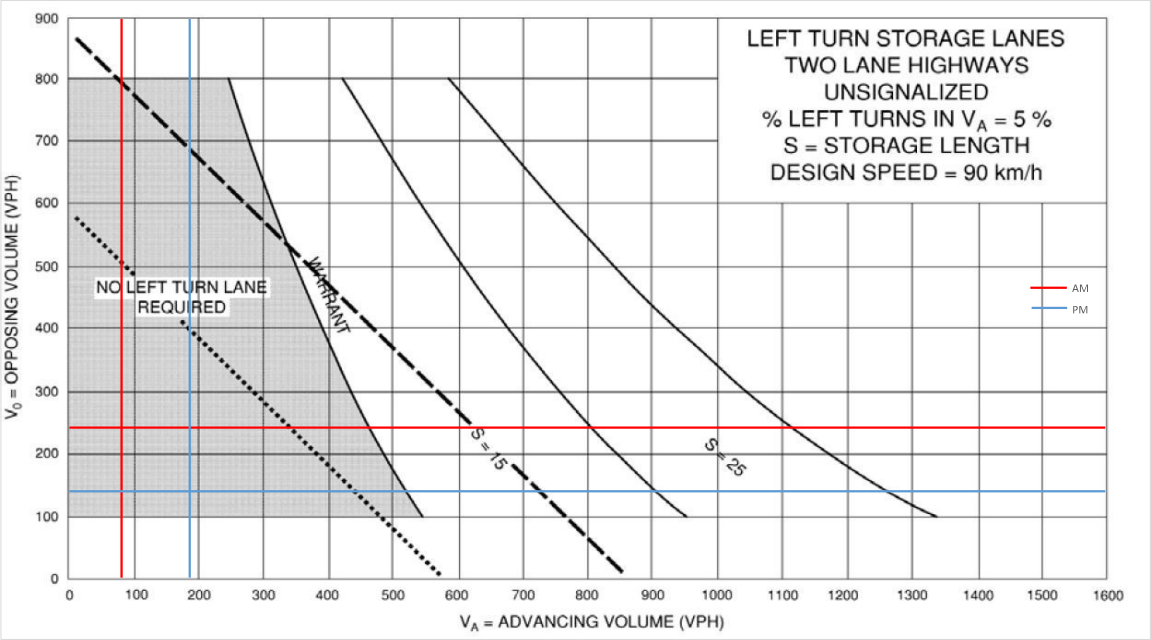
Future Total 2035

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	60	352	26	2	199	23	8	207	13	40	241	51	3.5%	228	332		
	PM	59	280	11	2	397	49	16	260	17	25	285	71	5.5%	293	381		

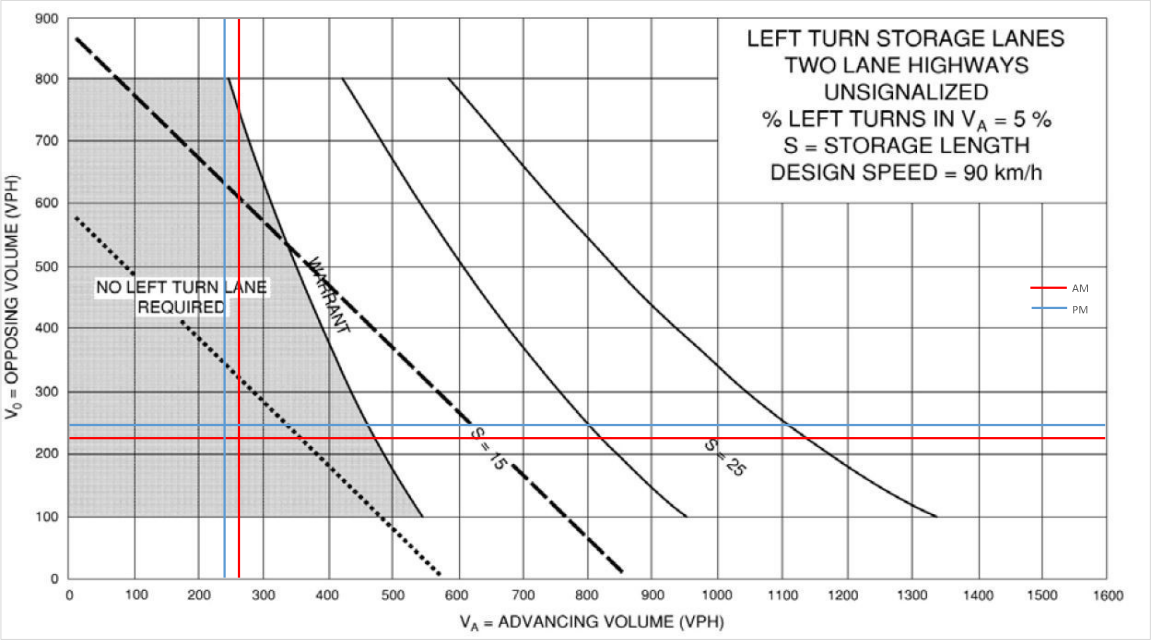
Existing - Eastbound Left



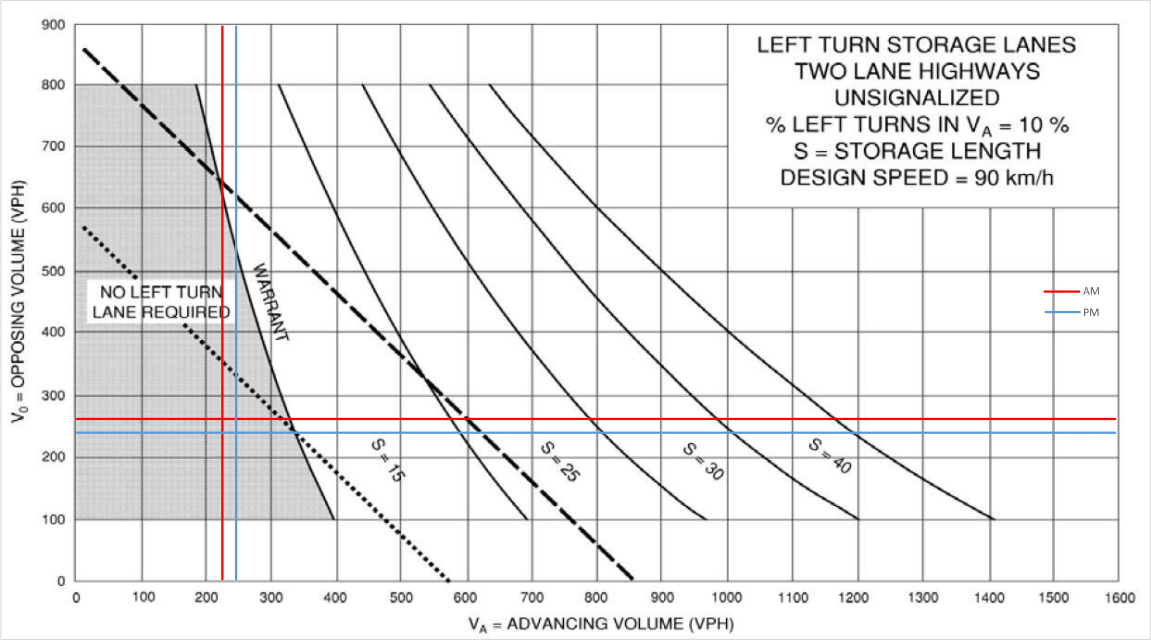
Existing - Westbound Left



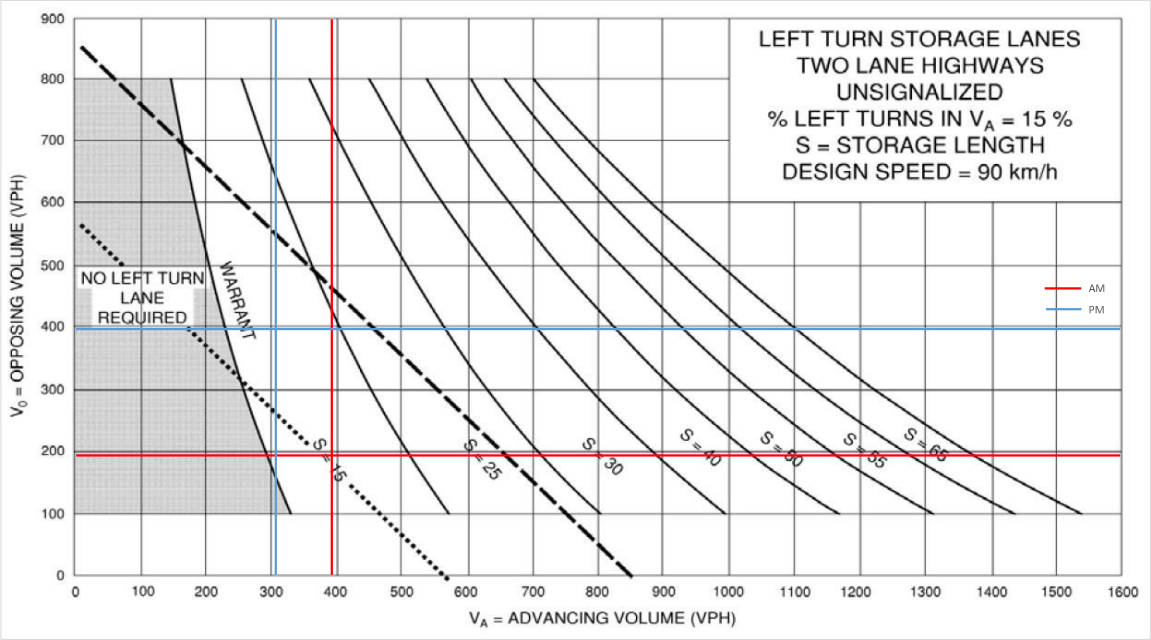
Existing - Northbound Left



Existing - Southbound Left



Future Background 2030 - Eastbound Left



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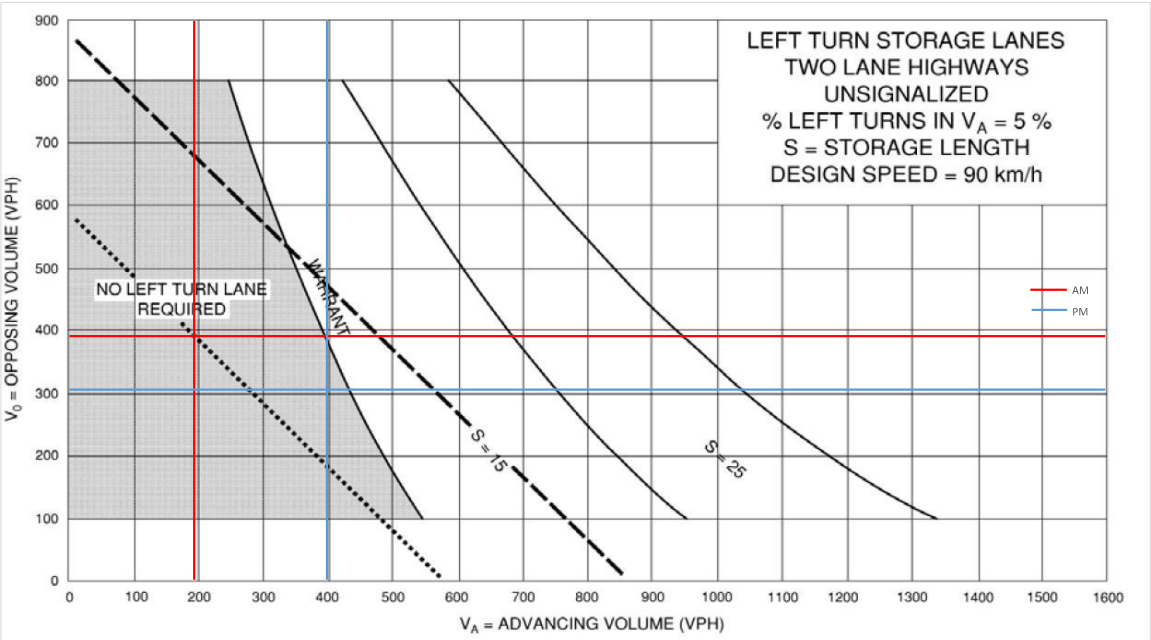
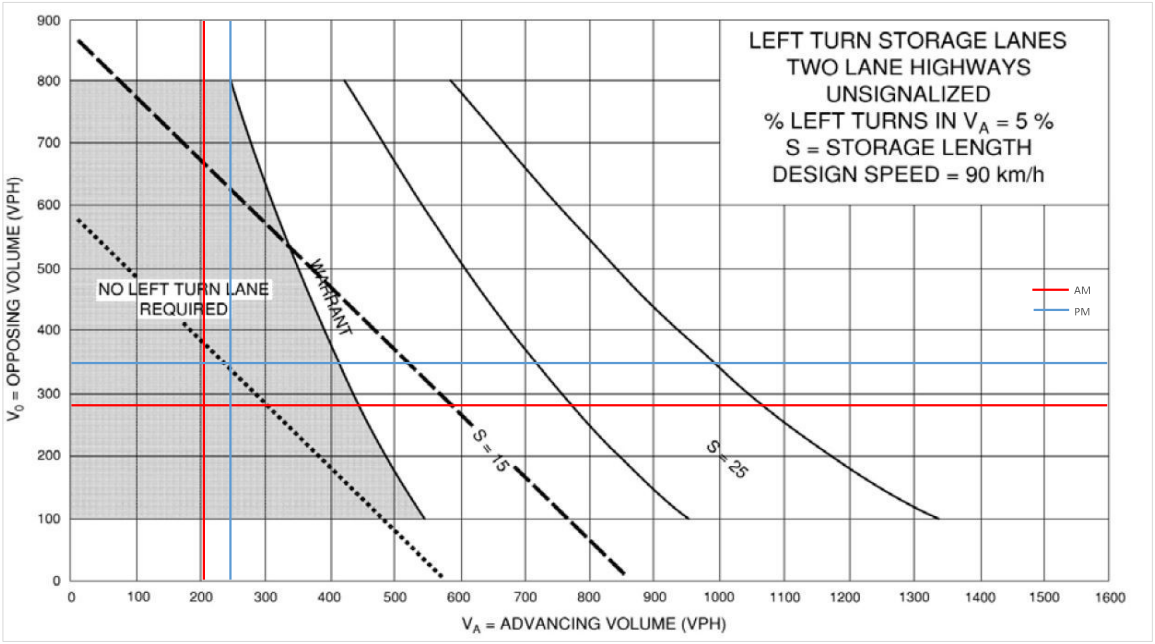
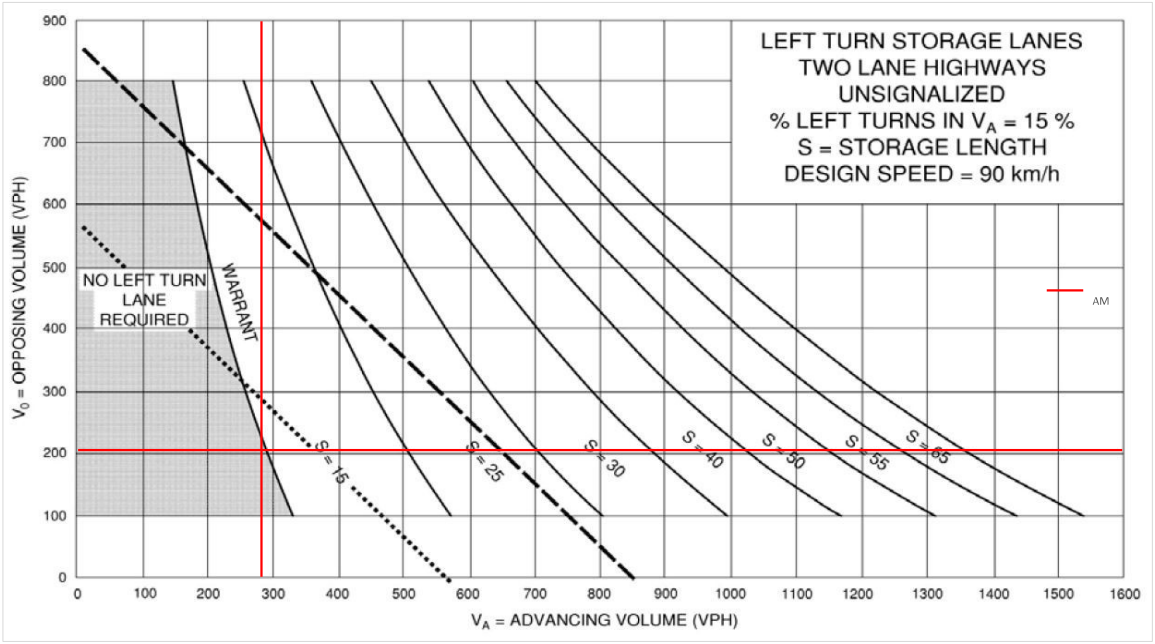


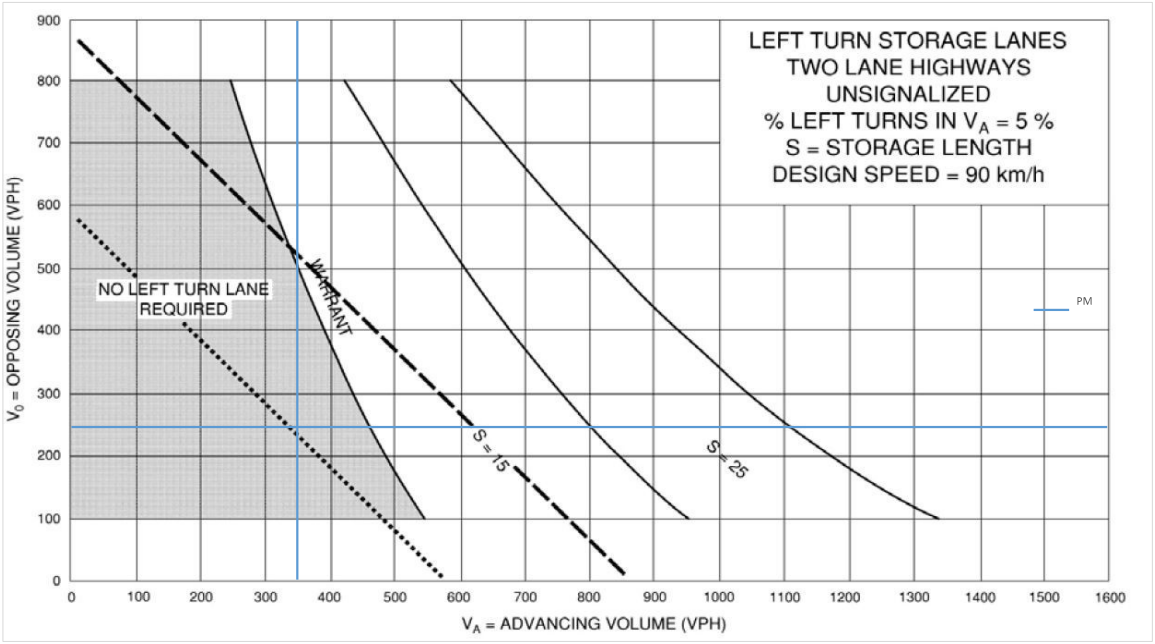
Future Background 2030 - Northbound Left



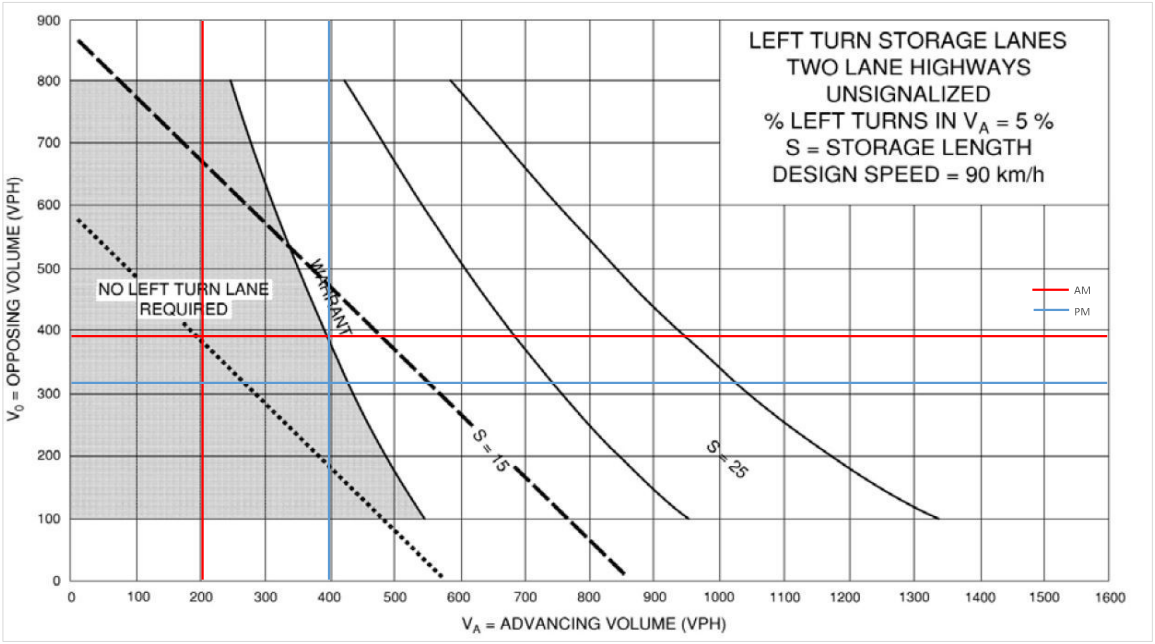
Future Background 2030 - Southbound Left



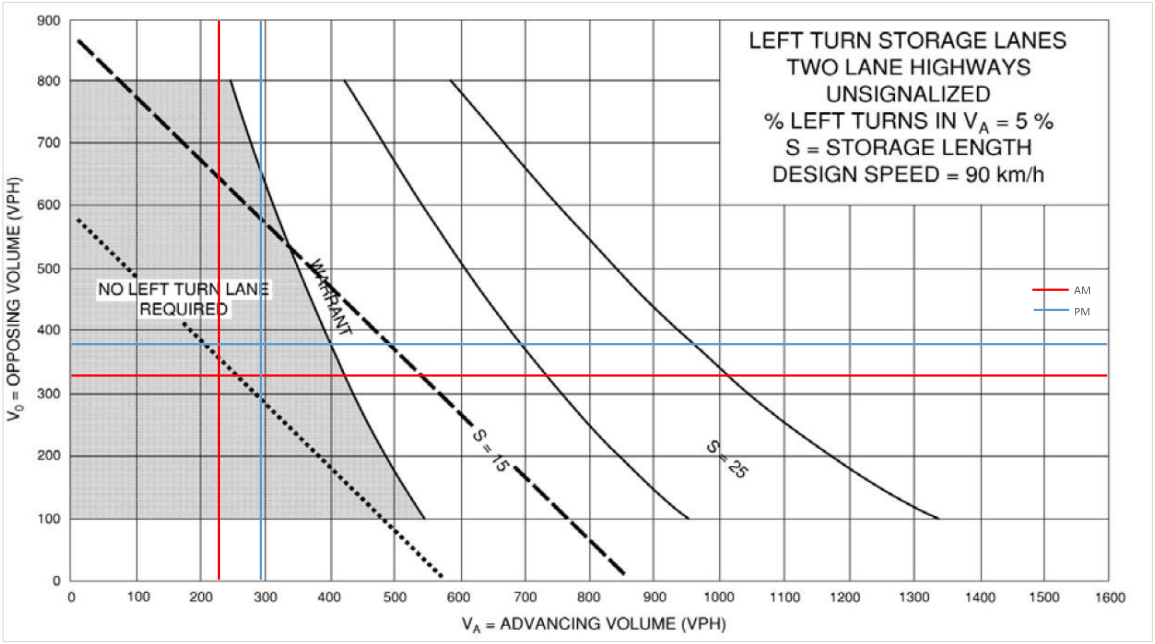
Future Background 2030 - Southbound Left



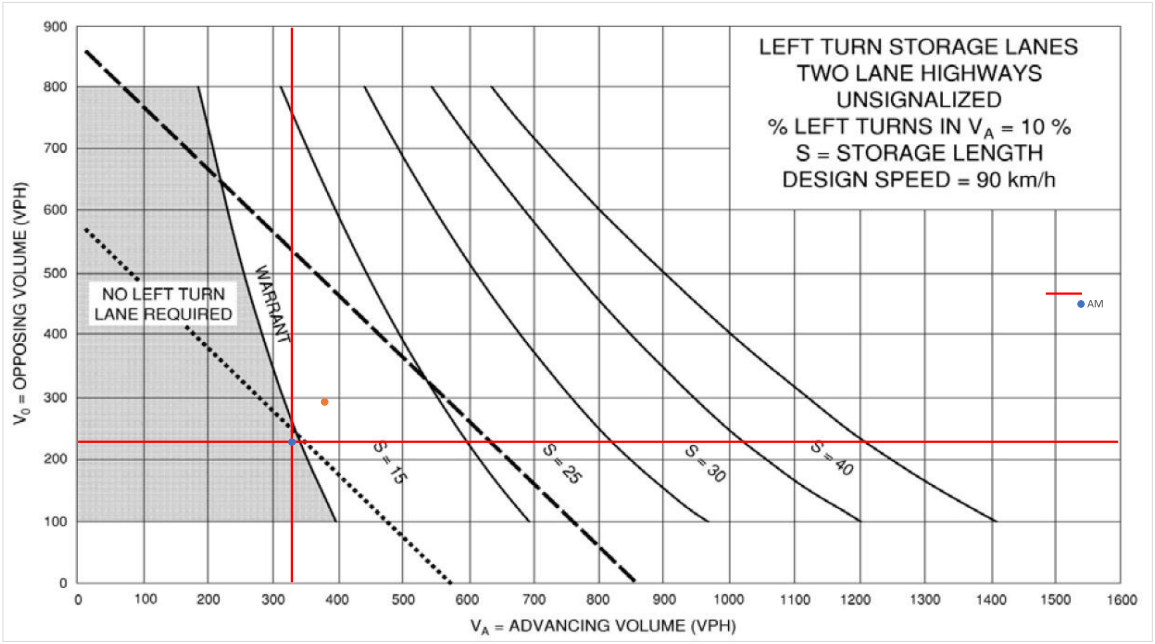
Future Background 2035 - Westbound Left



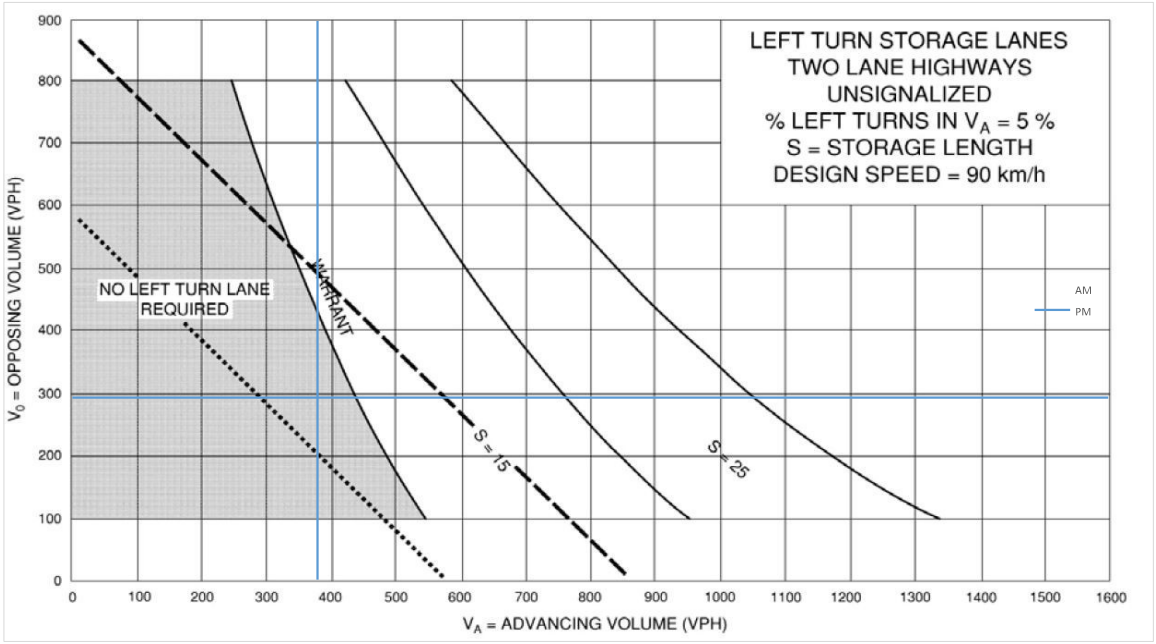
Future Background 2035 - Northbound Left



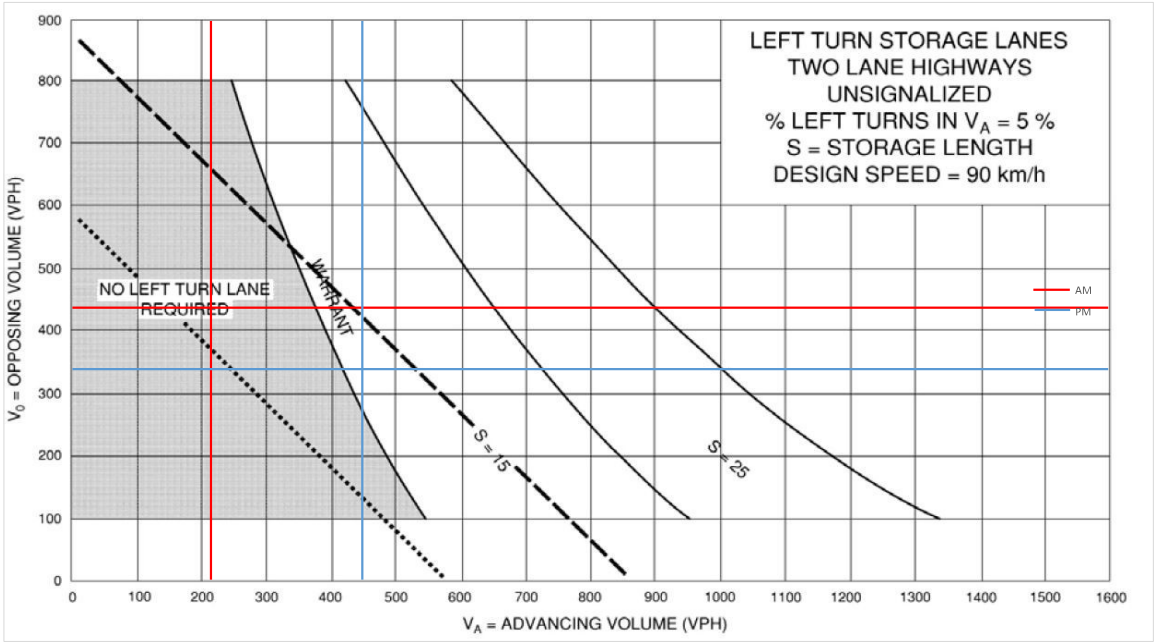
Future Background 2035 - Southbound Left



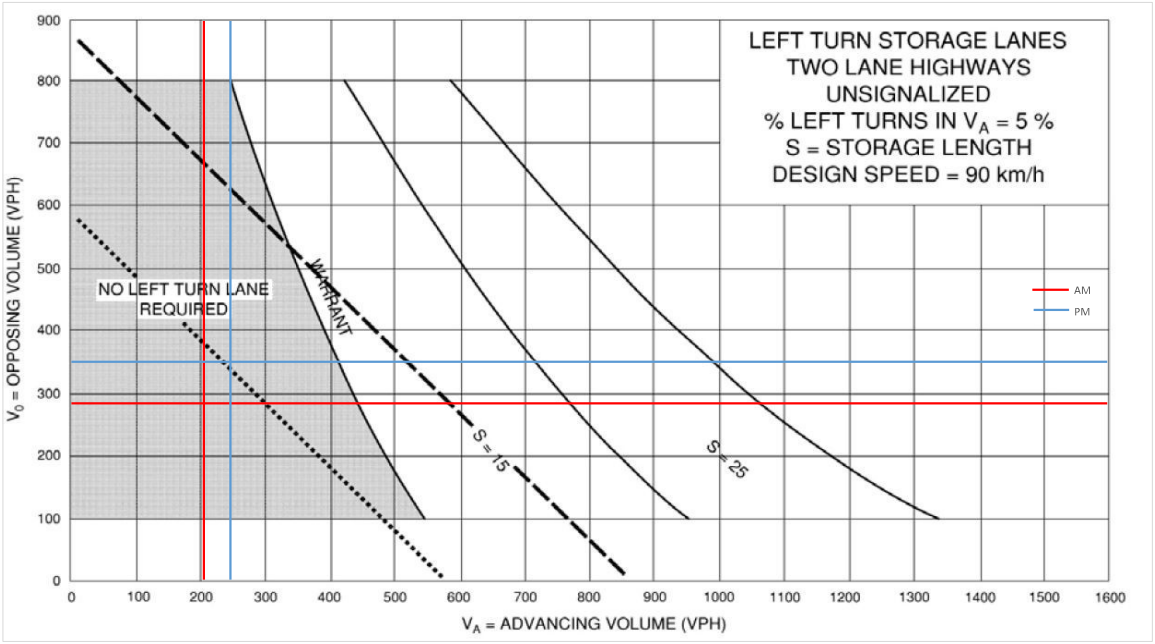
Future Background 2035 - Southbound Left



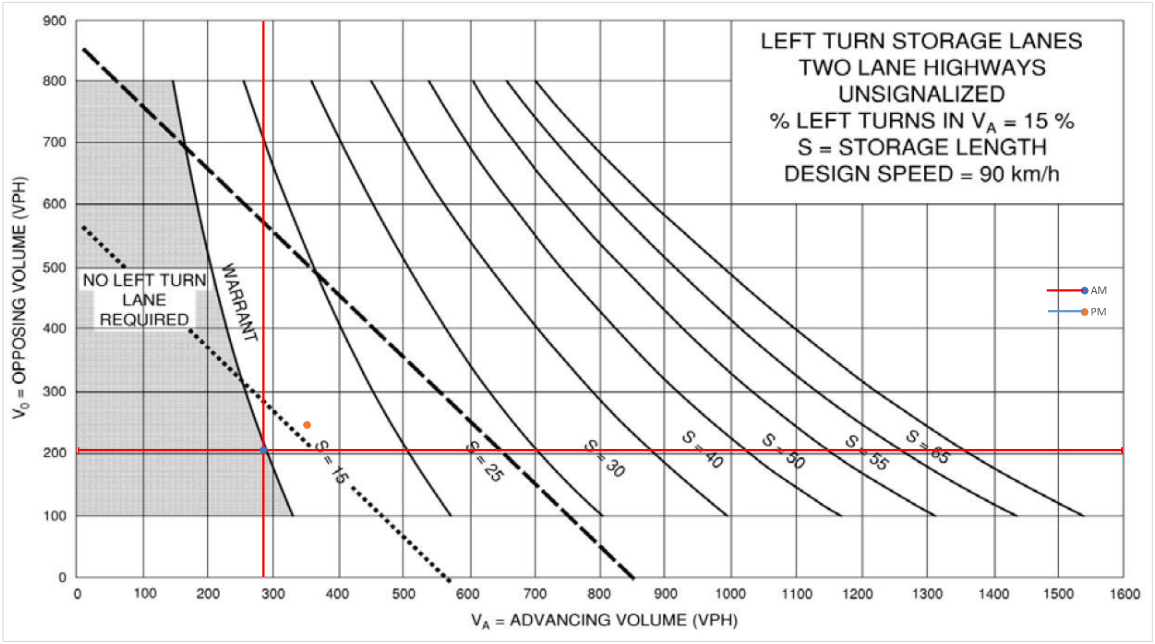
Future Total 2030 - Westbound Left



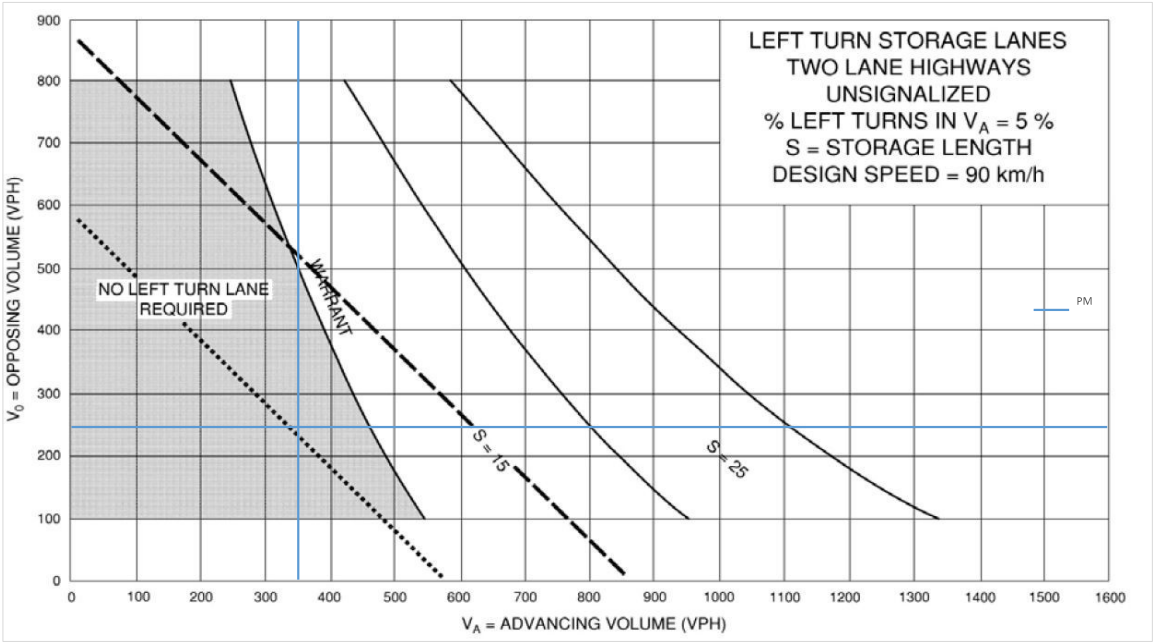
Future Total 2030 - Northbound Left



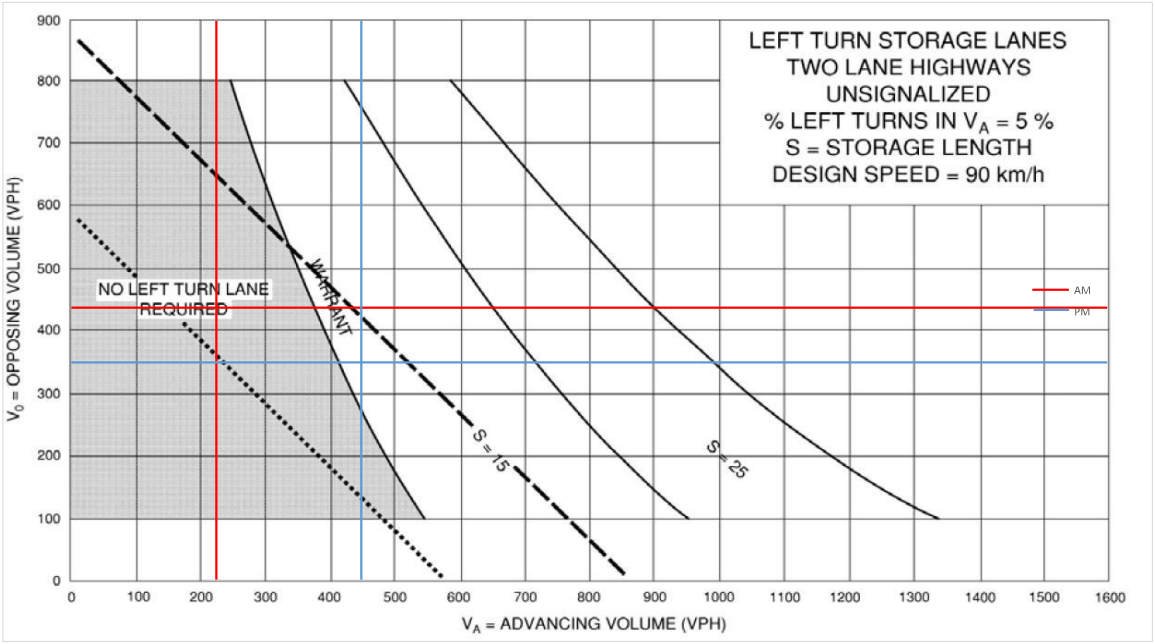
Future Total 2030 - Southbound Left



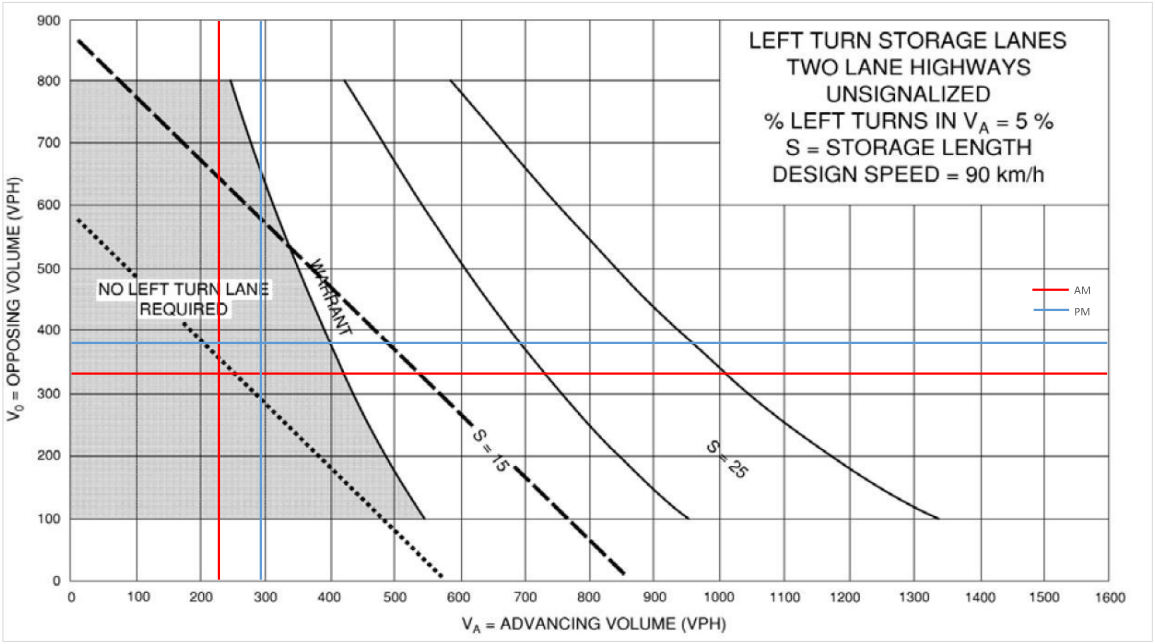
Future Total 2030 - Southbound Left



Future Total 2035 - Westbound Left



Future Total 2035 - Northbound Left



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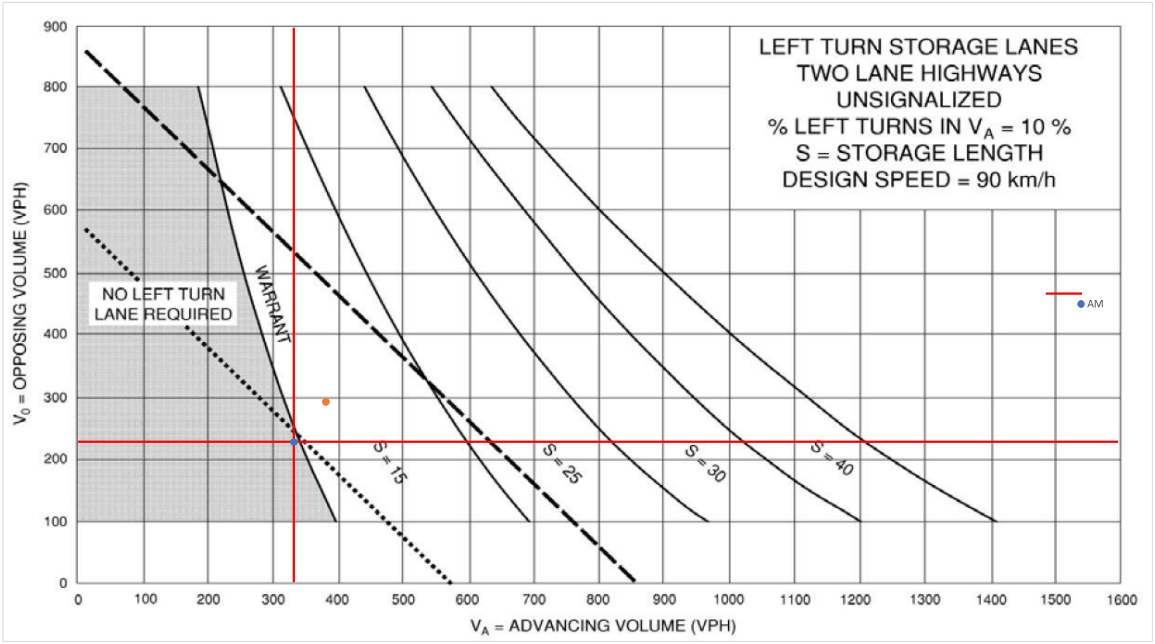

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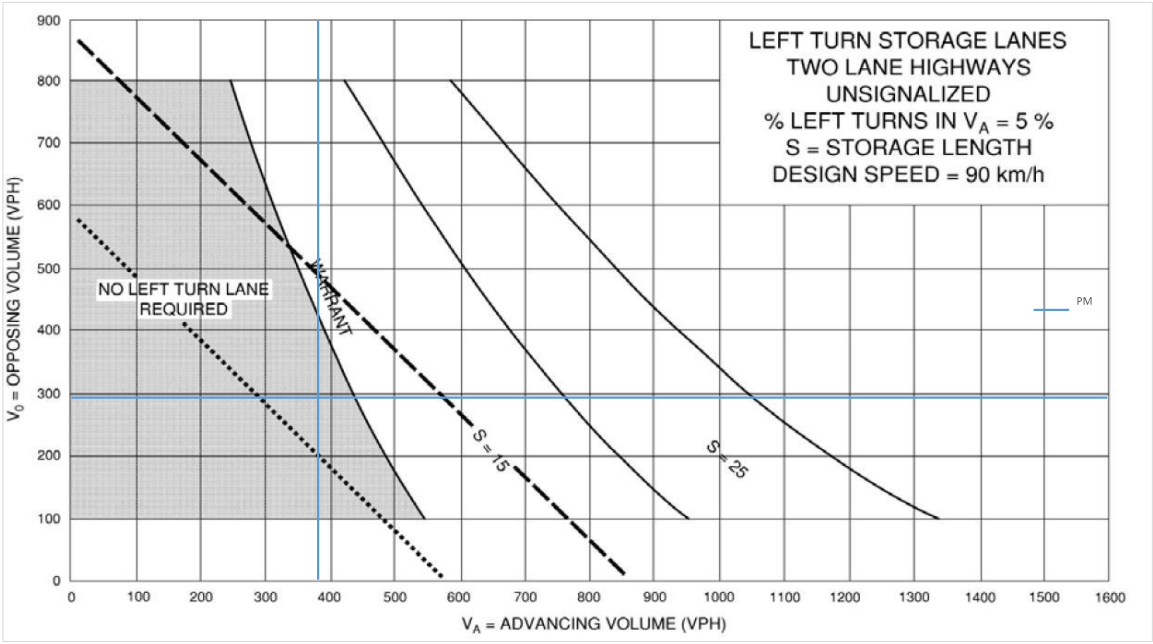


Stittsville Main Street Huntley Road at Flewellyn

Existing

Design Speed																		
												Yes						
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	69	15	7	43	29	17	176	12	39	188	53	13.9%	280	205
PM	44	56	14	6	71	71	27	256	14	33	255	47	9.9%	335	297

Future Background 2030

Design Speed																		
												Yes						
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	164	15	19	146	173	17	232	17	101	259	53	24.5%	413	266
PM	44	131	14	15	196	174	27	234	27	179	272	47	35.9%	498	288

Future Background 2035

Design Speed																		
												Yes						
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	164	15	19	156	173	17	240	17	101	269	53	23.9%	423	274
PM	44	142	14	15	196	174	27	245	27	179	281	47	35.3%	507	299

Future Total 2030

Design Speed																		
												Yes						
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	166	15	22	151	209	17	232	18	117	259	53	27.3%	429	267
PM	44	136	14	17	200	200	27	234	30	216	272	47	40.4%	535	291

Future Total 2035

Design Speed																		
												Yes						
90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	166	15	22	161	209	17	240	18	117	269	53	26.7%	439	275
PM	44	147	14	17	200	200	27	245	30	216	281	47	39.7%	544	302

Existing

Design Speed: 70 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	69	15	7	43	29	17	176	12	39	188	53	13.9%	280	205
PM	44	56	14	6	71	71	27	256	14	33	255	47	9.9%	335	297

Future Background 2030

Design Speed: 70 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	164	15	19	146	173	17	232	17	101	259	53	24.5%	413	266
PM	44	131	14	15	196	174	27	234	27	179	272	47	35.9%	498	288

Future Background 2035

Design Speed: 70 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	164	15	19	156	173	17	240	17	101	269	53	23.9%	423	274
PM	44	142	14	15	196	174	27	245	27	179	281	47	35.3%	507	299

Future Total 2030

Design Speed: 70 km/h

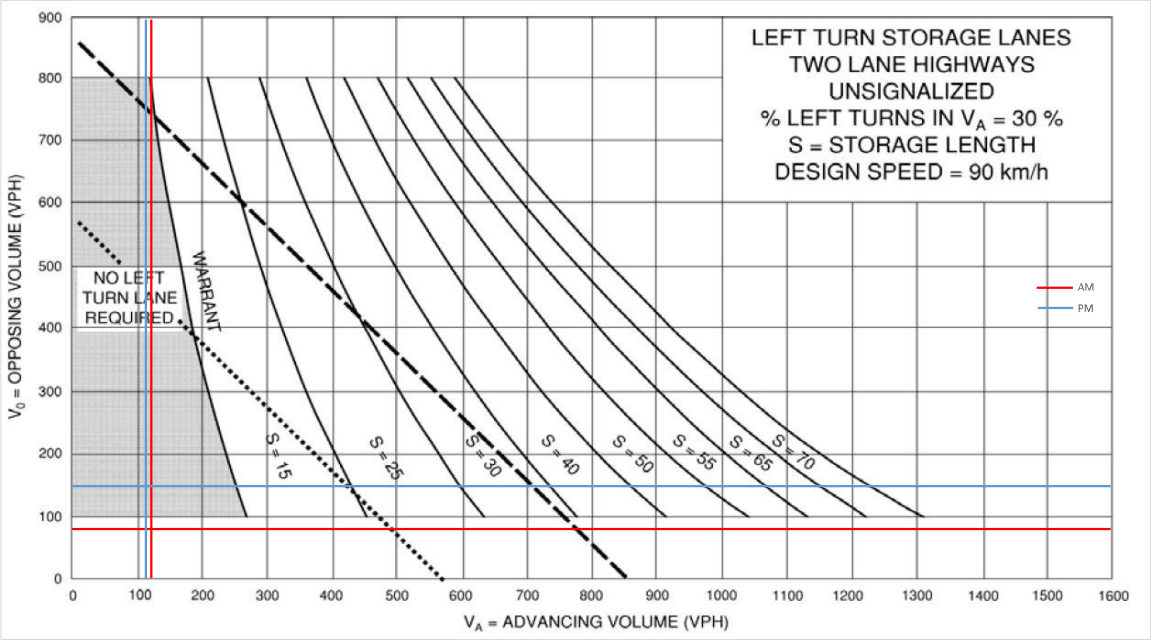
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	166	15	22	151	209	17	232	18	117	259	53	27.3%	429	267
PM	44	136	14	17	200	200	27	234	30	216	272	47	40.4%	535	291

Future Total 2035

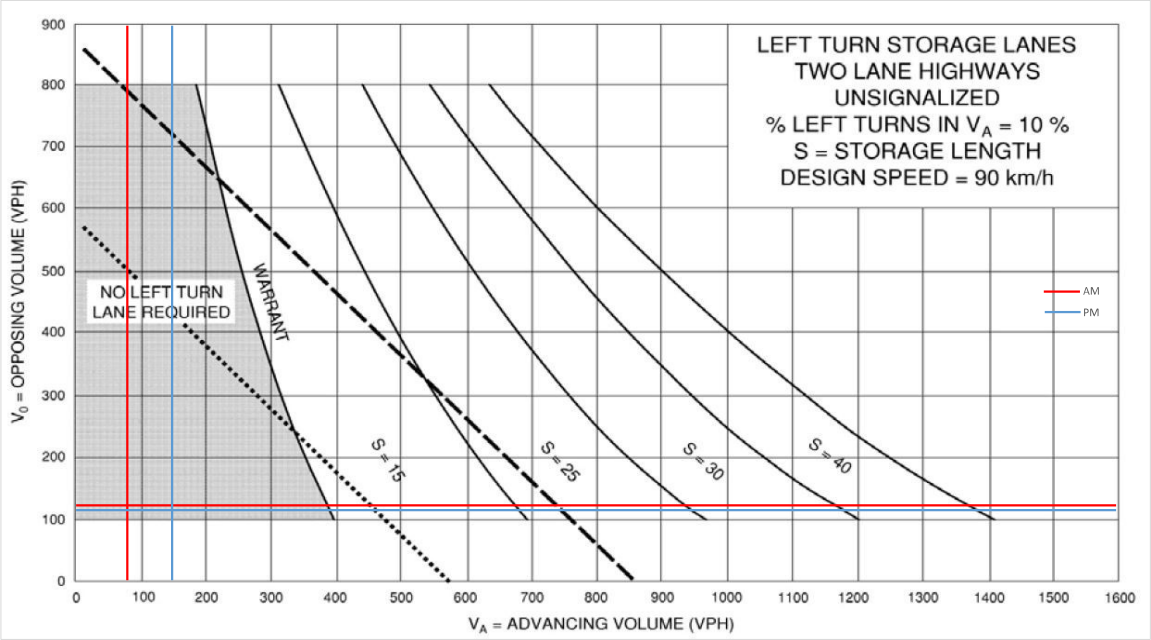
Design Speed: 70 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	38	166	15	22	161	209	17	240	18	117	269	53	26.7%	439	275
PM	44	147	14	17	200	200	27	245	30	216	281	47	39.7%	544	302

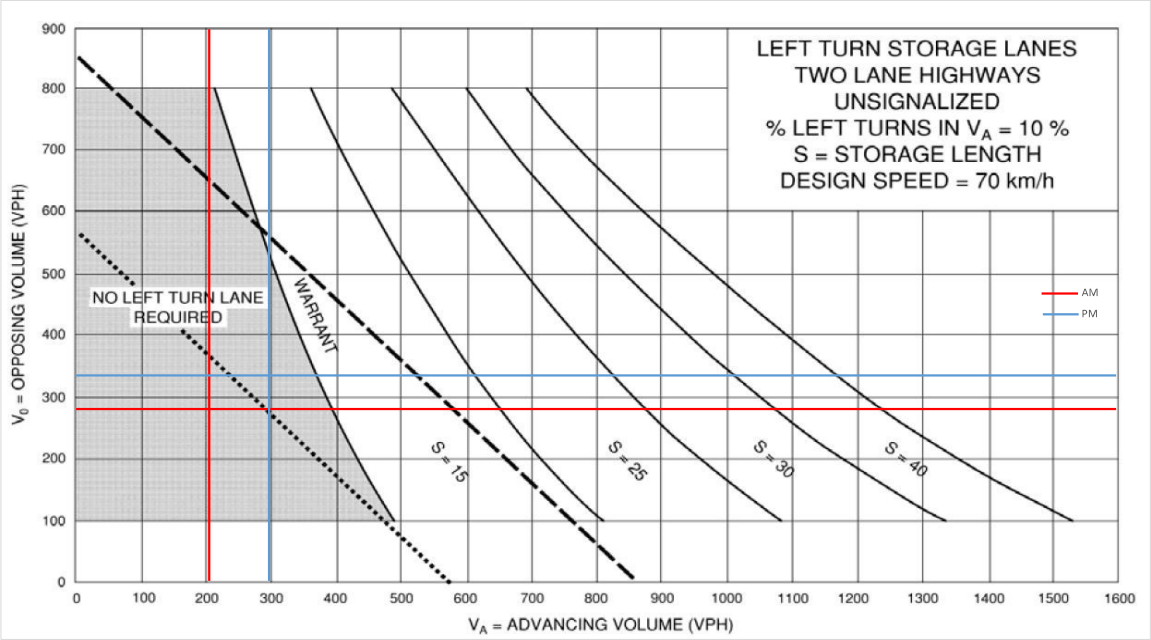
Existing - Eastbound Left



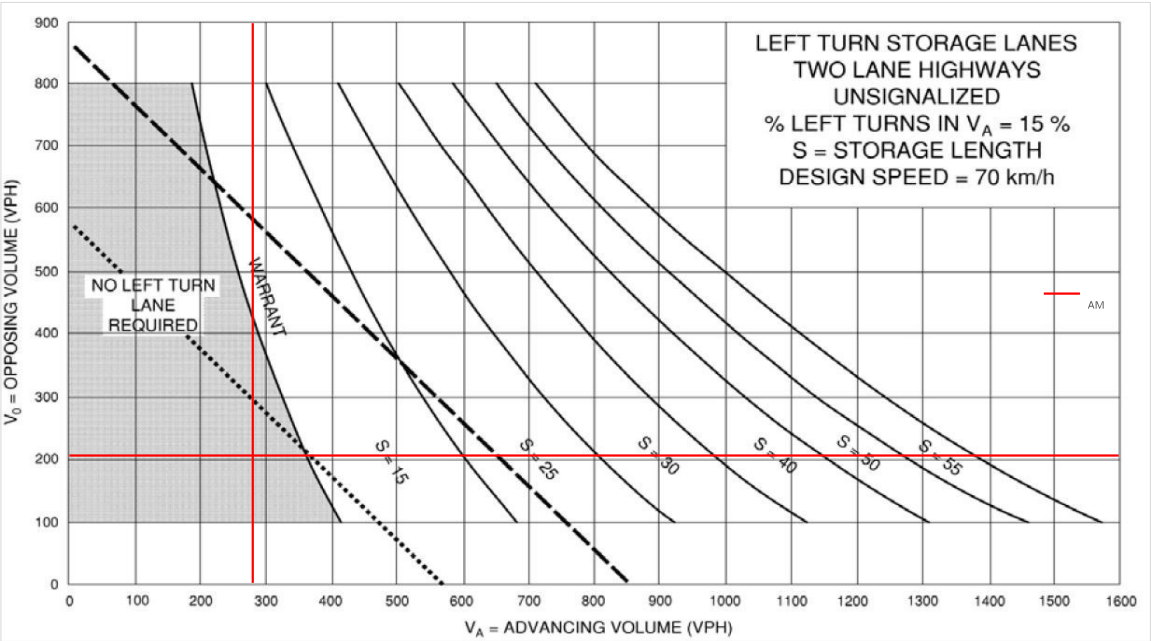
Existing - Westbound Left



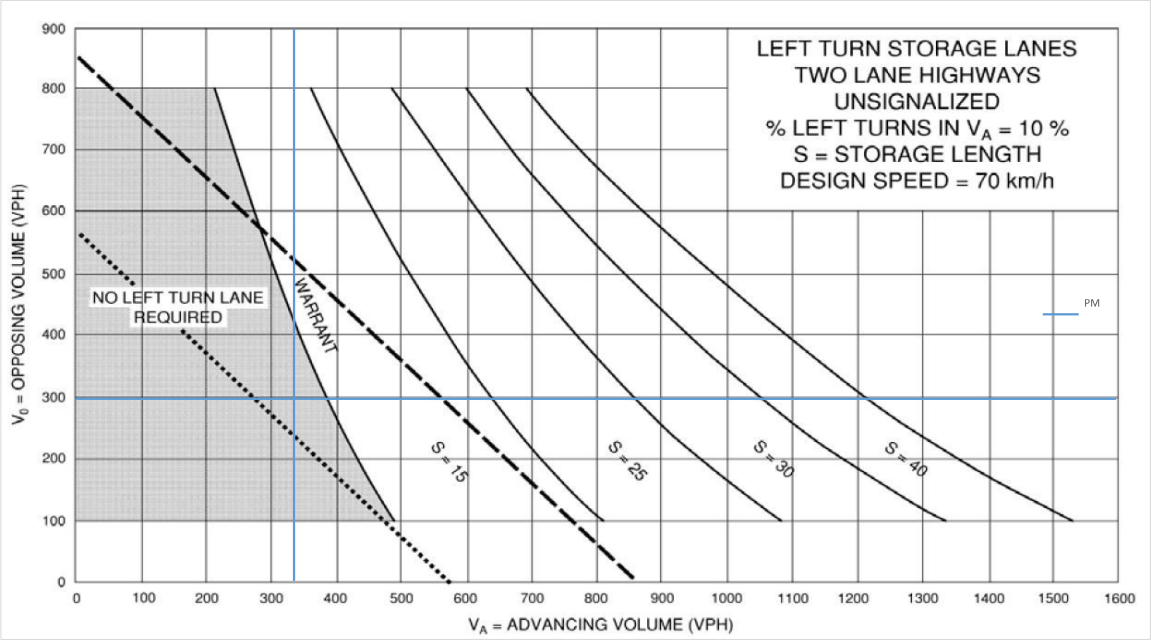
Existing - Northbound Left



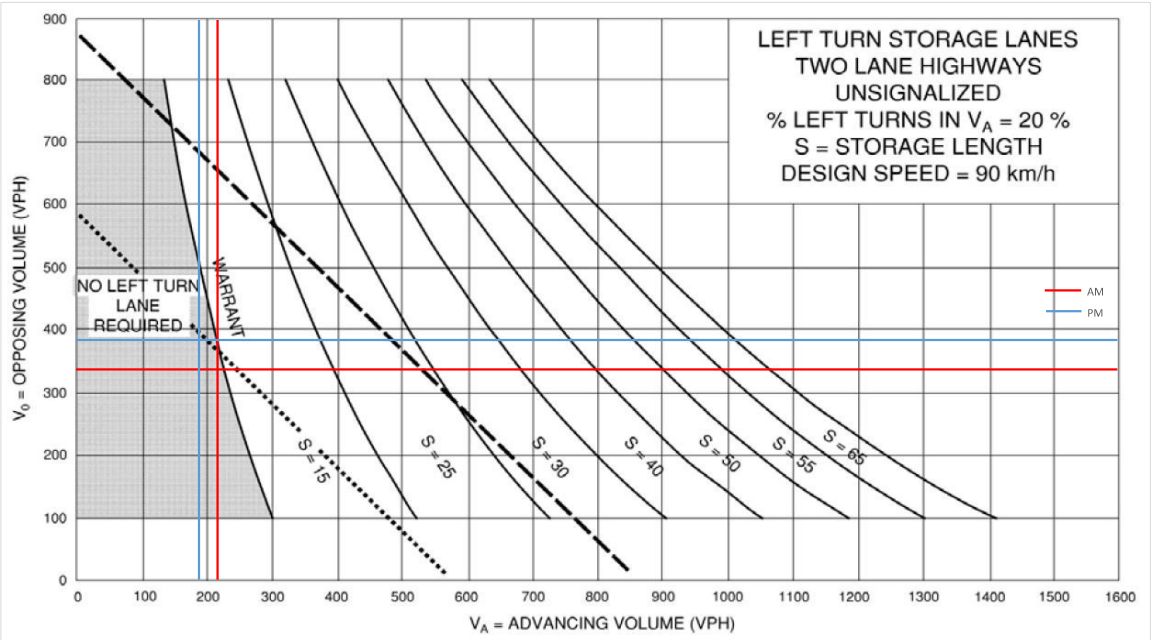
Existing - Southbound Left



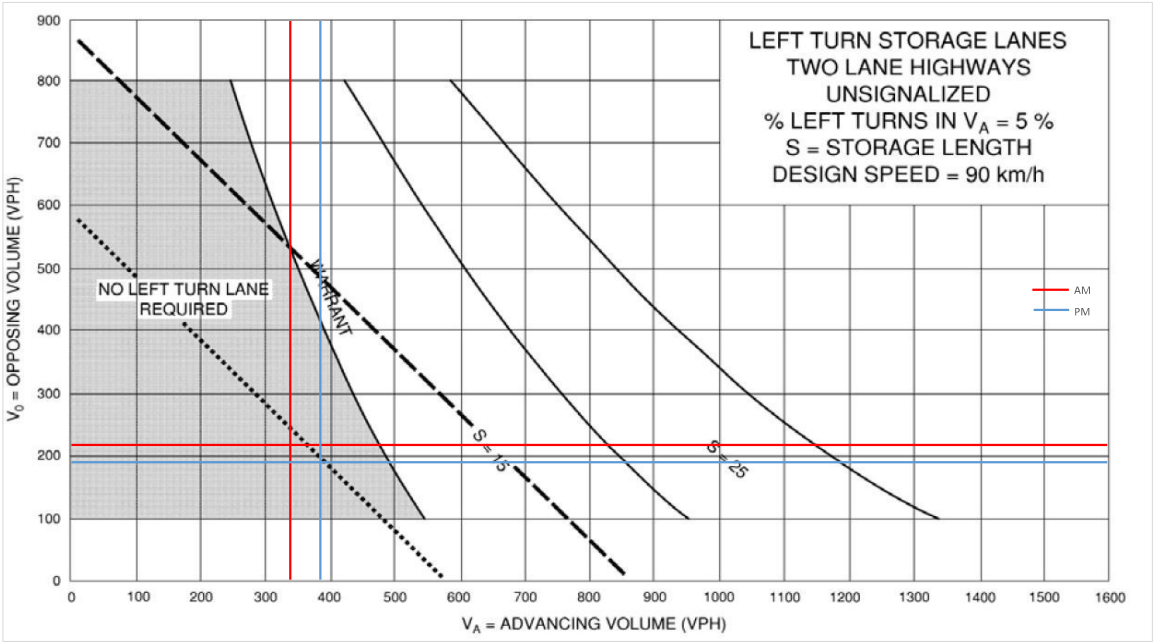
Existing - Southbound Left



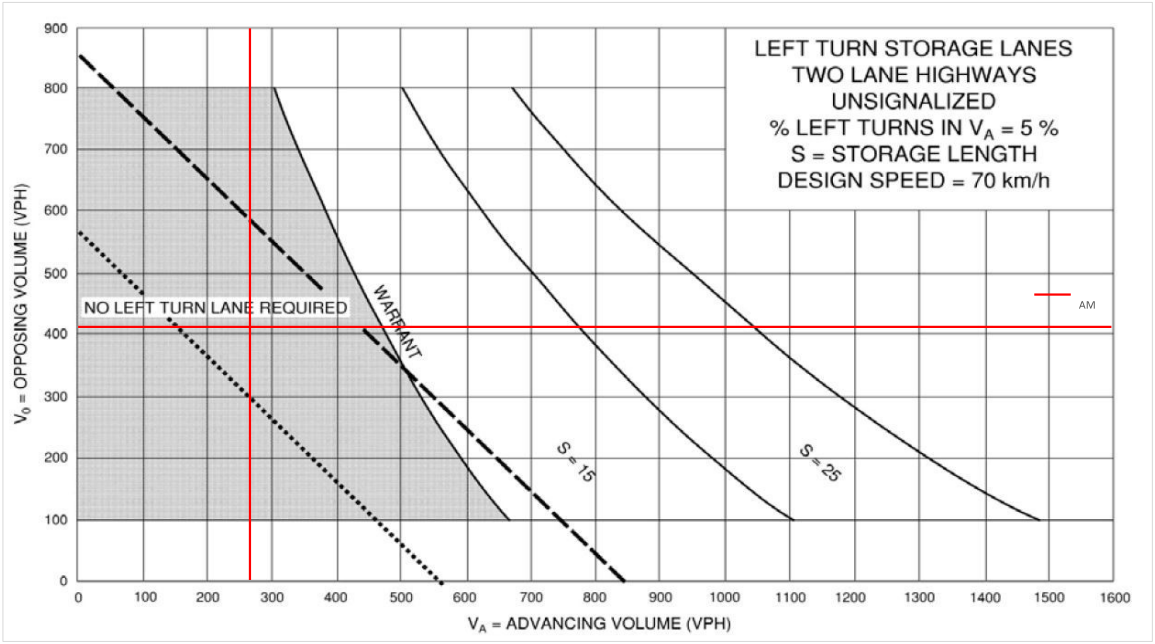
Future Background 2030 - Eastbound Left



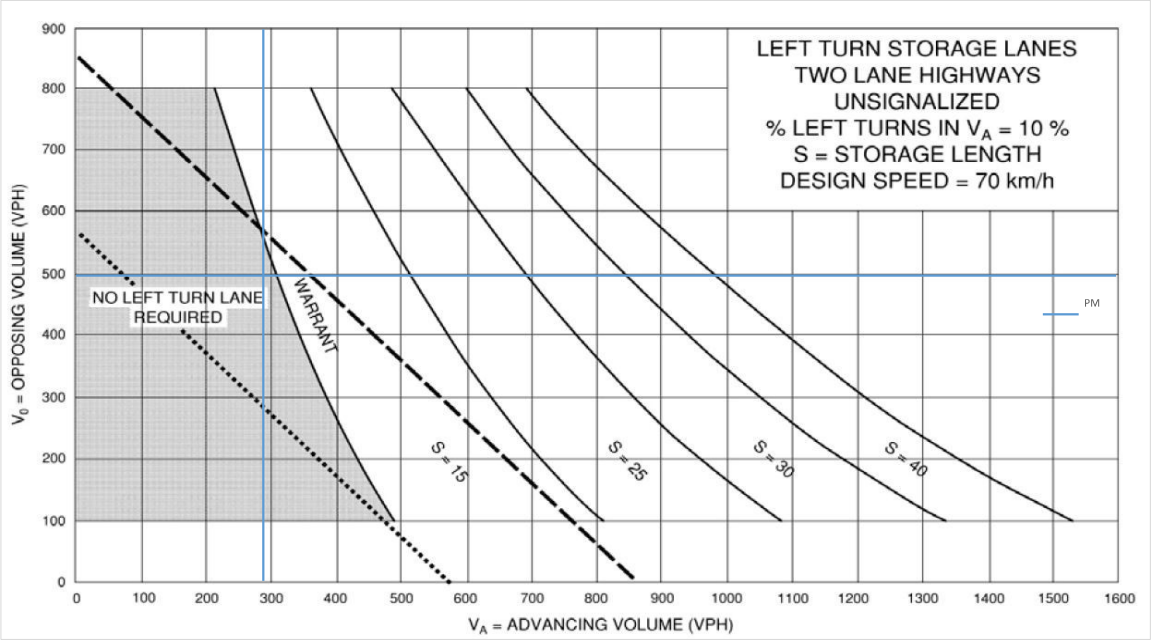
Future Background 2030 - Westbound Left



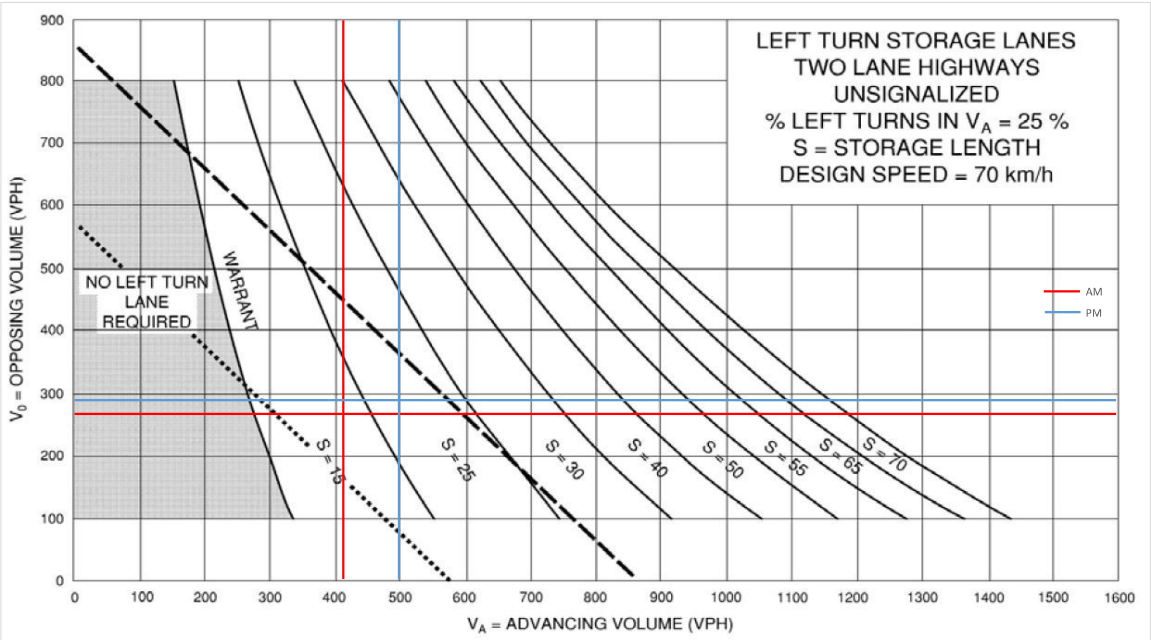
Future Background 2030 - Northbound Left



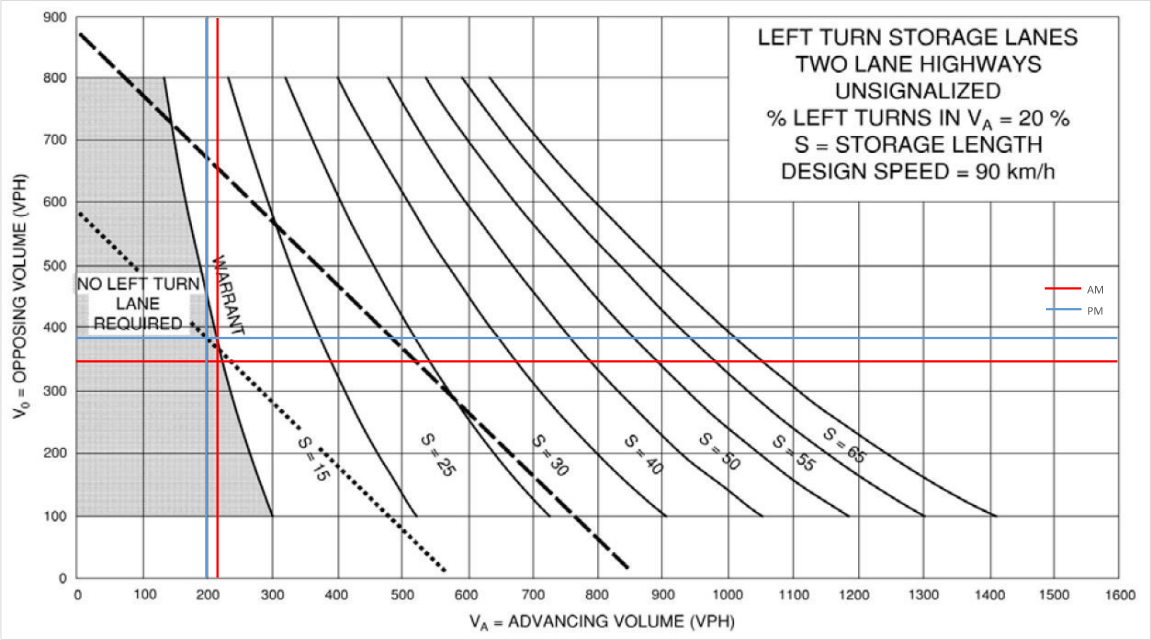
Future Background 2030 - Northbound Left



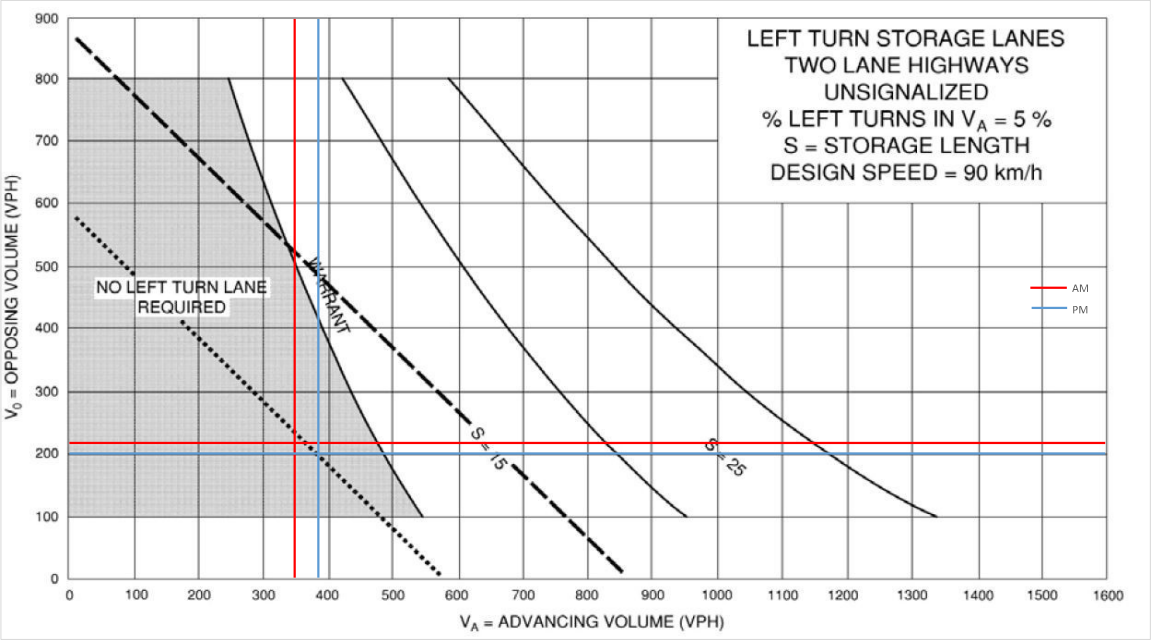
Future Background 2030 - Southbound Left



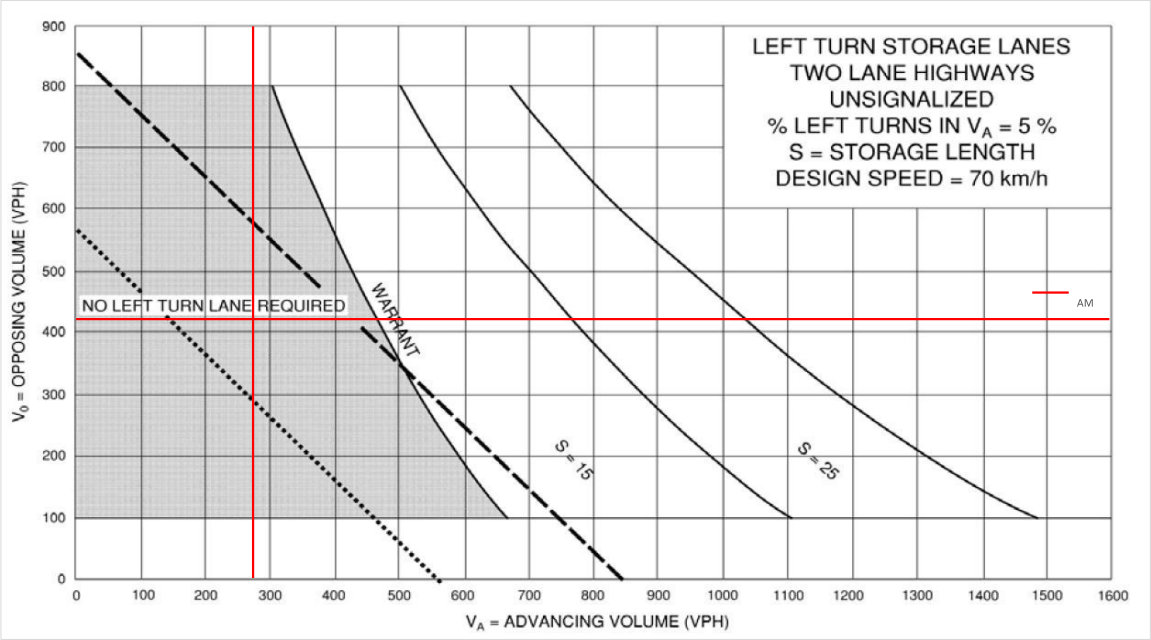
Future Background 2035 - Eastbound Left



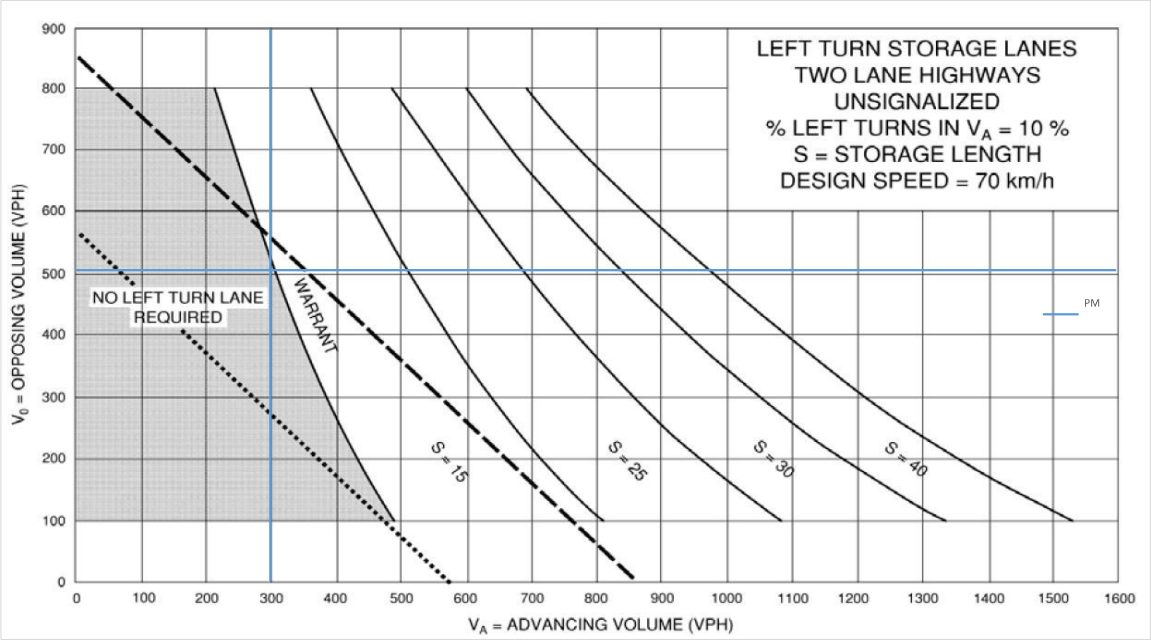
Future Background 2035 - Westbound Left



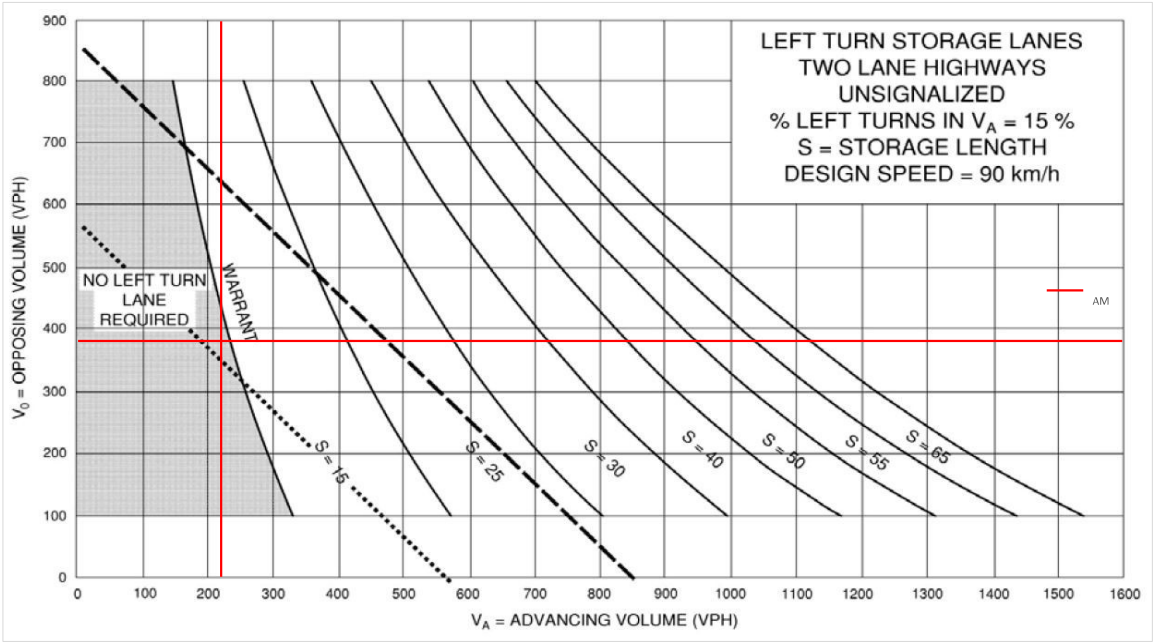
Future Background 2035 - Northbound Left



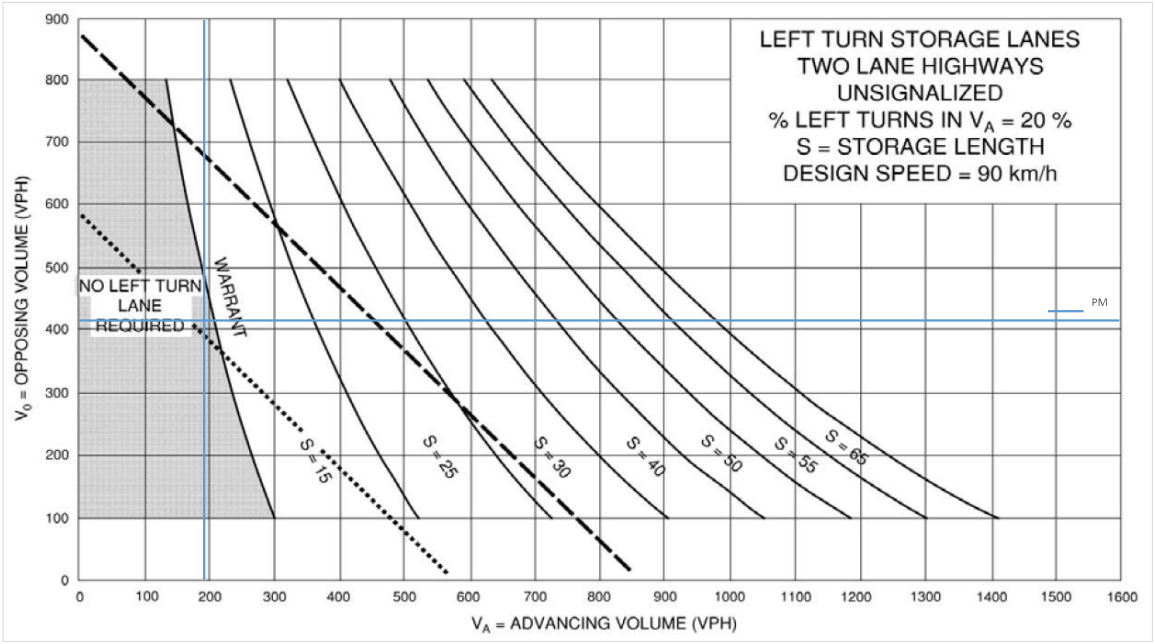
Future Background 2035 - Northbound Left



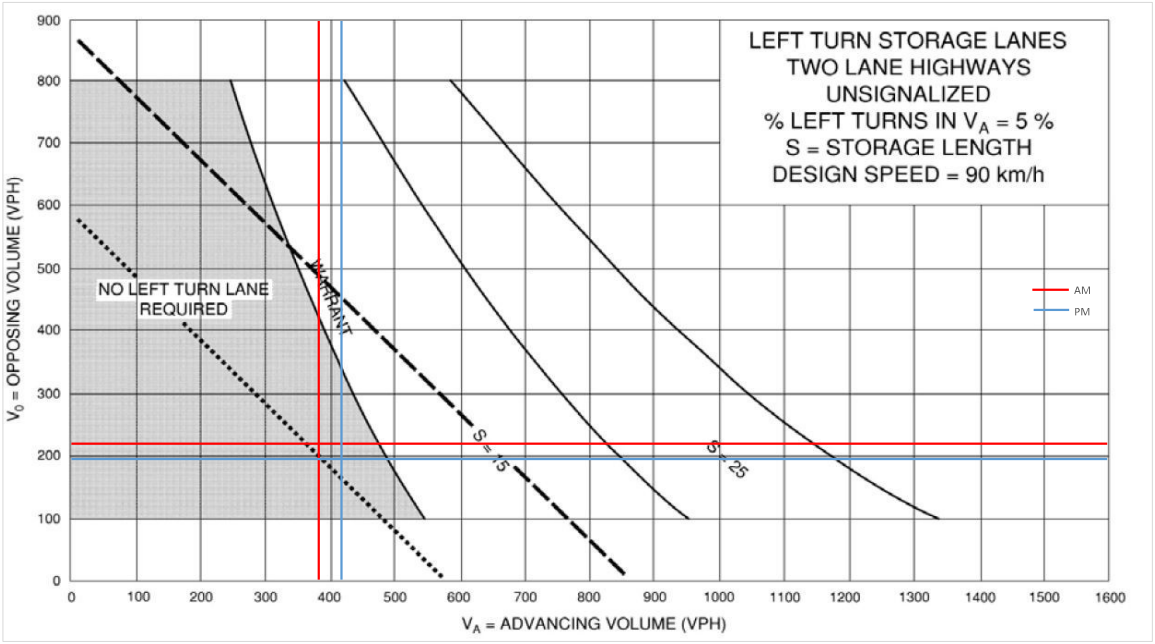
Future Total 2030 - Eastbound Left



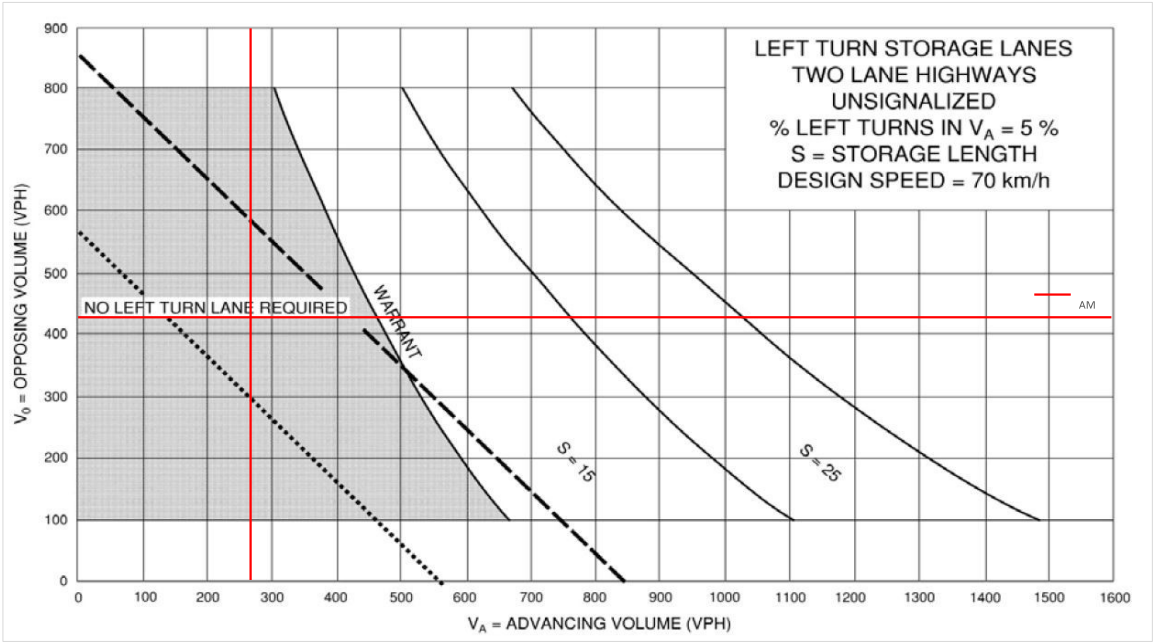
Future Total 2030 - Eastbound Left



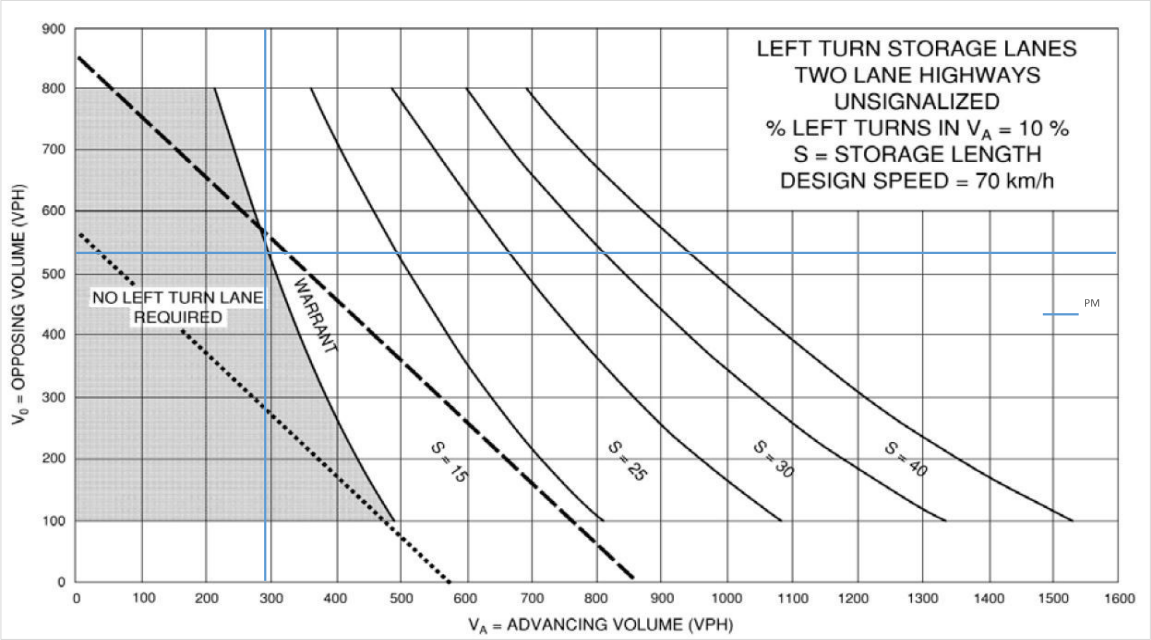
Future Total 2030 - Westbound Left



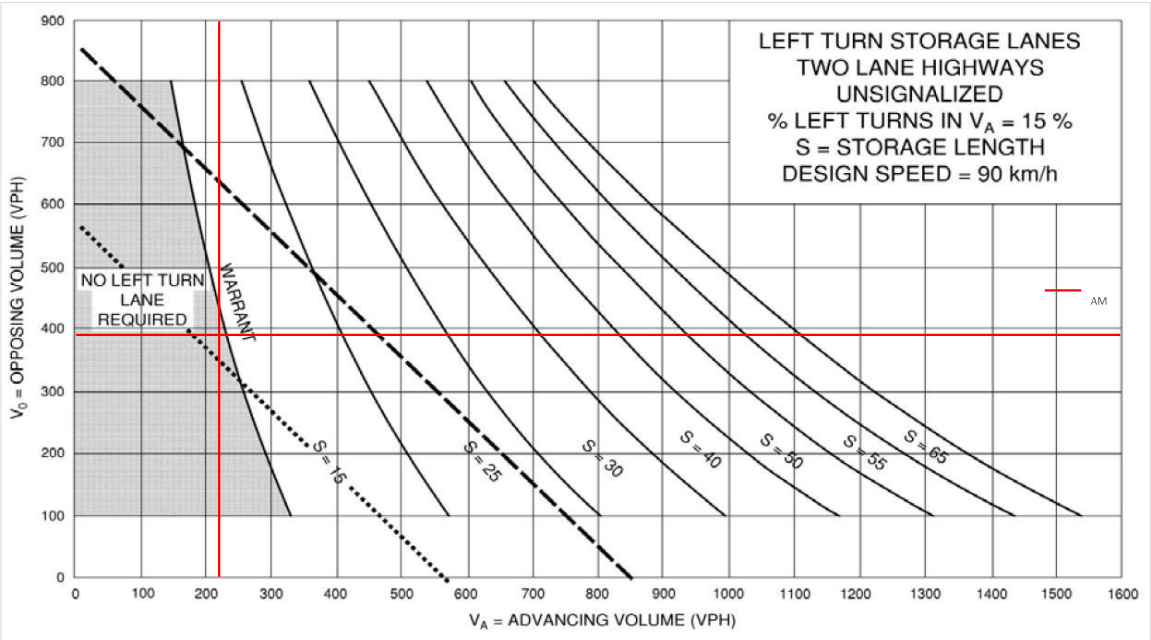
Future Total 2030 - Northbound Left



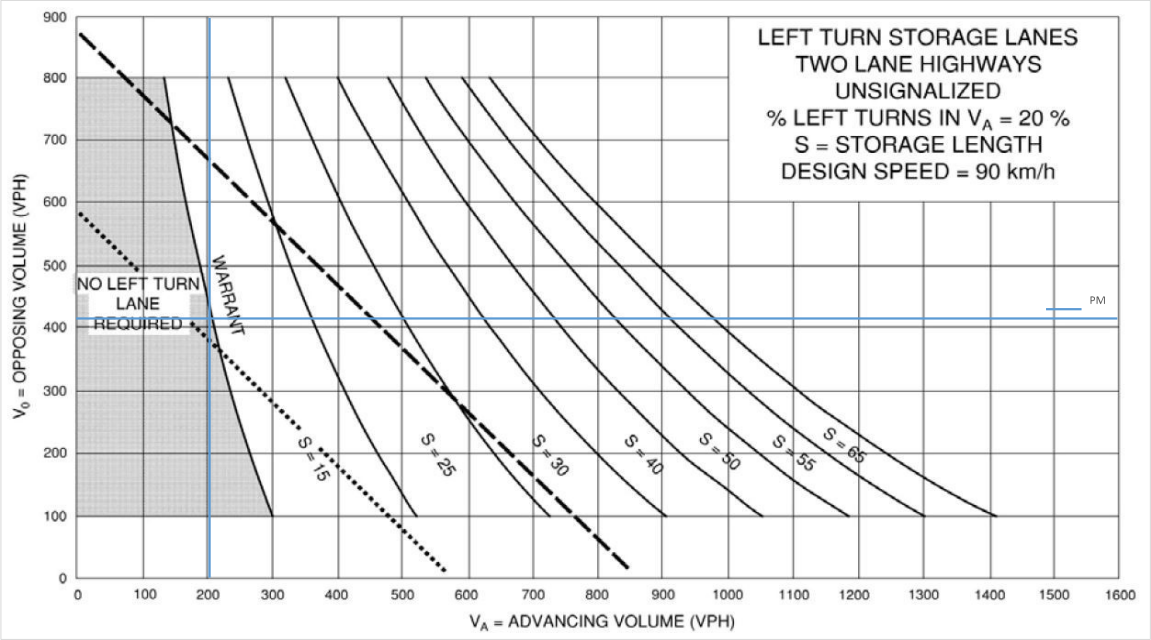
Future Total 2030 - Northbound Left



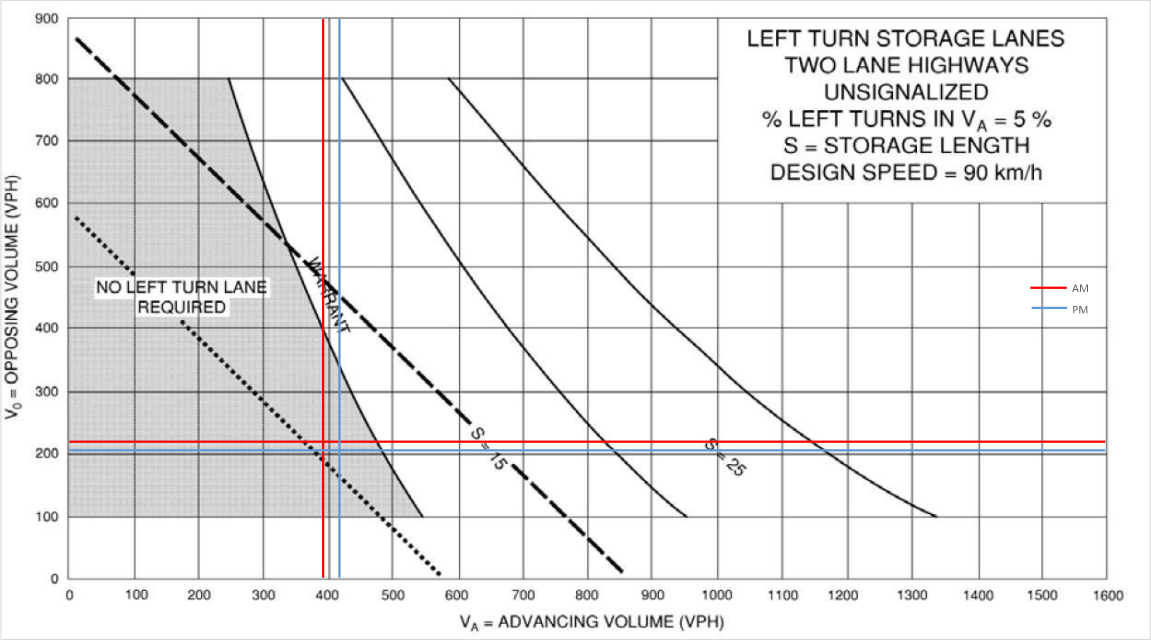
Future Total 2035 - Eastbound Left



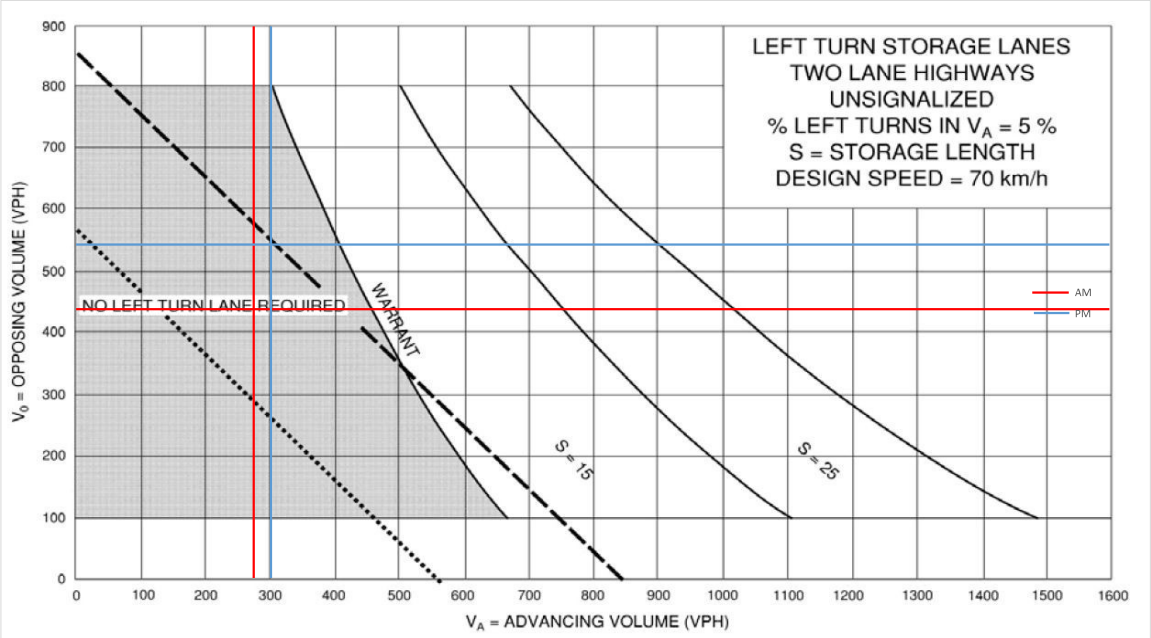
Future Total 2035 - Eastbound Left



Future Total 2035 - Westbound Left



Future Total 2035 - Northbound Left



Shea Road at Cosanti Drive

Existing

Design Speed: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	39	0	19	0	0	0	5	225	0	0	101	11	2.2%	230	112
PM	22	0	11	0	0	0	19	169	0	0	114	39	10.1%	188	153

Future Background 2030

Design Speed: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	43	0	21	0	0	0	6	296	0	0	266	12	2.0%	302	278
PM	24	0	12	0	0	0	21	313	0	0	370	43	6.3%	334	413

Future Background 2035

Design Speed: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	43	0	21	0	0	0	6	319	0	0	314	12	1.8%	325	326
PM	24	0	12	0	0	0	21	360	0	0	400	43	5.5%	381	443

Future Total 2030

Design Speed: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	43	0	21	0	0	0	6	306	0	0	271	12	1.9%	312	283
PM	24	0	12	0	0	0	21	320	0	0	381	43	6.2%	341	424

Future Total 2035

Design Speed: 90 km/h — Yes

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	43	0	21	0	0	0	6	329	0	0	319	12	1.8%	335	331
PM	24	0	12	0	0	0	21	367	0	0	411	43	5.4%	388	454

Existing

Design Speed: 50 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
							Yes								
AM	39	0	19	0	0	0	5	225	0	0	101	11	2.2%	230	112
PM	22	0	11	0	0	0	19	169	0	0	114	39	10.1%	188	153

Future Background 2030

Design Speed: 50 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
							Yes								
AM	43	0	21	0	0	0	6	296	0	0	266	12	2.0%	302	278
PM	24	0	12	0	0	0	21	313	0	0	370	43	6.3%	334	413

Future Background 2035

Design Speed: 50 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
							Yes								
AM	43	0	21	0	0	0	6	319	0	0	314	12	1.8%	325	326
PM	24	0	12	0	0	0	21	360	0	0	400	43	5.5%	381	443

Future Total 2030

Design Speed: 50 km/h

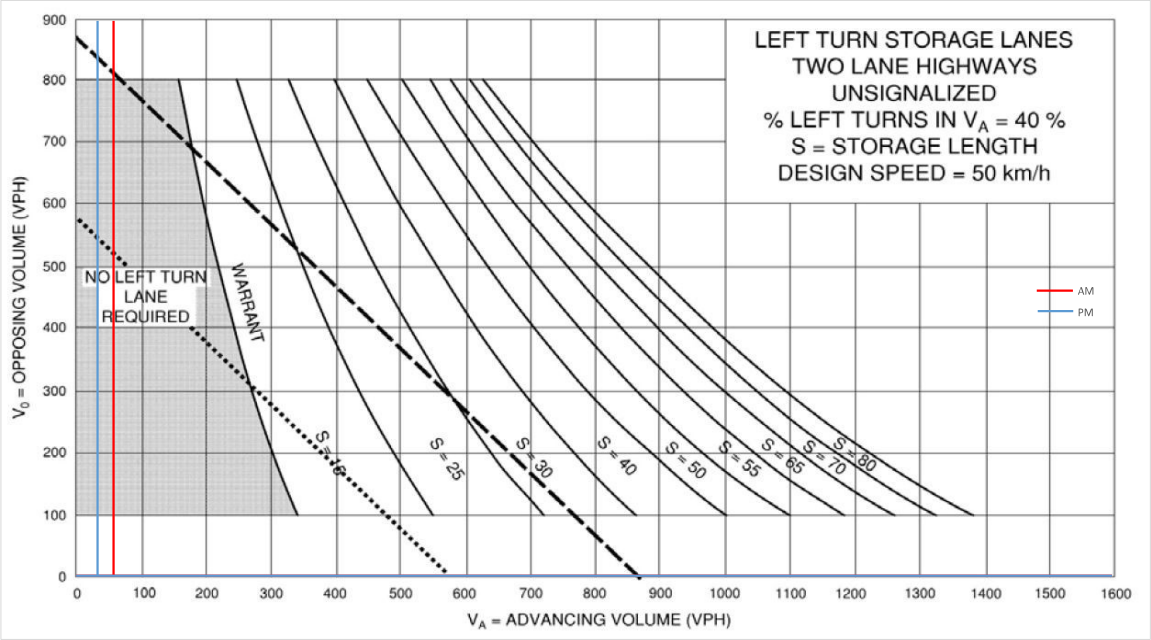
	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
							Yes								
AM	43	0	21	0	0	0	6	306	0	0	271	12	1.9%	312	283
PM	24	0	12	0	0	0	21	320	0	0	381	43	6.2%	341	424

Future Total 2035

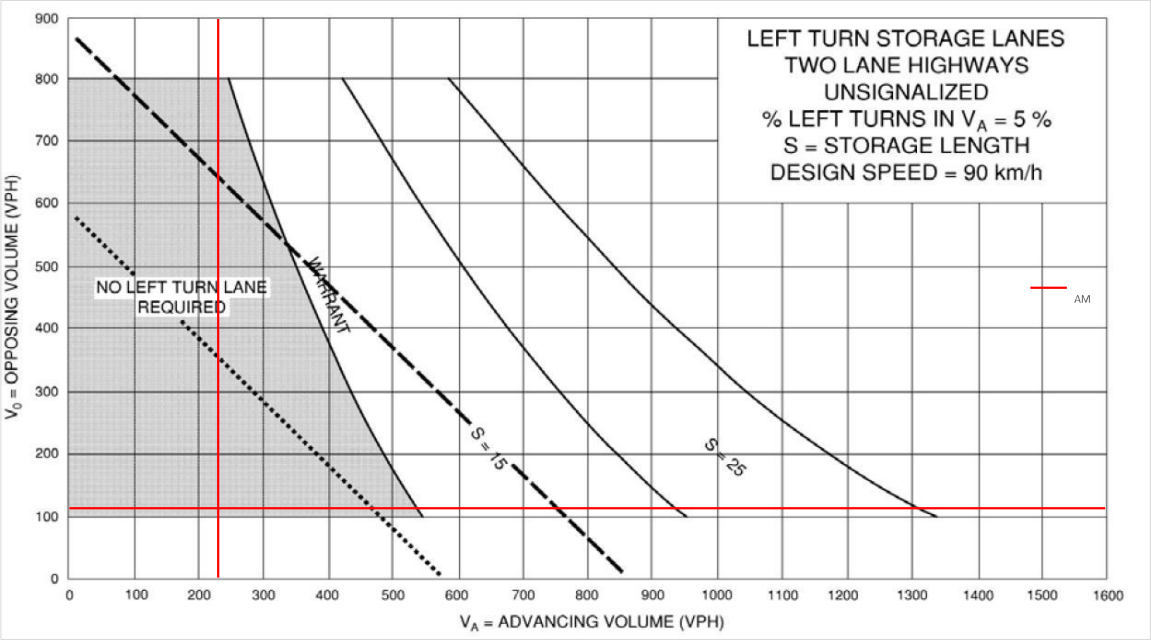
Design Speed: 50 km/h

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
							Yes								
AM	43	0	21	0	0	0	6	329	0	0	319	12	1.8%	335	331
PM	24	0	12	0	0	0	21	367	0	0	411	43	5.4%	388	454

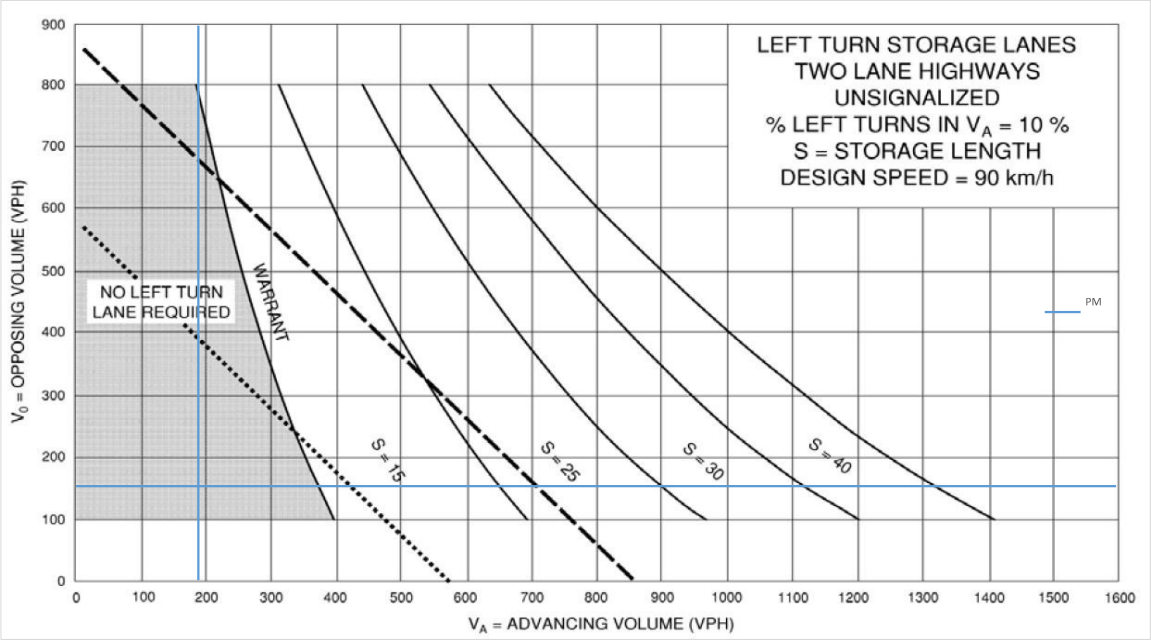
Existing - Eastbound Left



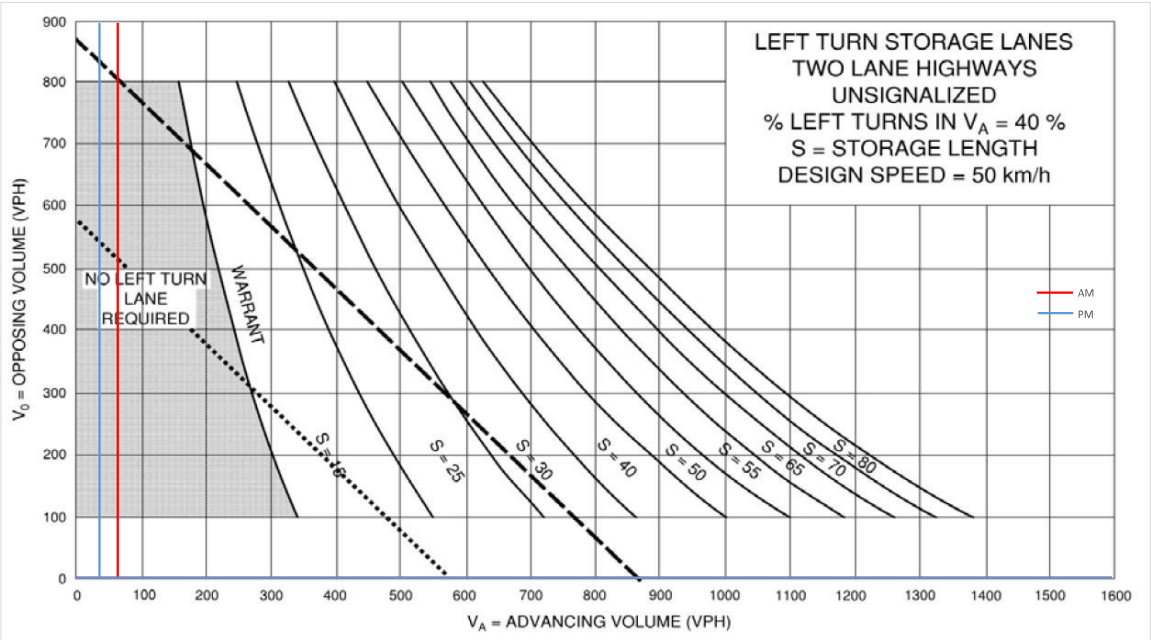
Existing - Northbound Left



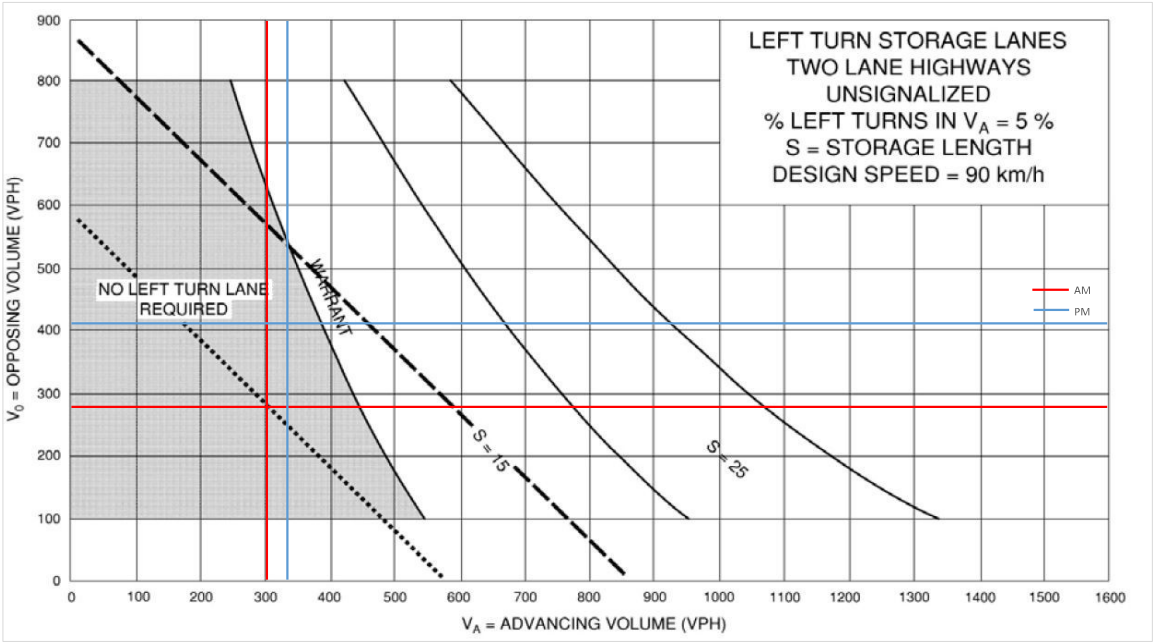
Existing - Northbound Left



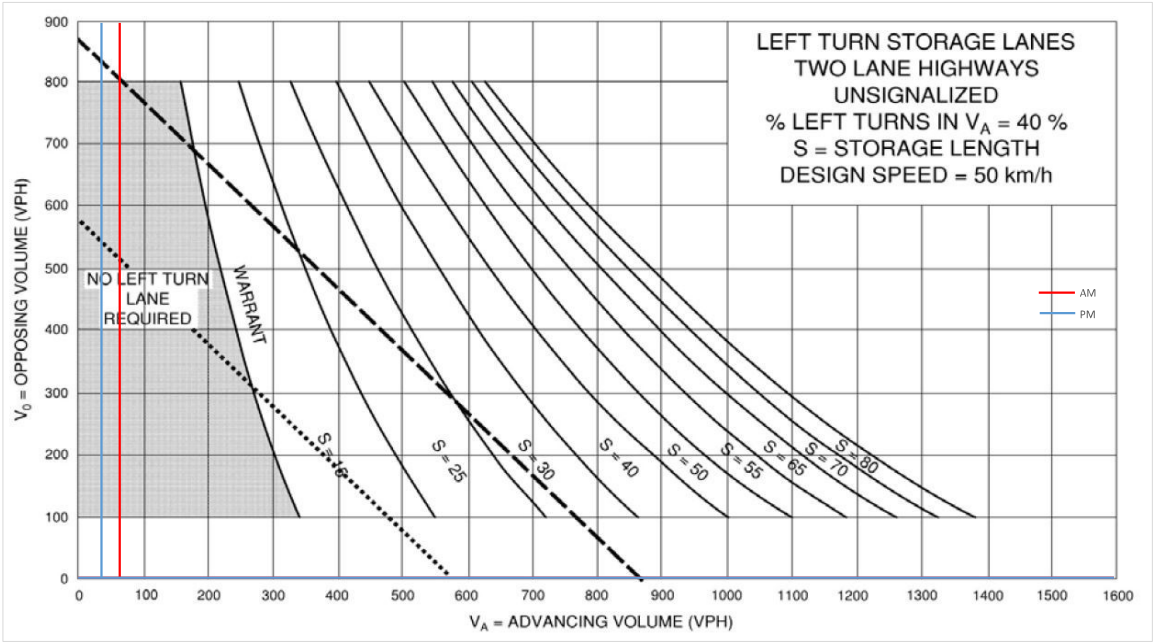
Future Background 2030 - Eastbound Left



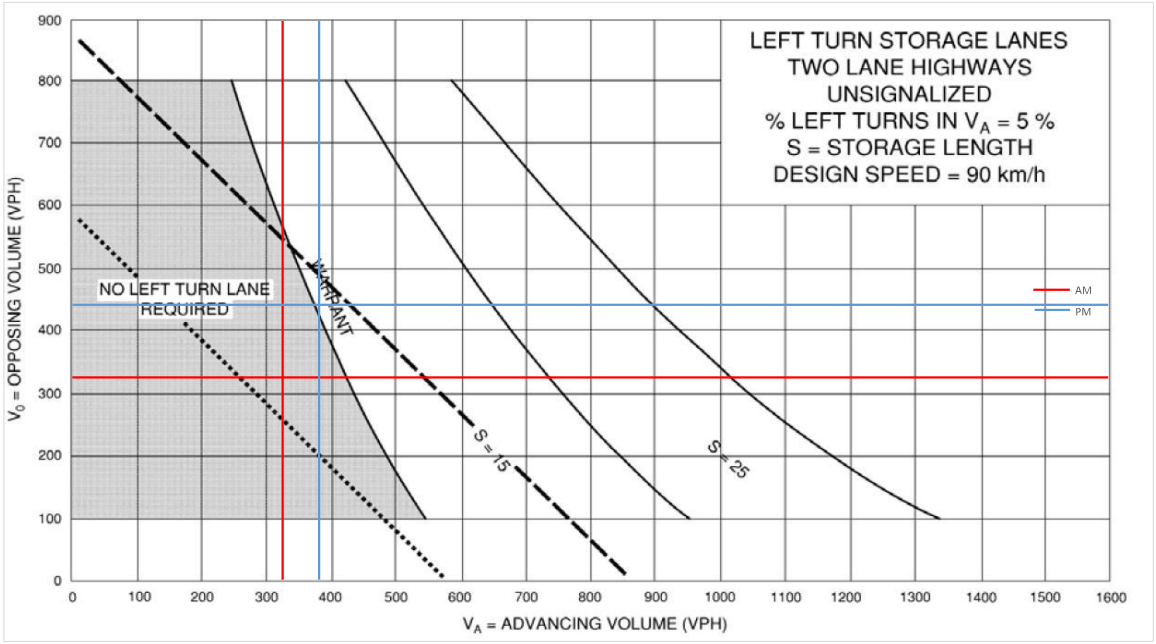
Future Background 2030 - Northbound Left



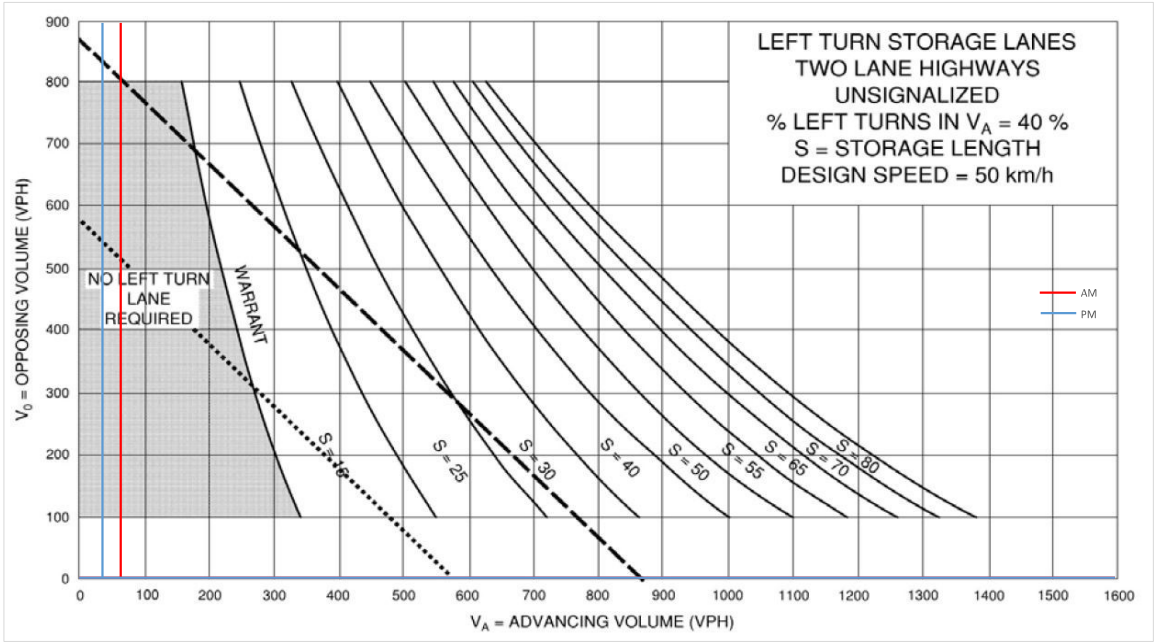
Future Background 2035 - Eastbound Left



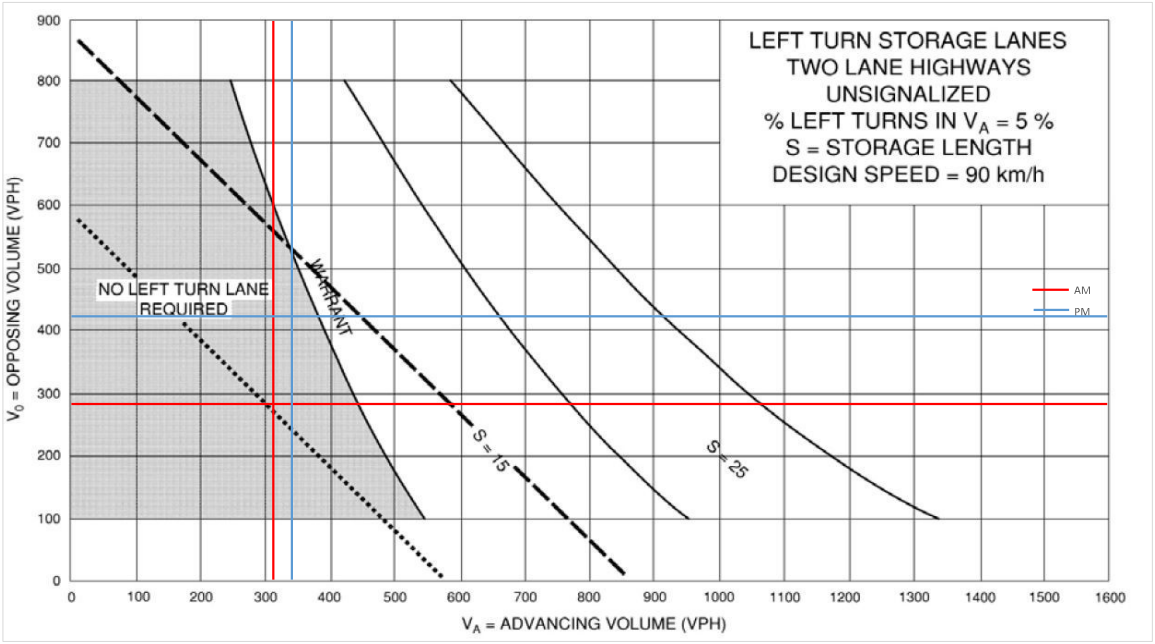
Future Background 2035 - Northbound Left



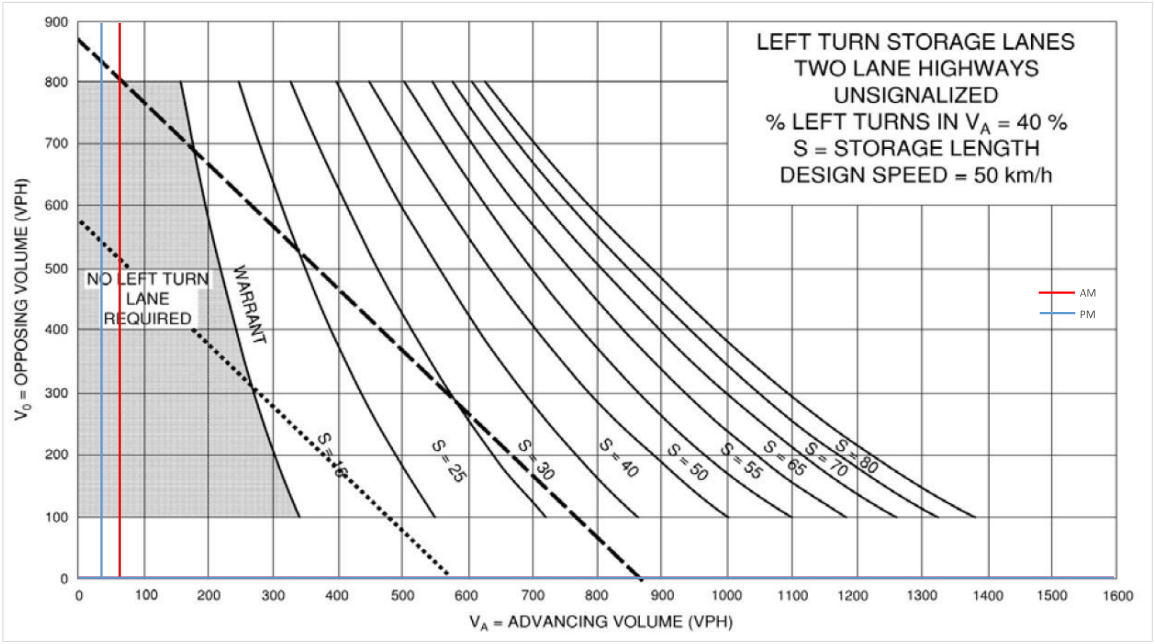
Future Total 2030 - Eastbound Left



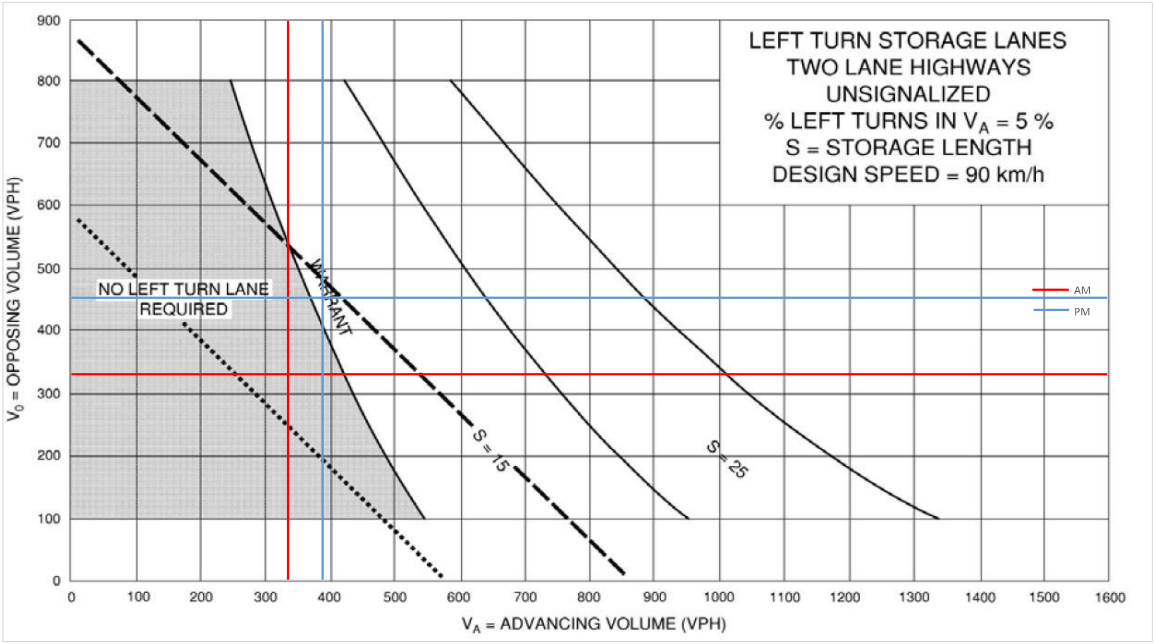
Future Total 2030 - Northbound Left



Future Total 2035 - Eastbound Left



Future Total 2035 - Northbound Left



Shea Road at Street 21

Future Background 2030

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	41	0	12				5	261	0	0	269	18	0.0%	287	266		
	PM	29	0	9				13	305	0	0	340	42	0.0%	382	318		

Future Background 2035

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	41	0	12				6	261	0	0	269	23	0.0%	292	267		
	PM	29	0	9				16	305	0	0	340	53	0.0%	393	321		

Future Total 2030

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	51	0	15				6	275	0	0	275	19	0.0%	294	281		
	PM	36	0	11				14	315	0	0	353	43	0.0%	396	329		

Future Total 2035

Design Speed																		
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	Yes SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	51	0	15				6	284	0	0	317	23	0.0%	340	290		
	PM	36	0	11				16	352	0	0	370	53	0.0%	423	368		

Shea Road at Street 21

Future Background 2030

Design Speed																		
50	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Yes	%Left Turn	Volume Advancing	Volume Opposing	
	AM	41	0	12				5	261	0	0	269	18		0.0%	287	266	
	PM	29	0	9				13	305	0	0	340	42		0.0%	382	318	

Future Background 2035

Design Speed																		
50	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Yes	%Left Turn	Volume Advancing	Volume Opposing	
	AM	41	0	12				6	261	0	0	269	23		0.0%	292	267	
	PM	29	0	9				16	305	0	0	340	53		0.0%	393	321	

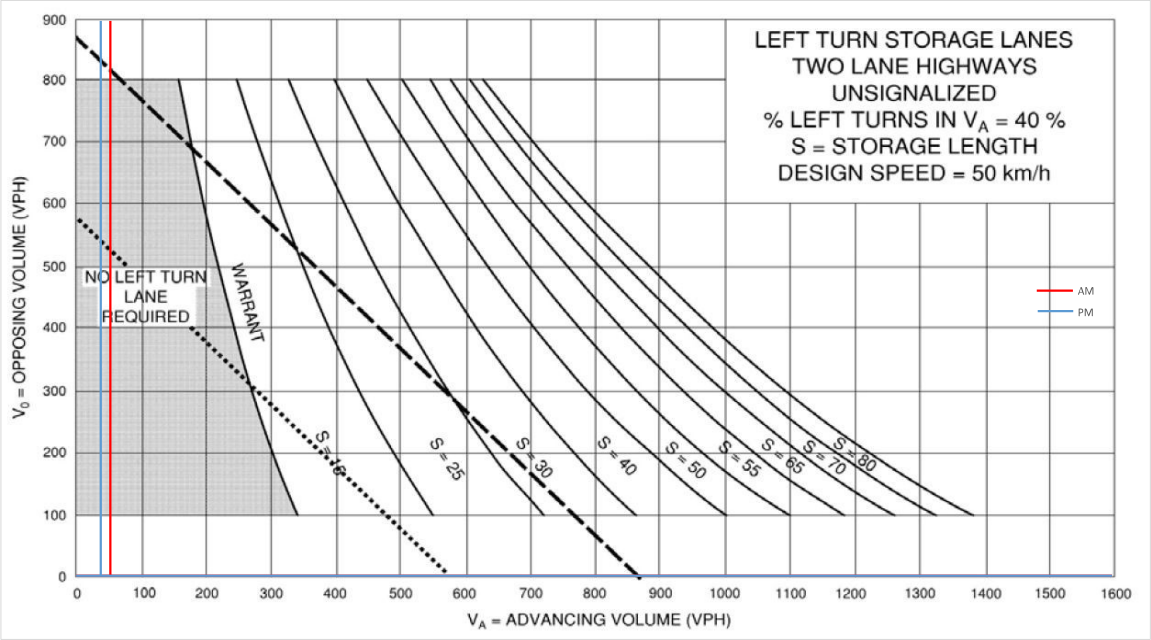
Future Total 2030

Design Speed																		
50	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Yes	%Left Turn	Volume Advancing	Volume Opposing	
	AM	51	0	15				6	275	0	0	275	19		0.0%	294	281	
	PM	36	0	11				14	315	0	0	353	43		0.0%	396	329	

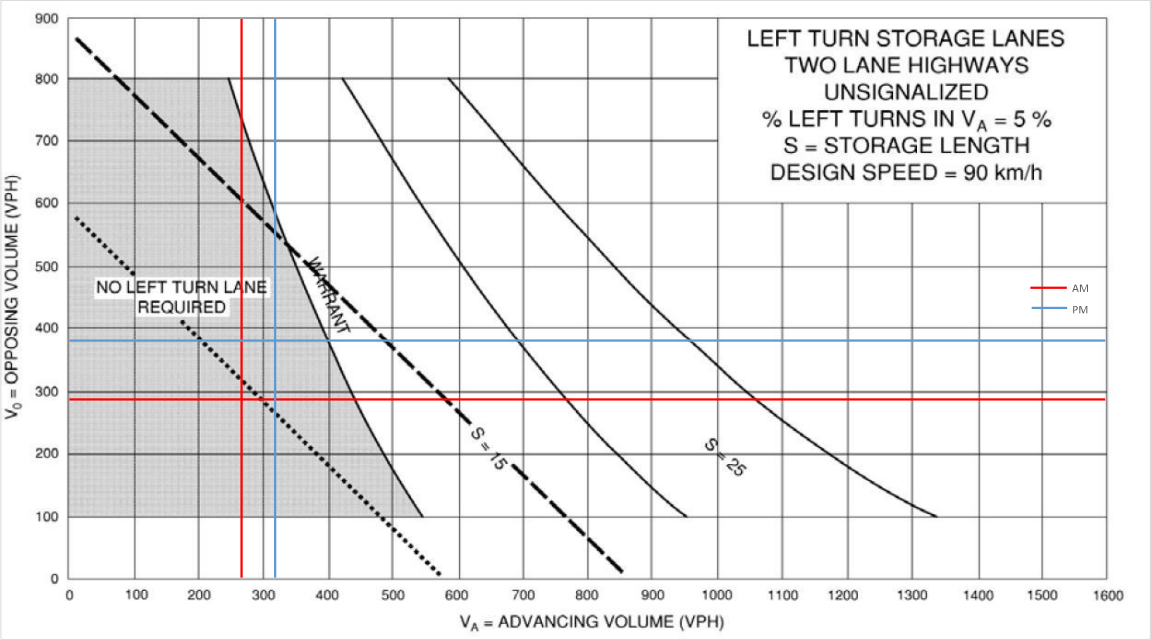
Future Total 2035

Design Speed																		
50	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Yes	%Left Turn	Volume Advancing	Volume Opposing	
	AM	51	0	15				6	284	0	0	317	23		0.0%	340	290	
	PM	36	0	11				16	352	0	0	370	53		0.0%	423	368	

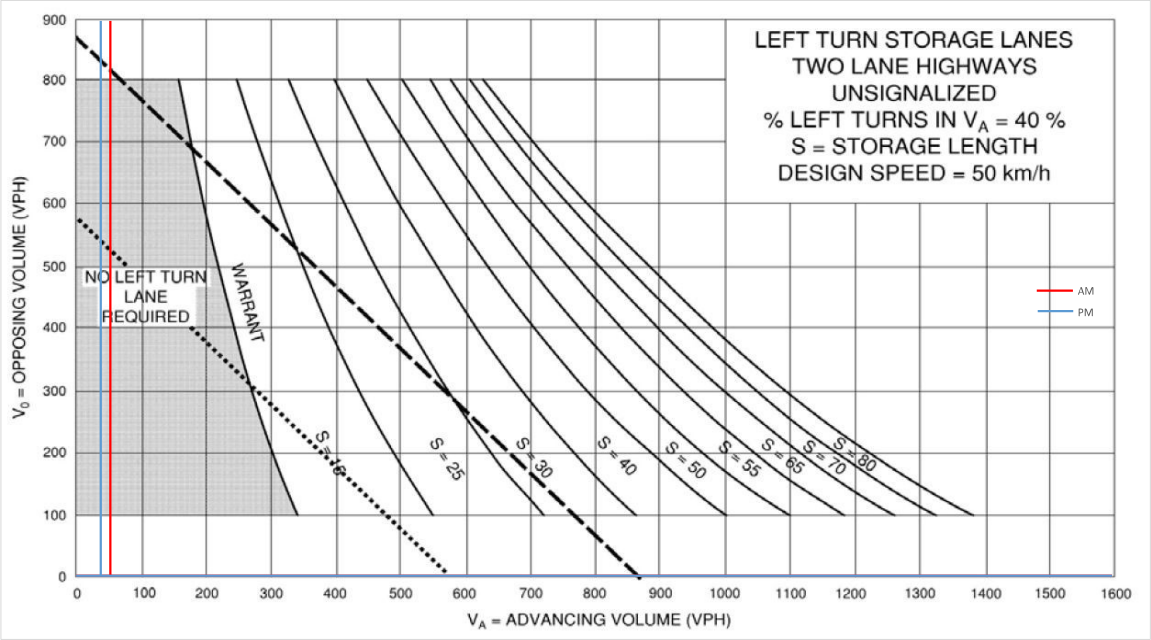
Future Background 2030 - Eastbound Left



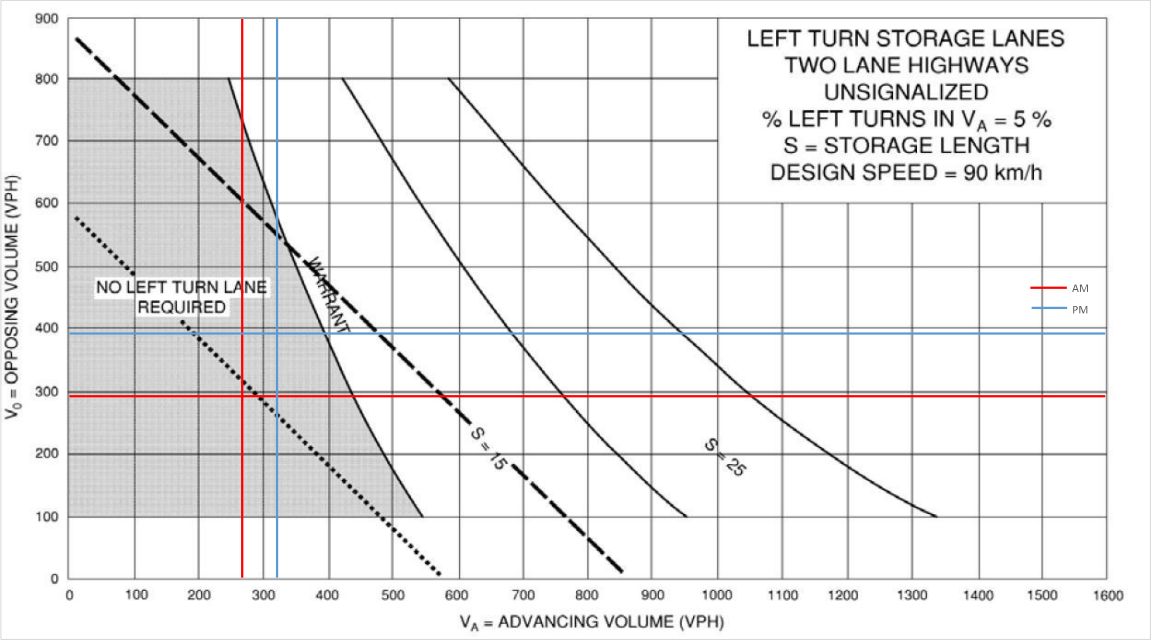
Future Background 2030 - Northbound Left



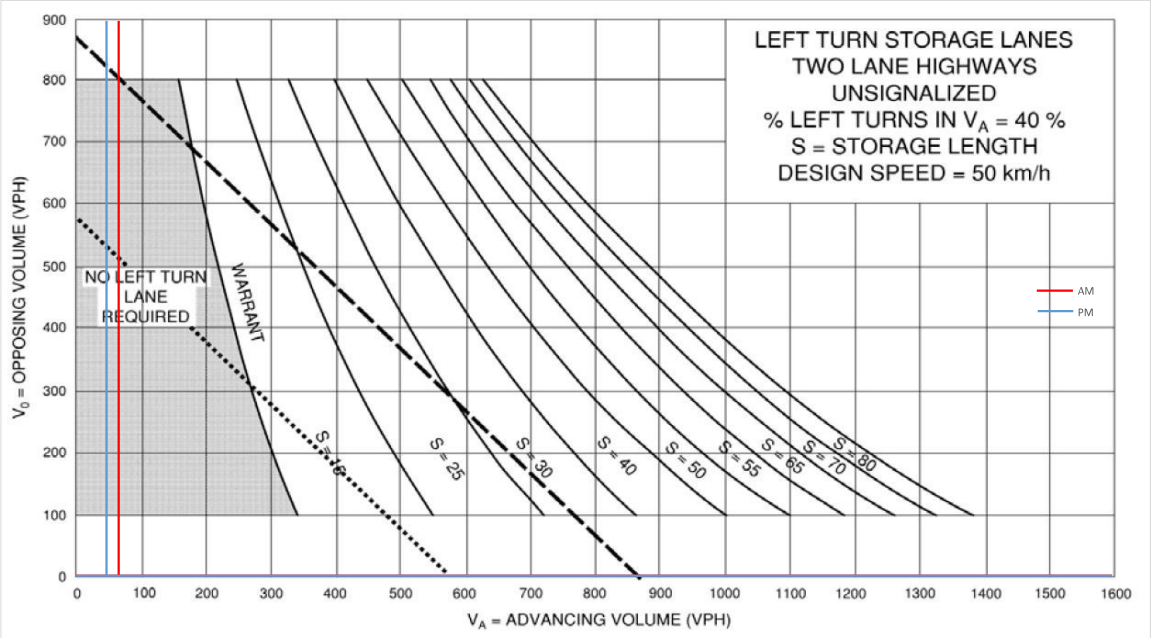
Future Background 2035 - Eastbound Left



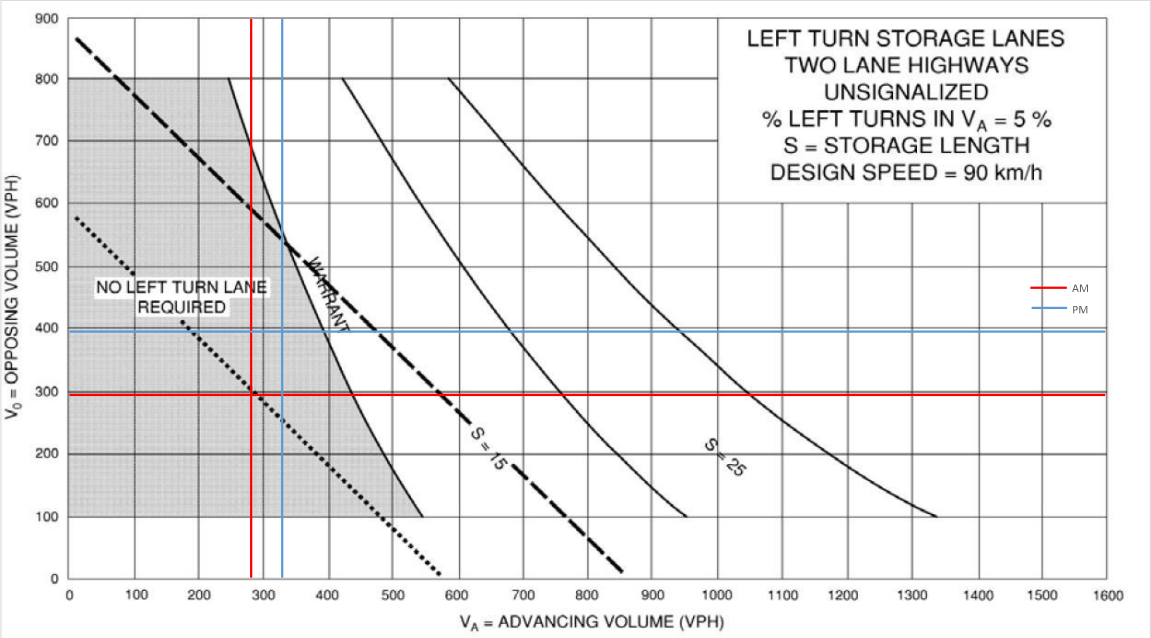
Future Background 2035 - Northbound Left



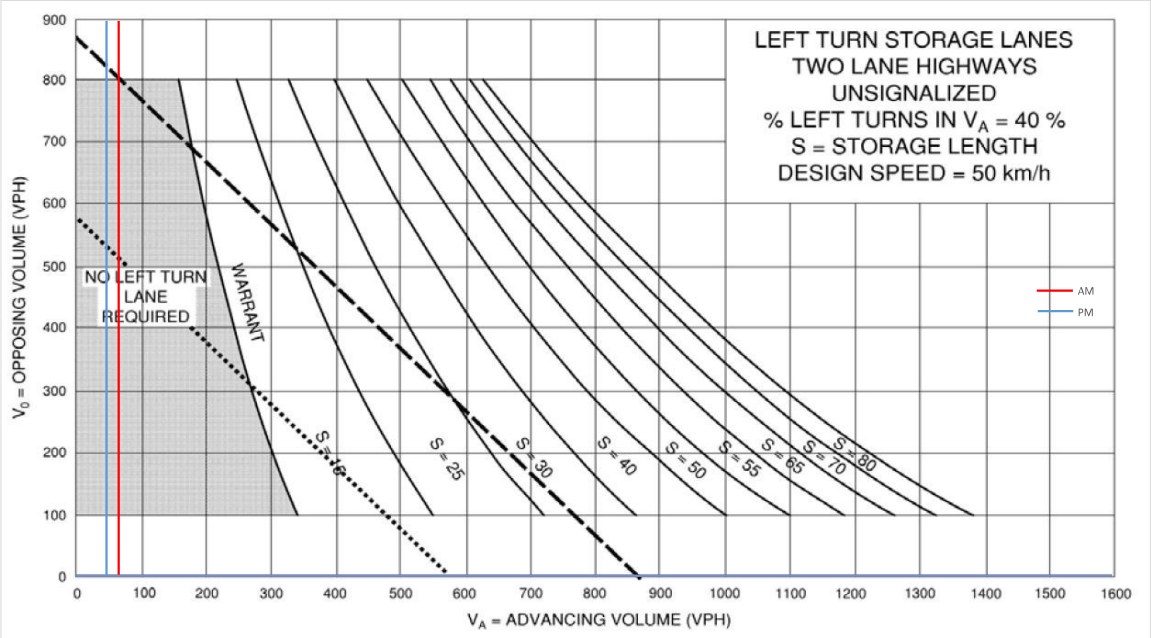
Future Total 2030 - Eastbound Left



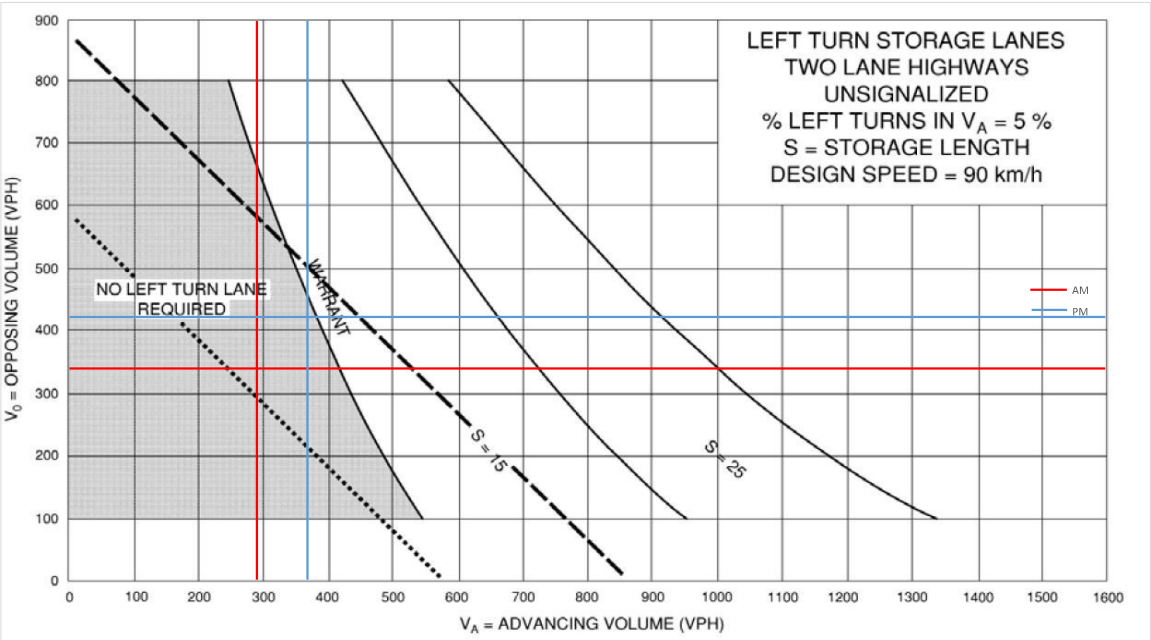
Future Total 2030 - Northbound Left



Future Total 2035 - Eastbound Left



Future Total 2035 - Northbound Left



Flewellyn Road at Street 12

Future Background 2030

Design Speed: Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	53	234	0	0	213	53	0	0	0	119	0	115	18.5%	287	266
PM	125	231	0	0	297	125	0	0	0	85	0	82	35.1%	356	422

Future Background 2035

Design Speed: Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	53	234	0	0	223	53	0	0	0	119	0	115	18.5%	287	276
PM	125	242	0	0	297	125	0	0	0	85	0	82	34.1%	367	422

Future Total 2030

Design Speed: Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	67	240	0	0	229	67	0	0	0	149	0	144	21.8%	307	296
PM	157	245	0	0	308	157	0	0	0	106	0	103	39.1%	402	465

Future Total 2035

Design Speed: Yes

90 km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing
AM	67	240	0	0	239	67	0	0	0	149	0	144	21.8%	307	306
PM	157	256	0	0	308	157	0	0	0	106	0	103	38.0%	413	465

Future Background 2030

Design Speed		Yes															
50	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	53	234	0	0	213	53	0	0	0	119	0	115	18.5%	287	266	
	PM	125	231	0	0	297	125	0	0	0	85	0	82	35.1%	356	422	

Future Background 2035

Design Speed		Yes															
50	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	53	234	0	0	223	53	0	0	0	119	0	115	18.5%	287	276	
	PM	125	242	0	0	297	125	0	0	0	85	0	82	34.1%	367	422	

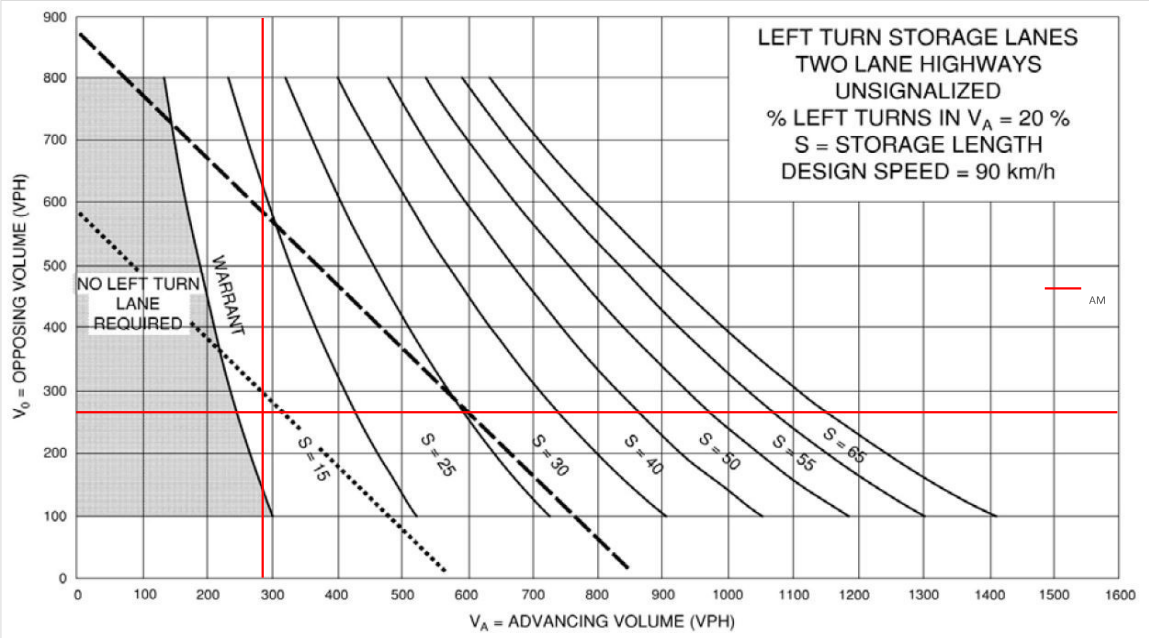
Future Total 2030

Design Speed		Yes															
50	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	67	240	0	0	229	67	0	0	0	149	0	144	21.8%	307	296	
	PM	157	245	0	0	308	157	0	0	0	106	0	103	39.1%	402	465	

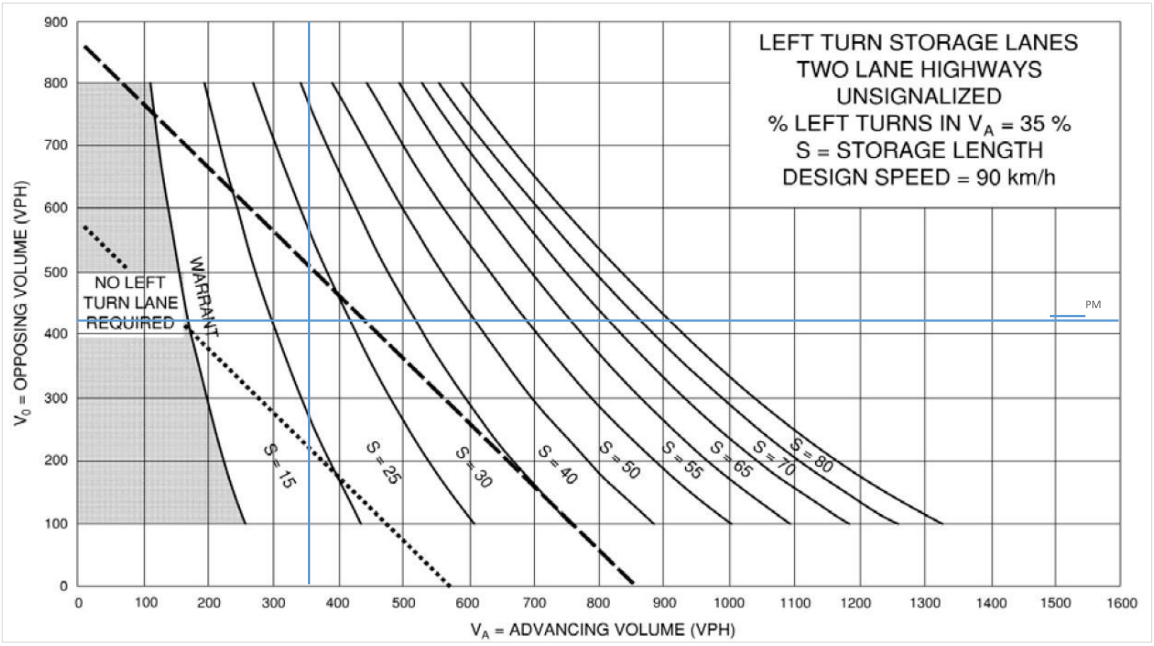
Future Total 2035

Design Speed		Yes															
50	km/h	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	67	240	0	0	239	67	0	0	0	149	0	144	21.8%	307	306	
	PM	157	256	0	0	308	157	0	0	0	106	0	103	38.0%	413	465	

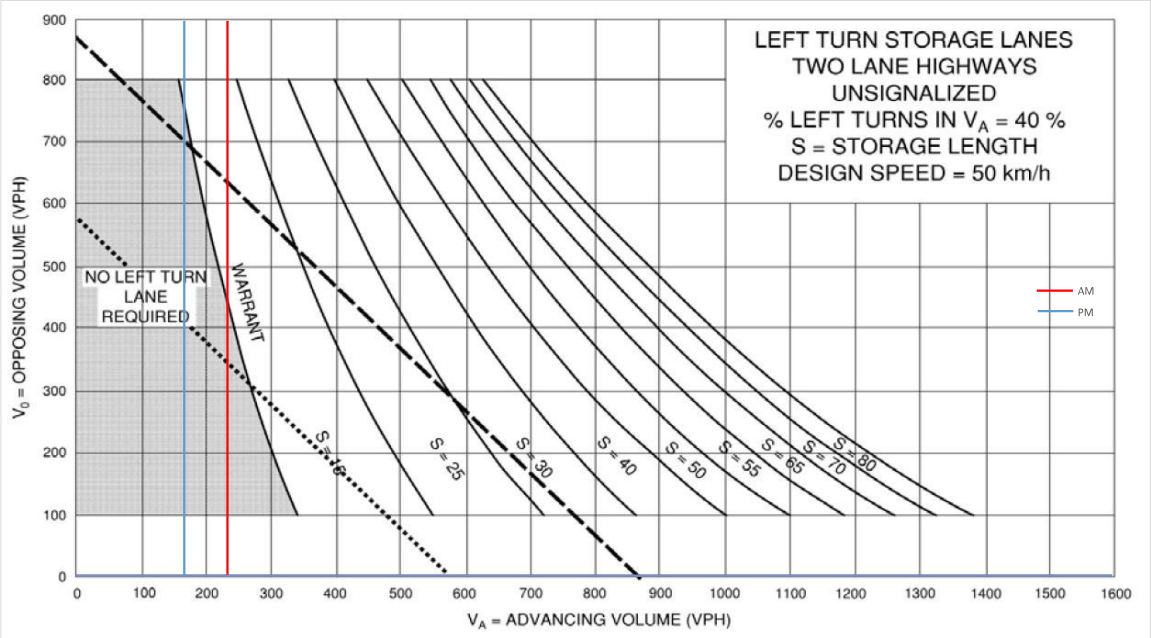
Future Background 2030 - Eastbound Left



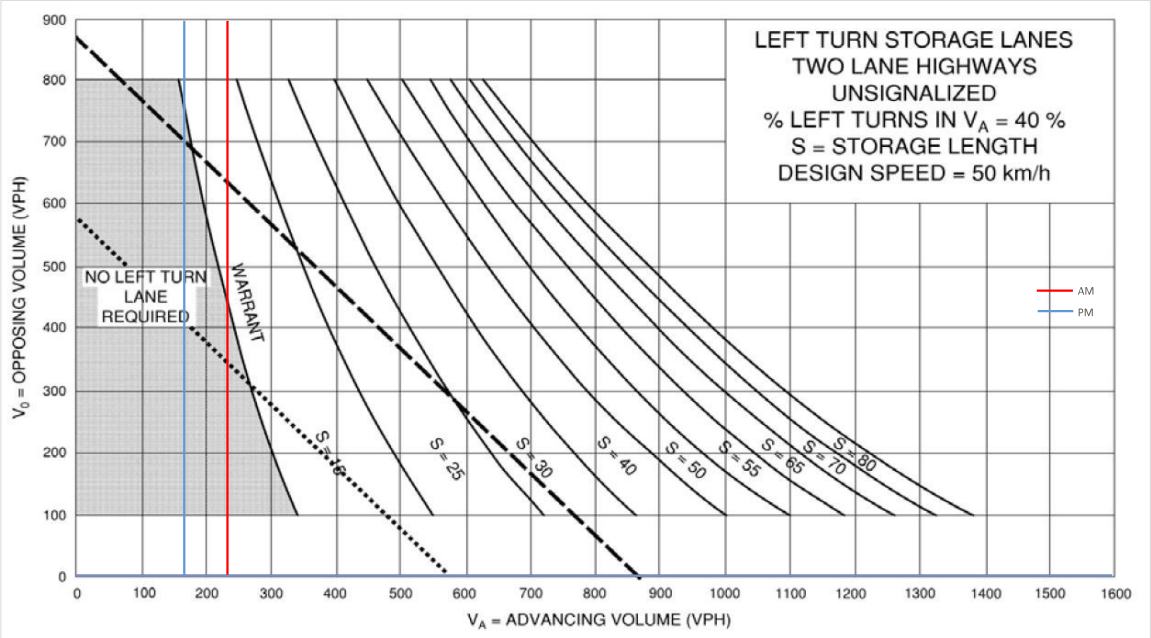
Future Background 2030 - Eastbound Left



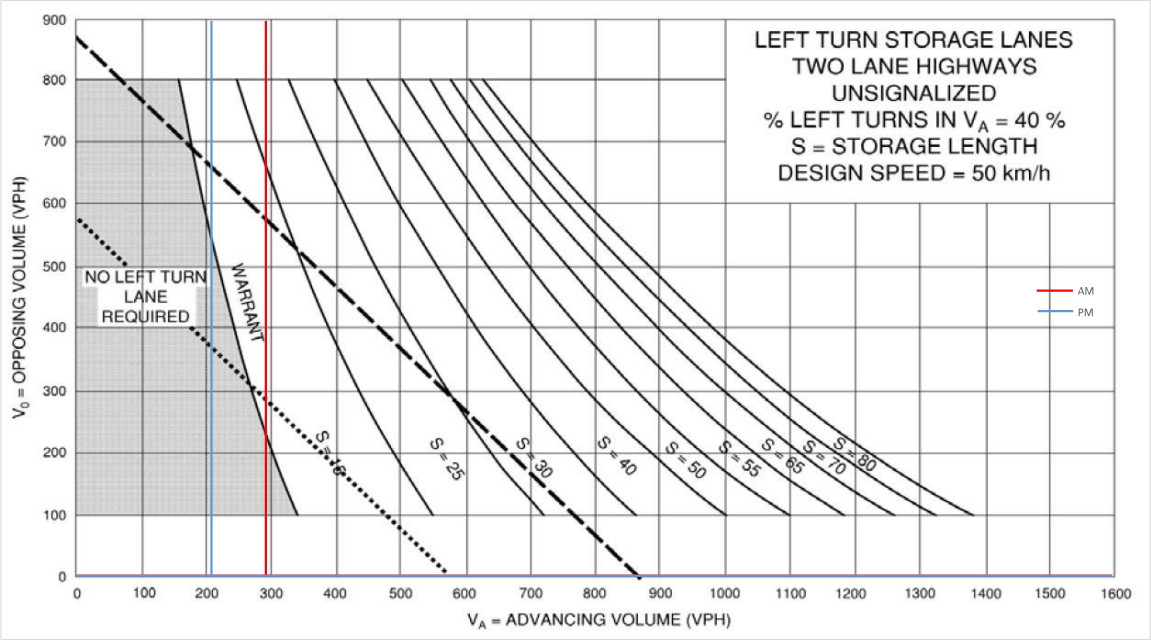
Future Background 2030 - Southbound Left



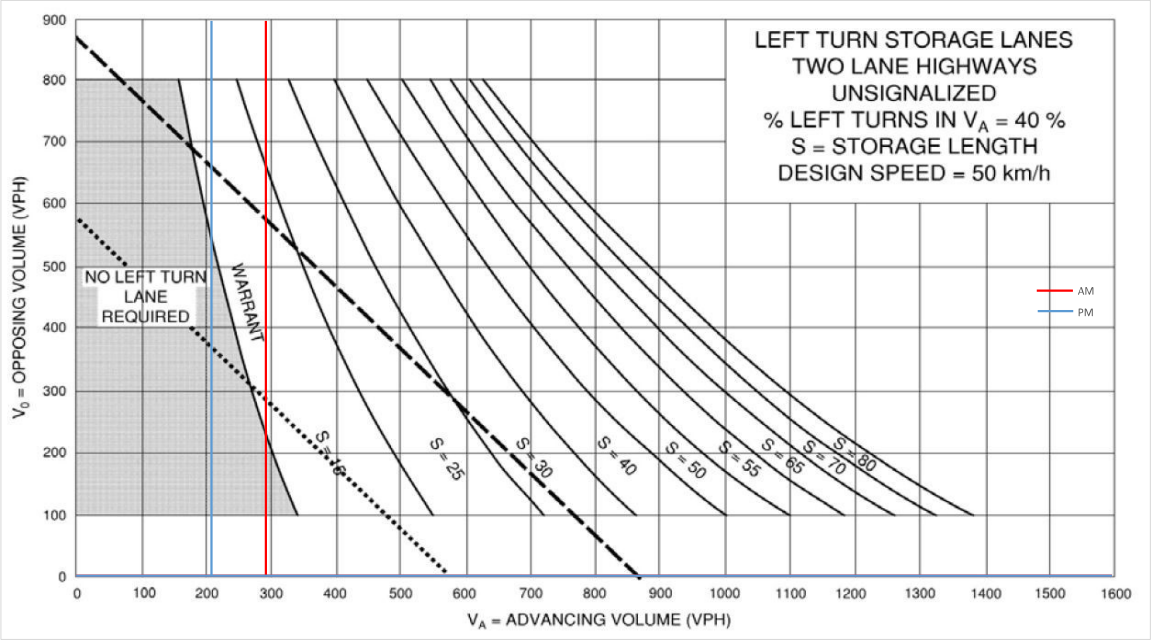
Future Background 2035 - Southbound Left



Future Total 2030 - Southbound Left



Future Total 2035 - Southbound Left



Flewellyn Road at Street 16

Future Background 2030

Design Speed																	Yes	
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	23	330	0	0	204	25	0	0	0	62	0	62	50.0%	124	0		
	PM	54	262	0	0	378	59	0	0	0	44	0	44	50.0%	88	0		

Future Background 2035

Design Speed																	Yes	
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	23	330	0	0	214	25	0	0	0	62	0	62	50.0%	124	0		
	PM	54	273	0	0	378	59	0	0	0	44	0	44	50.0%	88	0		

Future Total 2030

Design Speed																	Yes	
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	29	360	0	0	218	31	0	0	0	78	0	78	50.0%	156	0		
	PM	68	283	0	0	410	74	0	0	0	55	0	55	50.0%	110	0		

Future Total 2035

Design Speed																	Yes	
90 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing		
	AM	29	360	0	0	228	31	0	0	0	78	0	78	50.0%	156	0		
	PM	68	294	0	0	410	74	0	0	0	55	0	55	50.0%	110	0		

Future Background 2030

Design Speed																	
											Yes						
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	23	330	0	0	204	25	0	0	0	62	0	62	50.0%	124	0	
	PM	54	262	0	0	378	59	0	0	0	44	0	44	50.0%	88	0	

Future Background 2035

Design Speed																	
											Yes						
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	23	330	0	0	214	25	0	0	0	62	0	62	50.0%	124	0	
	PM	54	273	0	0	378	59	0	0	0	44	0	44	50.0%	88	0	

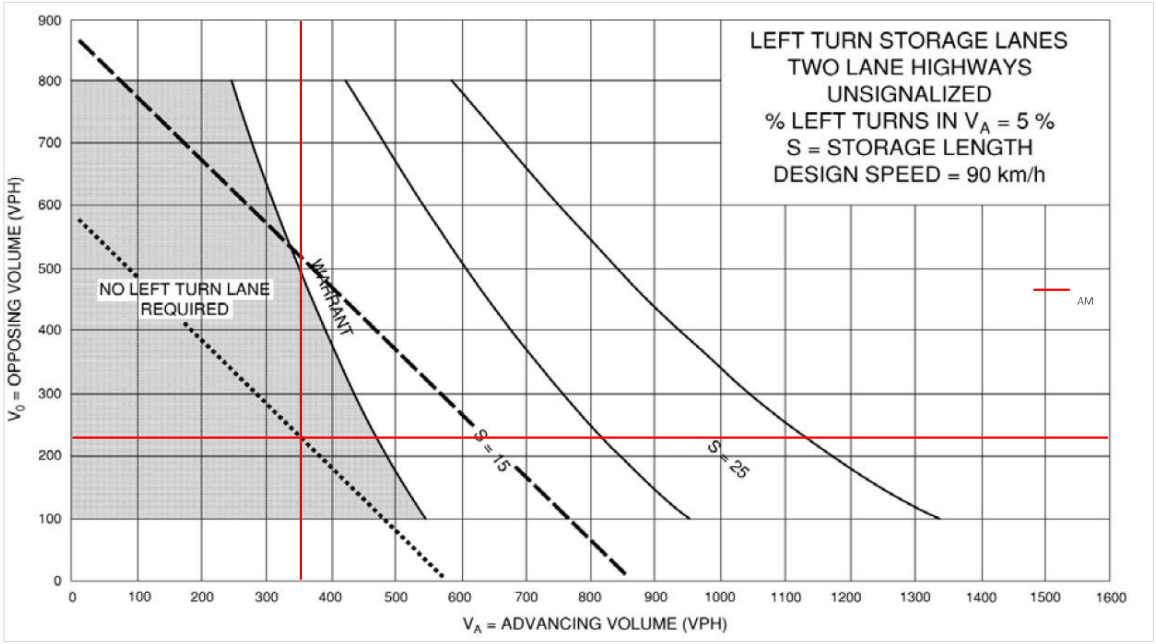
Future Total 2030

Design Speed																	
											Yes						
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	29	360	0	0	218	31	0	0	0	78	0	78	50.0%	156	0	
	PM	68	283	0	0	410	74	0	0	0	55	0	55	50.0%	110	0	

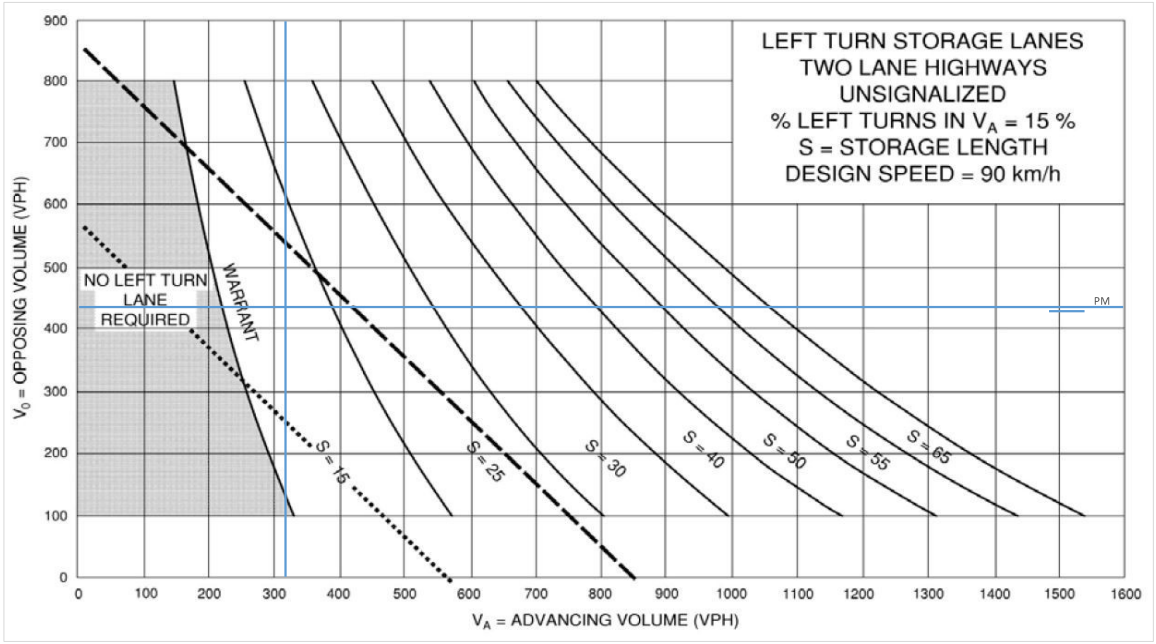
Future Total 2035

Design Speed																	
											Yes						
50 km/h		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	%Left Turn	Volume Advancing	Volume Opposing	
	AM	29	360	0	0	228	31	0	0	0	78	0	78	50.0%	156	0	
	PM	68	294	0	0	410	74	0	0	0	55	0	55	50.0%	110	0	

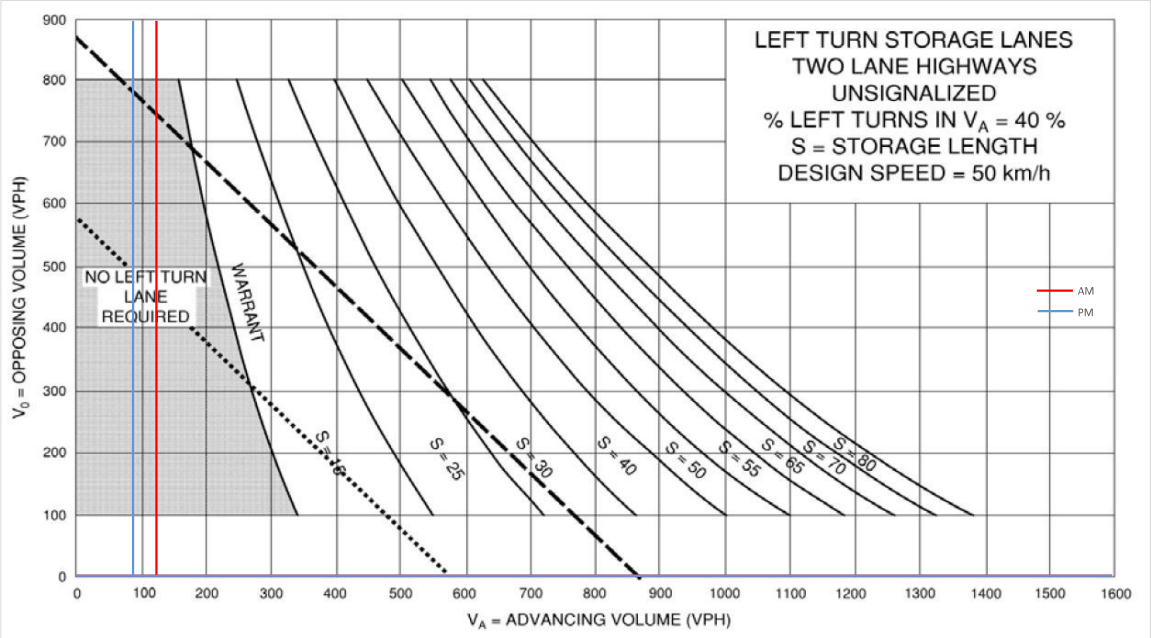
Future Background 2030 - Eastbound Left



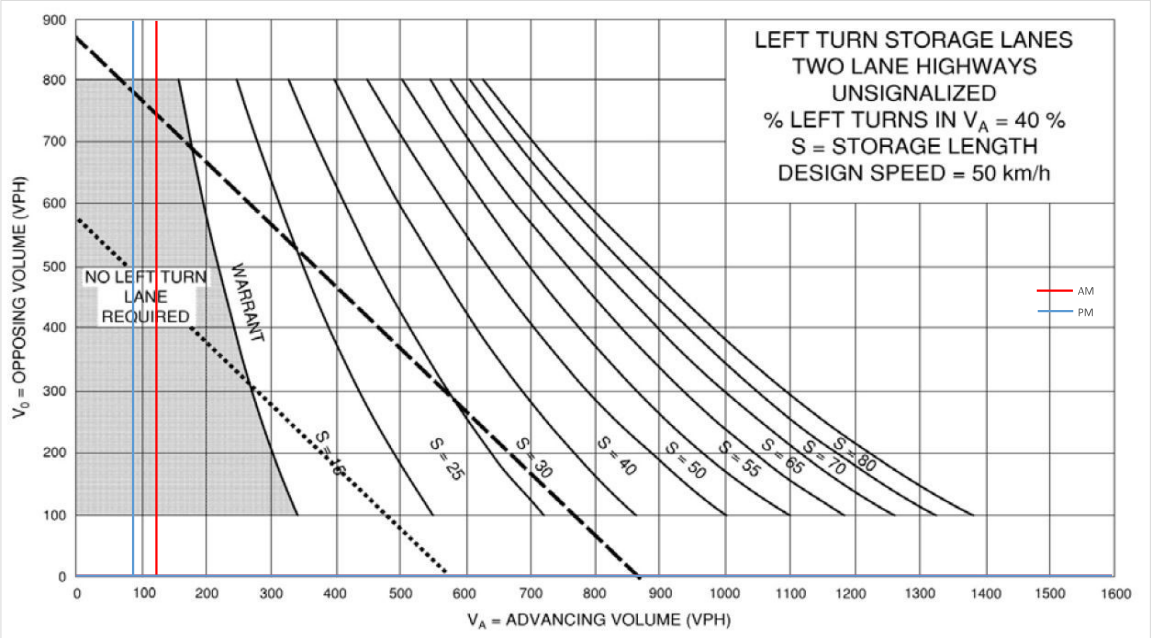
Future Background 2030 - Eastbound Left



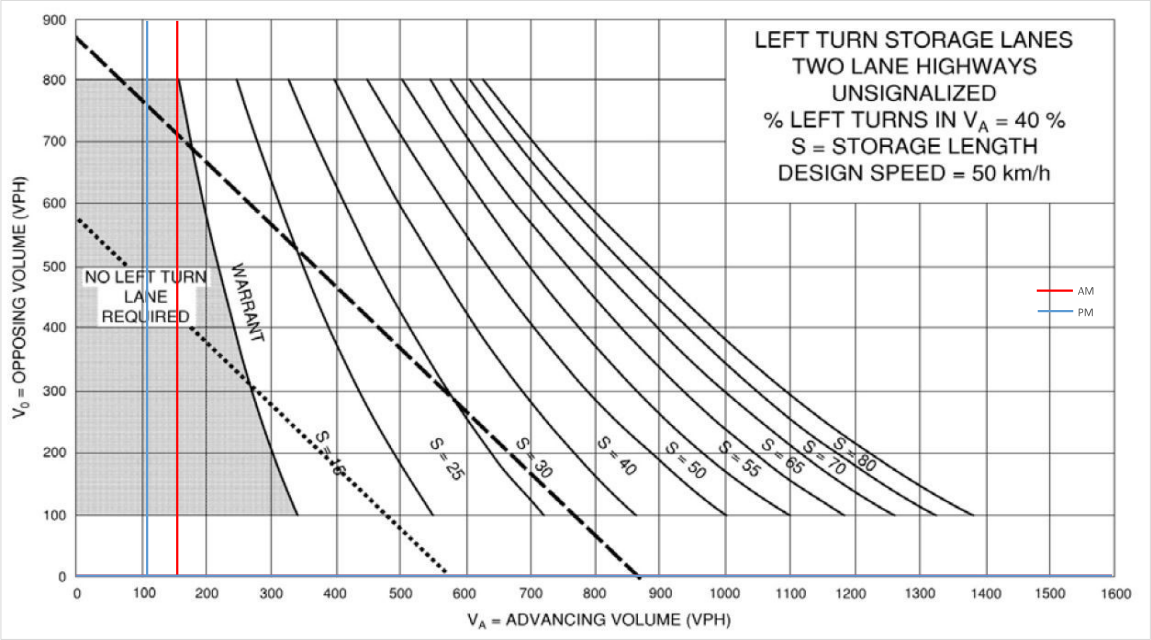
Future Background 2030 - Southbound Left



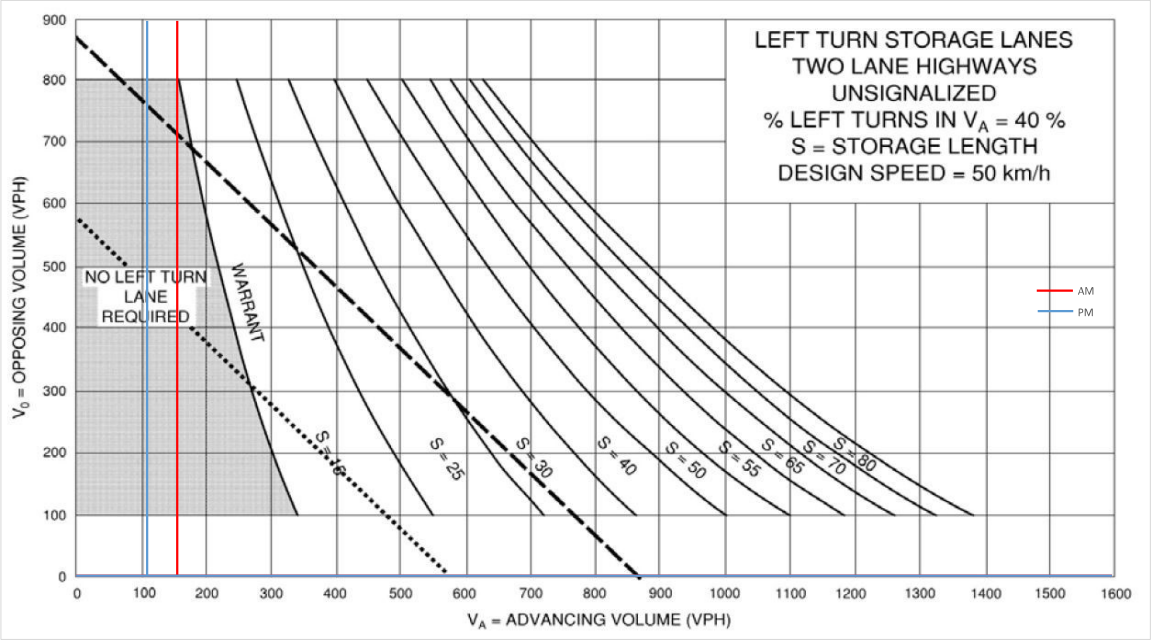
Future Background 2035 - Southbound Left



Future Total 2030 - Southbound Left



Future Total 2035 - Southbound Left



Appendix G

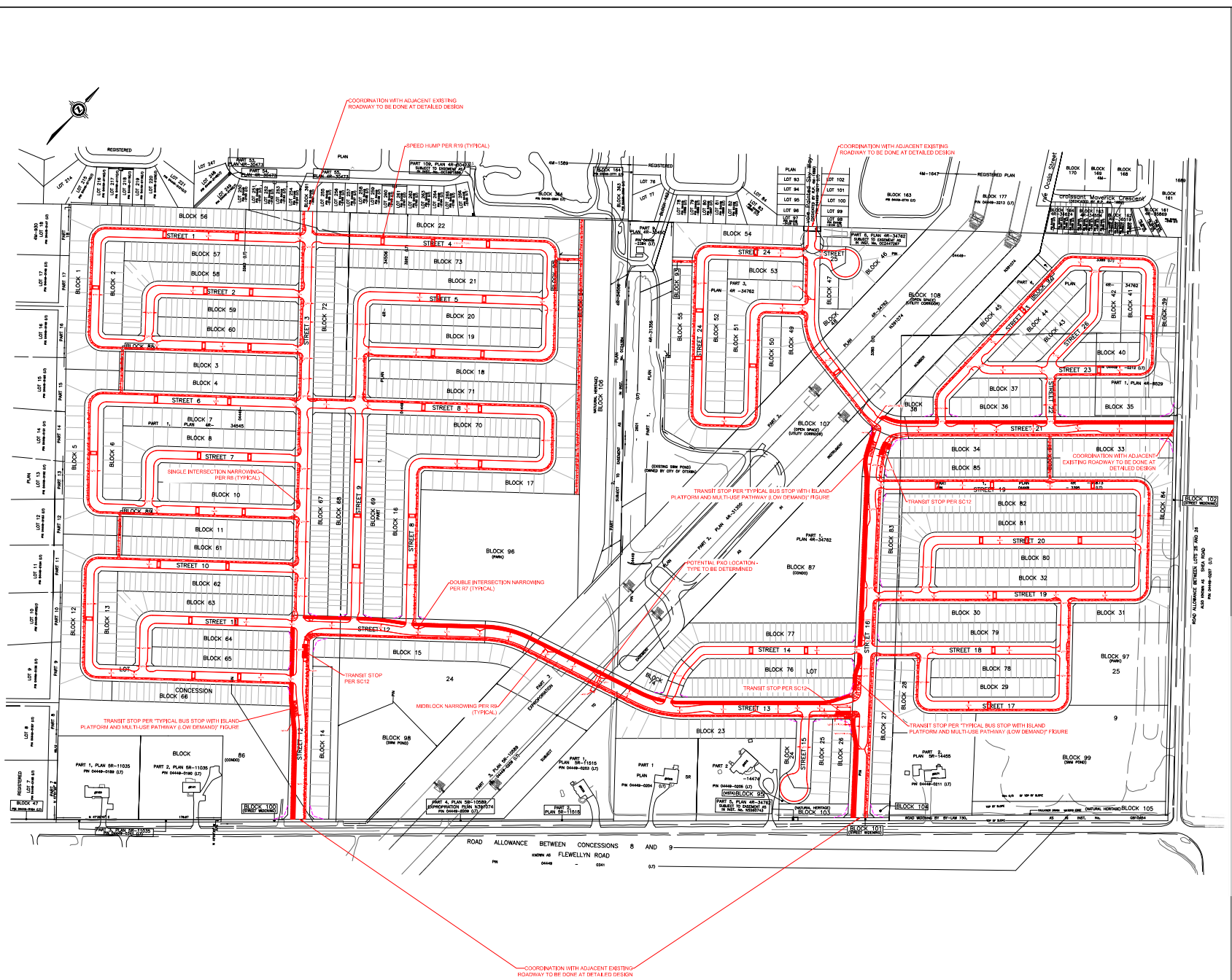
Collision Data

Accident Date	Accident Year	Accident Time	Location	Environment Condition	Light	Traffic Control	Traffic Control Condition	Classification Of Accident	Initial Impact Type	Road Surface Condition	# Vehicles	# Motorcycles	# Bicycles	# Pedestrians
4/22/2018	2018	11:30	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
5/15/2018	2018	13:45	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
7/30/2018	2018	17:09	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
8/31/2018	2018	17:29	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
11/16/2018	2018	9:35	FLEWELLYN RD @ SHEA RD (0000398)	03 - Snow	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	03 - Loose snow	0	0	0	0
11/28/2018	2018	18:43	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	07 - Dark	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
1/31/2019	2019	16:50	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	05 - Dusk	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
3/29/2019	2019	17:26	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
5/4/2019	2019	15:59	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
6/3/2019	2019	13:50	FLEWELLYN RD @ SHEA RD (0000398)	02 - Rain	01 - Daylight	02 - Stop sign	0	03 - P.D. only	03 - Rear end	02 - Wet	0	0	0	0
11/7/2019	2019	7:51	FLEWELLYN RD @ SHEA RD (0000398)	03 - Snow	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	06 - Ice	0	0	0	0
2/13/2020	2020	7:08	FLEWELLYN RD @ SHEA RD (0000398)	03 - Snow	03 - Dawn	02 - Stop sign	0	03 - P.D. only	02 - Angle	02 - Wet	0	0	0	0
11/1/2020	2020	12:17	FLEWELLYN RD @ SHEA RD (0000398)	02 - Rain	01 - Daylight	02 - Stop sign	0	03 - P.D. only	07 - SMV other	02 - Wet	0	0	0	0
6/16/2021	2021	15:15	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
9/21/2021	2021	16:17	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
10/23/2021	2021	14:48	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
1/1/2022	2022	3:01	FLEWELLYN RD @ SHEA RD (0000398)	07 - Fog, mist, smoke, dust	07 - Dark	02 - Stop sign	0	02 - Non-fatal injury	07 - SMV other	02 - Wet	0	0	0	0
1/14/2022	2022	16:26	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
2/22/2022	2022	19:20	FLEWELLYN RD @ SHEA RD (0000398)	04 - Freezing Rain	07 - Dark	02 - Stop sign	0	03 - P.D. only	02 - Angle	06 - Ice	0	0	0	0
2/24/2022	2022	7:11	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	03 - Dawn	02 - Stop sign	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
7/10/2022	2022	11:13	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
8/23/2022	2022	16:46	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	01 - Daylight	02 - Stop sign	0	02 - Non-fatal injury	02 - Angle	01 - Dry	0	0	0	0
9/2/2022	2022	20:11	FLEWELLYN RD @ SHEA RD (0000398)	01 - Clear	07 - Dark	02 - Stop sign	0	02 - Non-fatal injury	07 - SMV other	01 - Dry	0	1	0	0
3/8/2018	2018	19:35	FERNBANK RD @ SHEA RD (0000399)	03 - Snow	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	06 - Ice	0	0	0	0
7/27/2018	2018	18:03	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
8/10/2018	2018	11:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
11/14/2018	2018	7:46	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
1/21/2019	2019	14:03	FERNBANK RD @ SHEA RD (0000399)	05 - Drifting Snow	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	05 - Packed snow	0	0	0	0
2/26/2019	2019	8:58	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
4/1/2019	2019	7:10	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
11/6/2019	2019	7:15	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	03 - Dawn	11 - Roundabout	0	03 - P.D. only	02 - Angle	01 - Dry	0	0	0	0
12/4/2019	2019	10:28	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	02 - Angle	02 - Wet	0	0	0	0
1/13/2020	2020	18:30	FERNBANK RD @ SHEA RD (0000399)	03 - Snow	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	06 - Ice	0	0	0	0
10/23/2020	2020	19:23	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	07 - Dark	11 - Roundabout	0	03 - P.D. only	03 - Rear end	01 - Dry	0	0	0	0
2/14/2021	2021	17:44	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	07 - Dark	11 - Roundabout	0	02 - Non-fatal injury	03 - Rear end	01 - Dry	0	0	0	0
1/12/2022	2022	9:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0
2/12/2022	2022	10:57	FERNBANK RD @ SHEA RD (0000399)	04 - Freezing Rain	01 - Daylight	11 - Roundabout	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0
3/3/2022	2022	10:00	FERNBANK RD @ SHEA RD (0000399)	01 - Clear	01 - Daylight	11 - Roundabout	0	03 - P.D. only	99 - Other	01 - Dry	0	0	0	0
11/16/2018	2018	18:23	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	03 - Loose snow	0	0	0	0
1/10/2019	2019	9:15	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	03 - Snow	01 - Daylight	10 - No control	0	03 - P.D. only	03 - Rear end	05 - Packed snow	0	0	0	0
1/24/2019	2019	8:33	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	04 - Freezing Rain	01 - Daylight	10 - No control	0	03 - P.D. only	07 - SMV other	04 - Slush	0	0	0	0
9/27/2019	2019	20:05	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
9/27/2020	2020	23:15	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
11/9/2020	2020	6:36	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	01 - Clear	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
12/2/2021	2021	19:47	FLEWELLYN RD btwn POPLARWOOD AVE & SHEA RD (__3ZABGI)	02 - Rain	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	02 - Wet	0	0	0	0
8/27/2018	2018	6:10	SHEA RD btwn FERNBANK RD & FLEWELLYN RD (__3ZABGL)	01 - Clear	03 - Dawn	10 - No control	0	03 - P.D. only	07 - SMV other	01 - Dry	0	0	0	0
11/9/2018	2018	23:17	SHEA RD btwn FERNBANK RD & FLEWELLYN RD (__3ZABGL)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	03 - Loose snow	0	0	0	0
2/19/2022	2022	17:29	SHEA RD btwn FERNBANK RD & FLEWELLYN RD (__3ZABGL)	03 - Snow	07 - Dark	10 - No control	0	03 - P.D. only	07 - SMV other	06 - Ice	0	0	0	0

Appendix H

Conceptual Traffic Calming Plan

CGH TRANSPORTATION



Notes:

LEGEND:

CONCRETE SIDEWALK
2.00m ON COLLECTOR ROADS
1.80m ON LOCAL ROADS

3.00m ASPHALT MULTI-USE PATHWAY

RECOMMENDED DAYLIGHT TRIANGLES:

LOCAL - LOCAL INTERSECTIONS = 3m x 3m TRIANGLE

LOCAL - COLLECTOR INTERSECTIONS = 3m x 9m TRIANGLE

COLLECTOR - COLLECTOR INTERSECTIONS = OVERLAPPING 5m x 15m TRIANGLES

NOTES:

1. THIS TRAFFIC CALMING CONCEPT IS SUBJECT TO SERVICING AND ILLUSTRATES THE PHILOSOPHY OF THE 30KM/H TRAFFIC CALMING GUIDELINES.
2. CENTERLINE SHIFTS HAVE BEEN INCORPORATED ON THE COLLECTOR ROADS AS PER CITY COMMENTS, THIS WILL RESULT IN THE LOSS OF APPROXIMATELY 45m OF POTENTIAL PARKING OPPORTUNITY PER LATERAL SHIFT.

REV.	DESCRIPTION:	BY:	DATE:
01	Issued for Review	BB	2025-03-03

STATUS:

CGH Transportation
6 Plaza Court
Ottawa, ON
K2H 7W1
(343) 999-9117

CLIENT: Caivan Communities
3713 Borrisokane Road
Ottawa, ON
K2J 4J4

ARCHITECT:

SITE: Stittsville South Subdivision

TITLE: GRDD Redline

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
NTS	2025-03-03	BB	AL
PROJECT NO:	DRAWING NO:		REVISION:
2025-005	001		01

Appendix I

MMLOS Analysis

Consultant	**CGH Transportation Inc.**	**Project**	**5993 Flewellyn**
Scenario	**Existing/Future**	**Date**	**2025-06-12**
Comments			

SEGMENTS			Shea Road	Flewellyn Road	New Local Road(with sidewalk)	New Local Road(without sidewalk)	New Collector Road
			Ex/Fu	Ex/Fu	Fu	Fu	Fu
Pedestrian	Sidewalk Width Boulevard Width		no sidewalk n/a	no sidewalk n/a	≥ 2 m < 0.5	no sidewalk n/a	≥ 2 m 0.5 - 2 m
	Avg Daily Curb Lane Traffic Volume		> 3000	≤ 3000	≤ 3000	≤ 3000	≤ 3000
	Operating Speed On-Street Parking		> 60 km/h no	> 60 km/h no	≤ 30 km/h yes	≤ 30 km/h yes	> 30 to 50 km/h yes
	Exposure to Traffic PLoS	**F**	**F**	**F**	**A**	**C**	**A**
	Effective Sidewalk Width						
	Pedestrian Volume						
	Crowding PLoS		-	-	-	-	-
	Level of Service		**F**	**F**	**A**	**-**	**A**
Bicycle	Type of Cycling Facility		Mixed Traffic	Curbside Bike Lane	Mixed Traffic	Mixed Traffic	Physically Separated
	Number of Travel Lanes		2-3 lanes total	≤ 1 each direction	2-3 lanes total	2-3 lanes total	
	Operating Speed		≥ 60 km/h	> 70 km/h	≤ 40 km/h	≤ 40 km/h	
	# of Lanes & Operating Speed LoS		**F**	**E**	**B**	**B**	**-**
	Bike Lane (+ Parking Lane) Width			≥1.5 to <1.8 m			
	Bike Lane Width LoS	**F**	**-**	**B**	**-**	**-**	**-**
	Bike Lane Blockages			Rare			
	Blockage LoS		**-**	**A**	**-**	**-**	**-**
	Median Refuge Width (no median = < 1.8 m)						
	No. of Lanes at Unsignalized Crossing						
	Sidestreet Operating Speed						
	Unsignalized Crossing - Lowest LoS		**-**	**-**	**-**	**-**	**A**
	Level of Service		**F**	**E**	**B**	**-**	**A**
Transit	Facility Type		Mixed Traffic	Mixed Traffic			
	Friction or Ratio Transit:Posted Speed	**E**	Vt/Vp ≤ 0.6	Vt/Vp ≤ 0.6			
	Level of Service		**E**	**E**	**-**	**-**	**-**
Truck	Truck Lane Width						
	Travel Lanes per Direction	**-**					
	Level of Service		**-**	**-**	**-**	**-**	**-**

Appendix J

TDM Checklist

CGH TRANSPORTATION

TDM Measures Checklist:
Residential Developments (multi-family, condominium or subdivision)

Legend

BASIC — The measure is generally feasible and effective, and in most cases would benefit the development and its users

BETTER — The measure could maximize support for users of sustainable modes, and optimize development performance

★ — The measure is one of the most dependably effective tools to encourage the use of sustainable modes

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	1.	**TDM PROGRAM MANAGEMENT**	
	1.1	**Program coordinator**	
BASIC ★	1.1.1	Designate an internal coordinator, or contract with an external coordinator	☐
	1.2	**Travel surveys**	
BETTER	1.2.1	Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	☐
	2.	**WALKING AND CYCLING**	
	2.1	**Information on walking/cycling routes & destinations**	
BASIC	2.1.1	Display local area maps with walking/cycling access routes and key destinations at major entrances *(multi-family, condominium)*	☐
	2.2	**Bicycle skills training**	
BETTER	2.2.1	Offer on-site cycling courses for residents, or subsidize off-site courses	☐

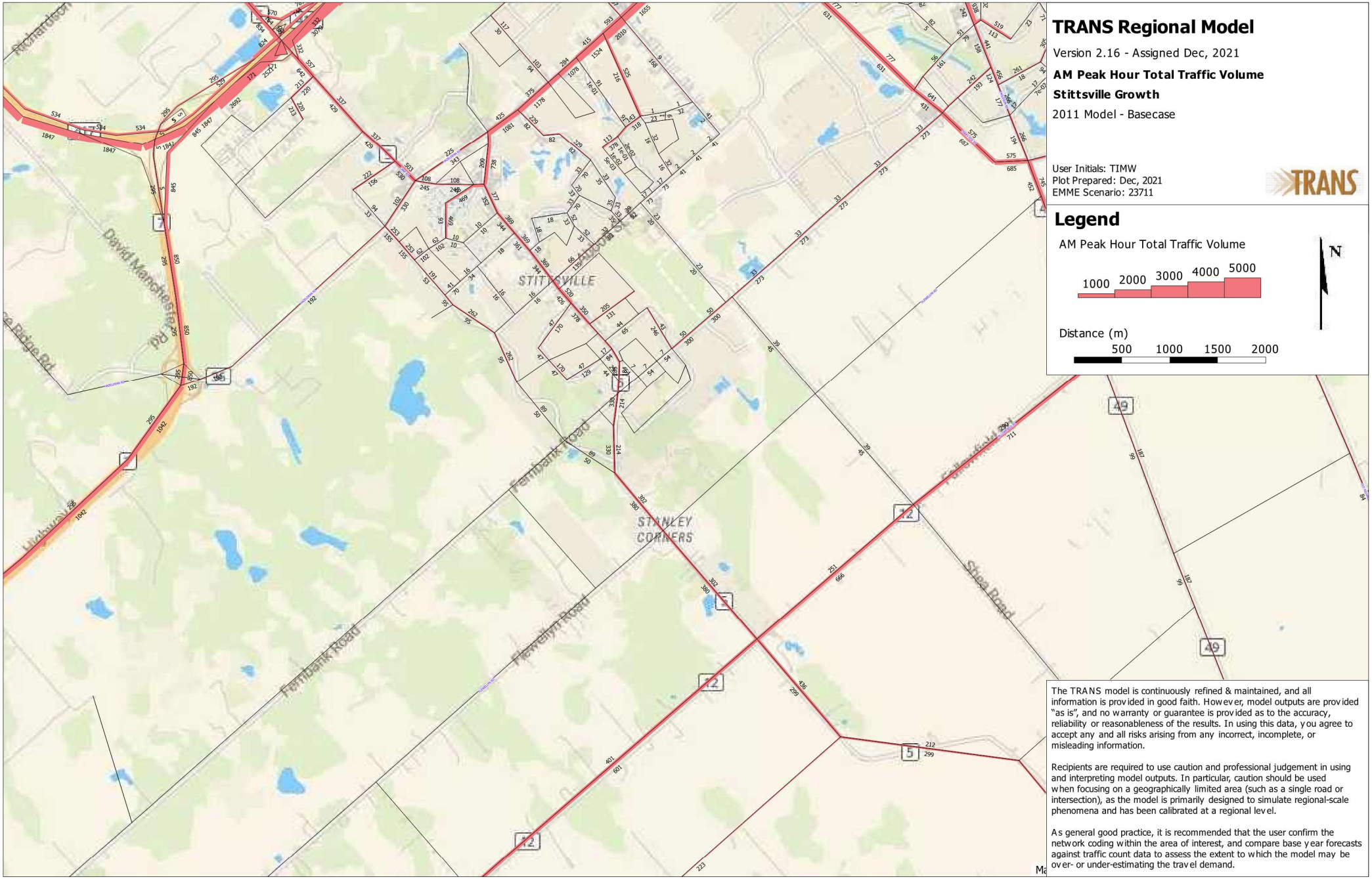
TDM Measures Checklist **City of Ottawa**
Version 1.0 (30 June 2017)

		TDM measures: *Residential developments*	Check if proposed & add descriptions
	3.	**TRANSIT**	
	3.1	**Transit information**	
BASIC	3.1.1	Display relevant transit schedules and route maps at entrances *(multi-family, condominium)*	☐
BETTER	3.1.2	Provide real-time arrival information display at entrances *(multi-family, condominium)*	☐
	3.2	**Transit fare incentives**	
BASIC ★	3.2.1	Offer PRESTO cards preloaded with one monthly transit pass on residence purchase/move-in, to encourage residents to use transit	☐
BETTER	3.2.2	Offer at least one year of free monthly transit passes on residence purchase/move-in	☑
	3.3	**Enhanced public transit service**	
BETTER ★	3.3.1	Contract with OC Transpo to provide early transit services until regular services are warranted by occupancy levels *(subdivision)*	☑
	3.4	**Private transit service**	
BETTER	3.4.1	Provide shuttle service for seniors homes or lifestyle communities (e.g. scheduled mall or supermarket runs)	☐
	4.	**CARSHARING & BIKESHARING**	
	4.1	**Bikeshare stations & memberships**	
BETTER	4.1.1	Contract with provider to install on-site bikeshare station *(multi-family)*	☐
BETTER	4.1.2	Provide residents with bikeshare memberships, either free or subsidized *(multi-family)*	☐
	4.2	**Carshare vehicles & memberships**	
BETTER	4.2.1	Contract with provider to install on-site carshare vehicles and promote their use by residents	☐
BETTER	4.2.2	Provide residents with carshare memberships, either free or subsidized	☐
	5.	**PARKING**	
	5.1	**Priced parking**	
BASIC ★	5.1.1	Unbundle parking cost from purchase price *(condominium)*	☐
BASIC ★	5.1.2	Unbundle parking cost from monthly rent *(multi-family)*	☐

			TDM measures: *Residential developments*	Check if proposed & add descriptions
		6.	**TDM MARKETING & COMMUNICATIONS**	
		6.1	**Multimodal travel information**	
BASIC	★	6.1.1	Provide a multimodal travel option information package to new residents	☑
		6.2	**Personalized trip planning**	
BETTER	★	6.2.1	Offer personalized trip planning to new residents	☐

Appendix K

TRANS Model



TRANS Regional Model

Version 2.16 - Assigned Dec, 2021

AM Peak Hour Total Traffic Volume

Stittsville Growth

2011 Model - Basecase

User Initials: TIMW
Plot Prepared: Dec, 2021
EMME Scenario: 23711

TRANS

Legend

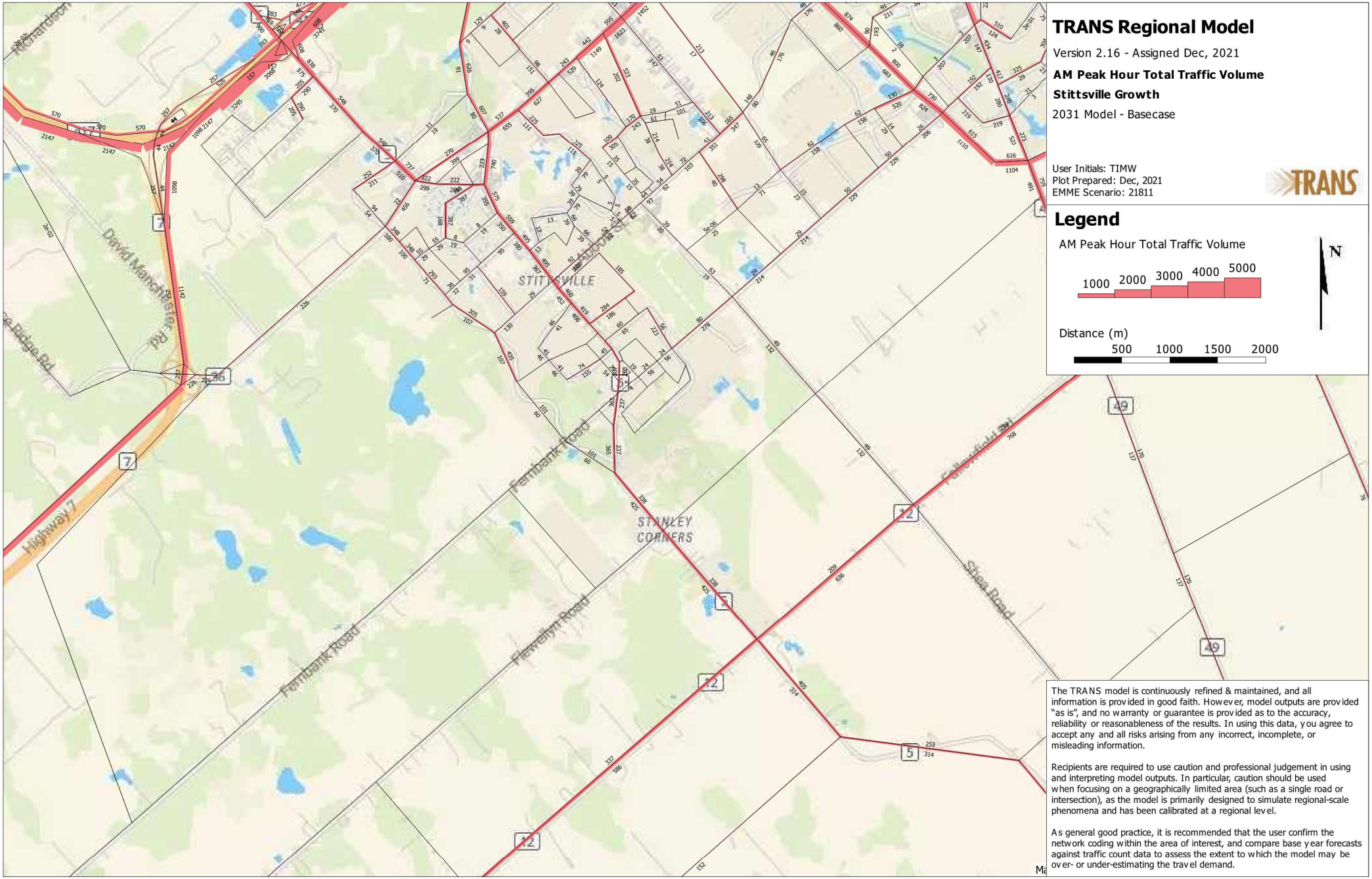
AM Peak Hour Total Traffic Volume

1000 2000 3000 4000 5000

Distance (m)

500 1000 1500 2000

N



TRANS Regional Model

Version 2.16 - Assigned Dec, 2021

AM Peak Hour Total Traffic Volume

Stittsville Growth

2031 Model - Basecase

User Initials: TIMW
Plot Prepared: Dec, 2021
EMME Scenario: 21811

TRANS

The TRANS model is continuously refined & maintained, and all information is provided in good faith. However, model outputs are provided "as is", and no warranty or guarantee is provided as to the accuracy, reliability or reasonableness of the results. In using this data, you agree to accept any and all risks arising from any incorrect, incomplete, or misleading information.

Recipients are required to use caution and professional judgement in using and interpreting model outputs. In particular, caution should be used when focusing on a geographically limited area (such as a single road or intersection), as the model is primarily designed to simulate regional-scale phenomena and has been calibrated at a regional level.

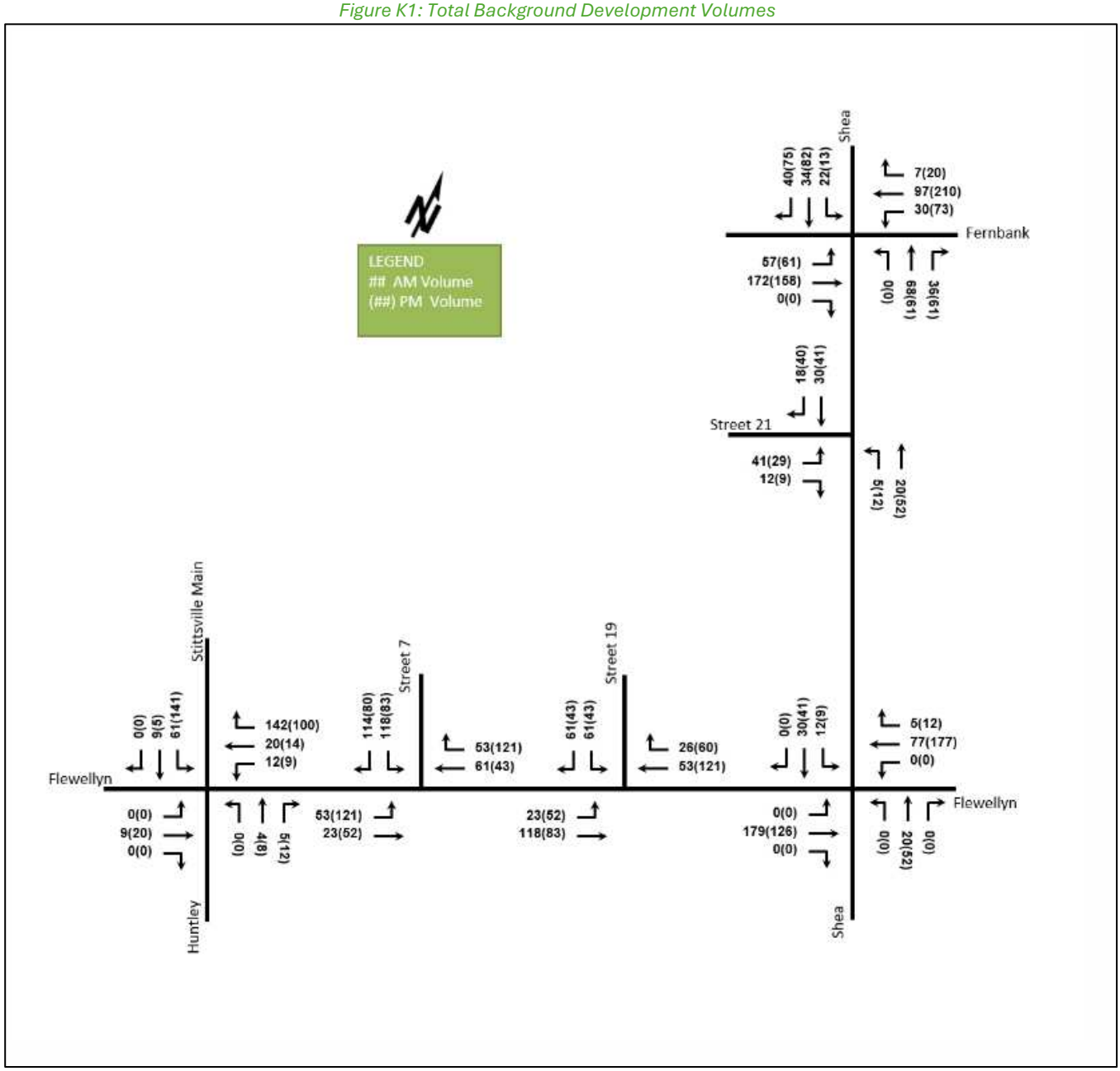
As general good practice, it is recommended that the user confirm the network coding within the area of interest, and compare base year forecasts against traffic count data to assess the extent to which the model may be over- or under-estimating the travel demand.

Appendix L

Background Development

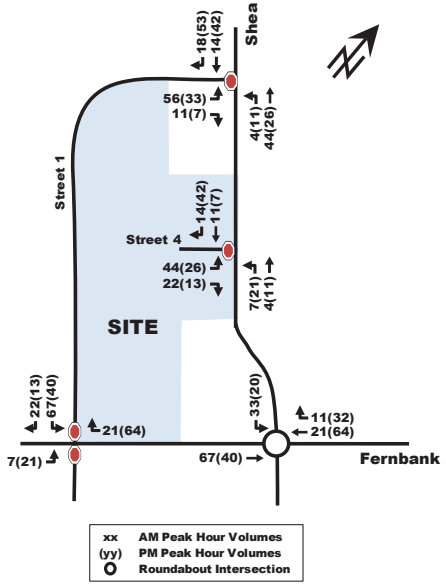
CGH TRANSPORTATION

Figure K1: Total Background Development Volumes



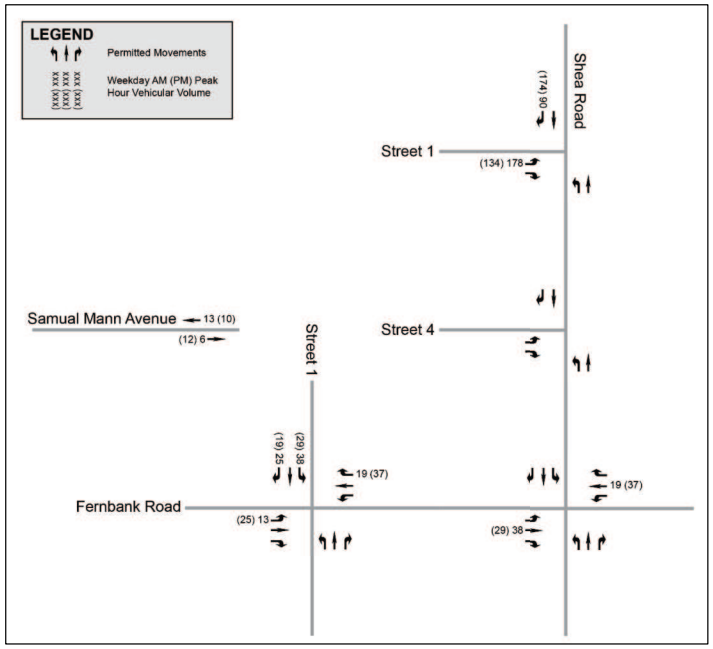
5957 & 5969 Fernbank Road (Parsons Addendum, 2020)

Figure 3: Total 'New' Auto Trips

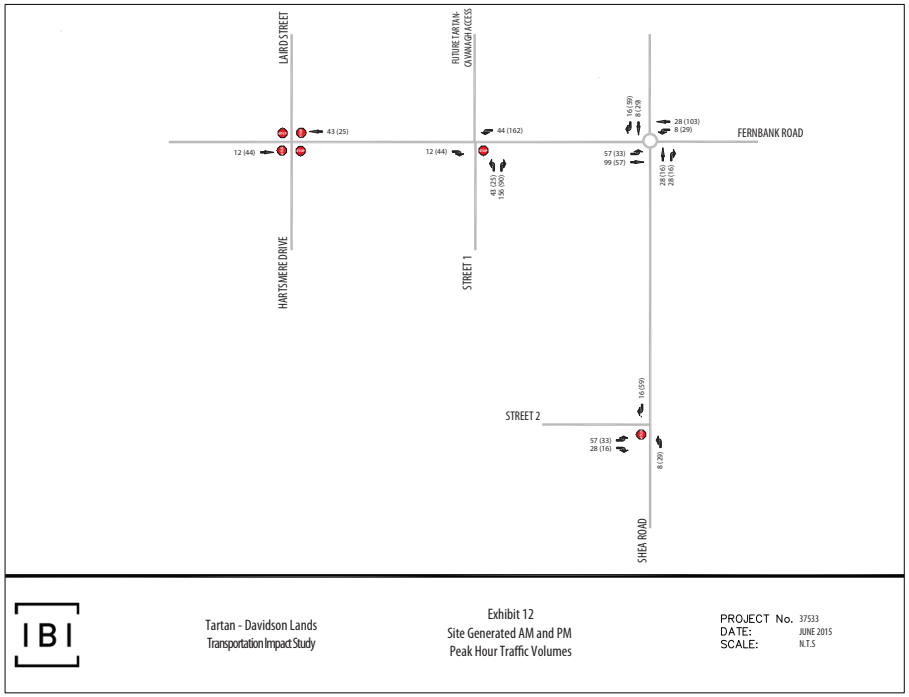


6041 Fernbank Road (IBI Group Addendum, 2021)

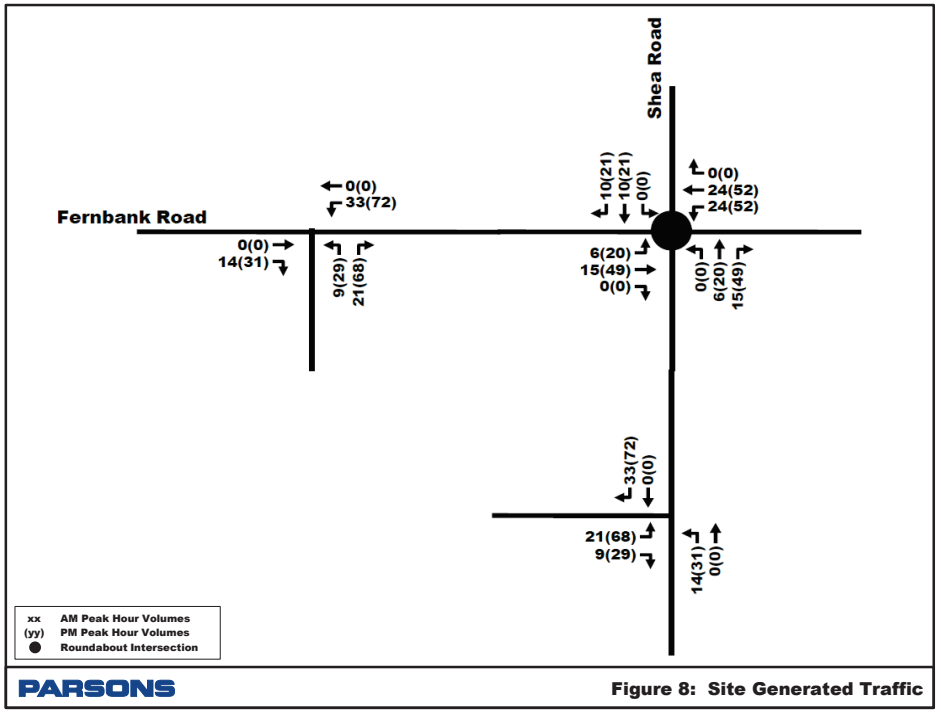
Figure 1 - Updated Site-Generated Traffic



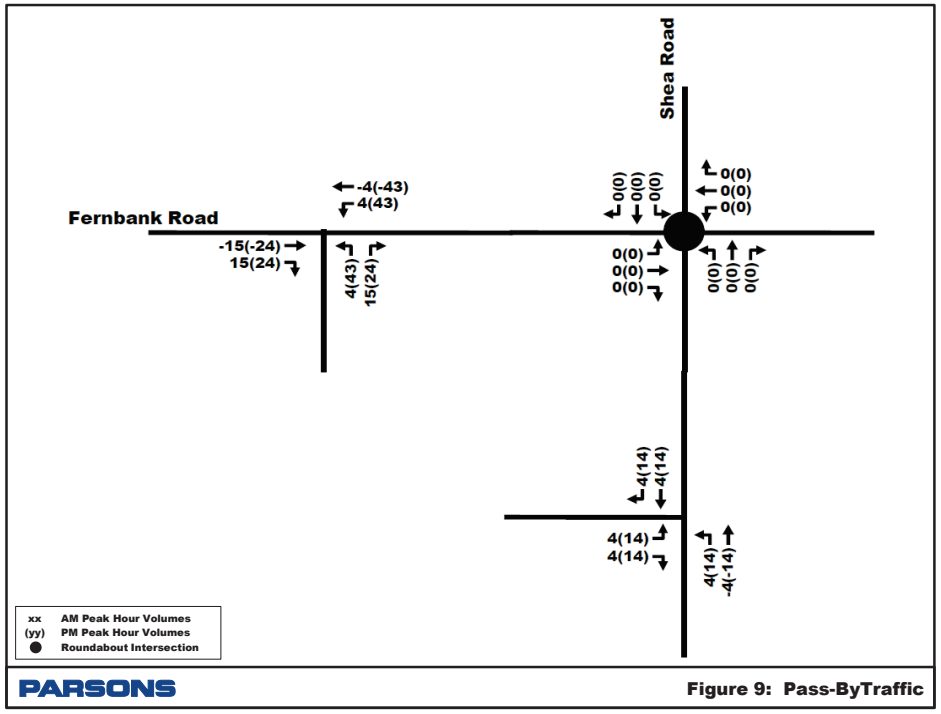
5993 Flewellyn Road (Davidson Lands) (IBI Group, 2015)



5960 Fernbank Road (Fernbank Shea, Commercial Development) (Parsons, 2016)



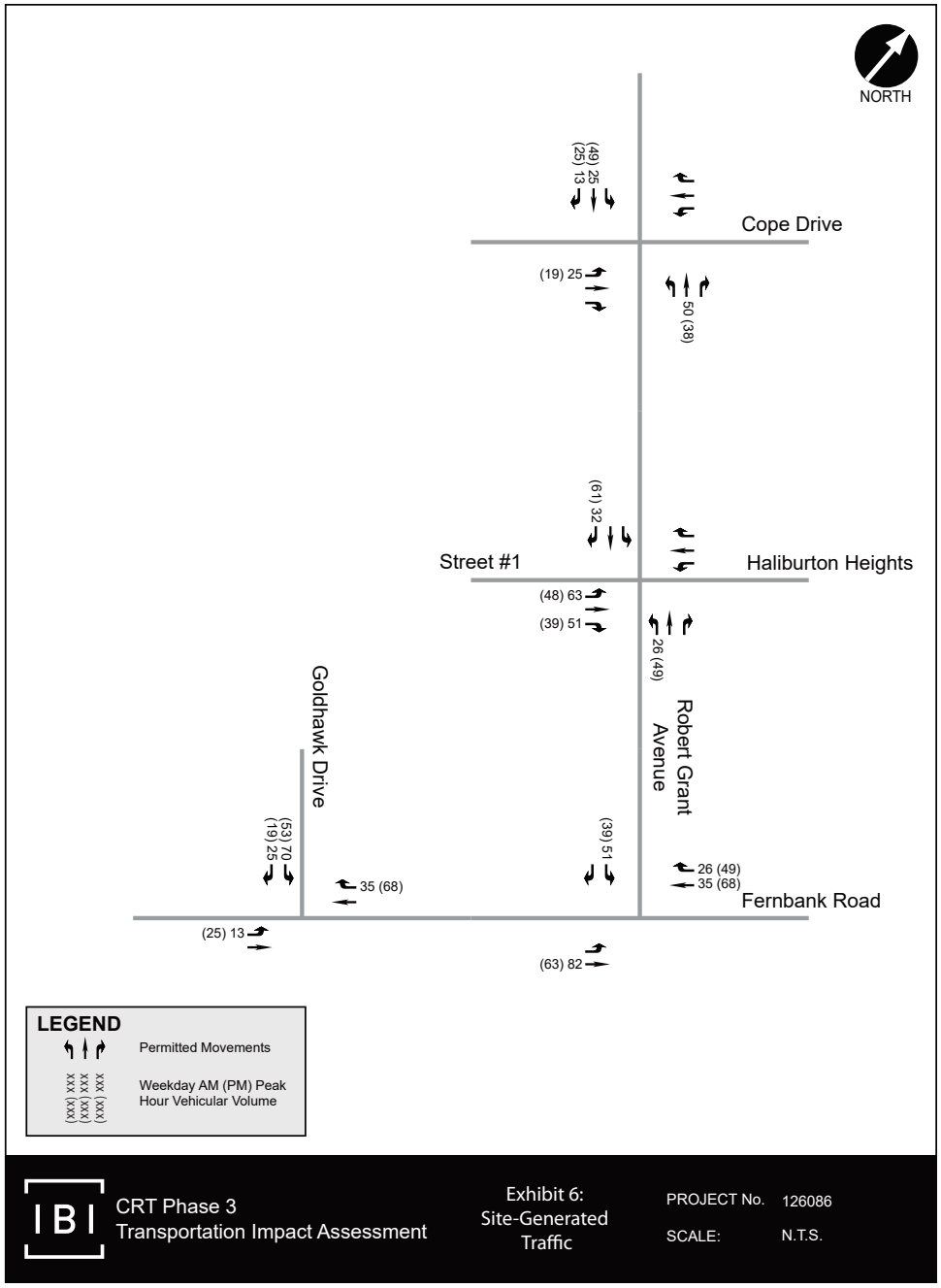
5960 Fernbank Road (Fernbank Shea, Commercial Development) (Parsons, 2016)



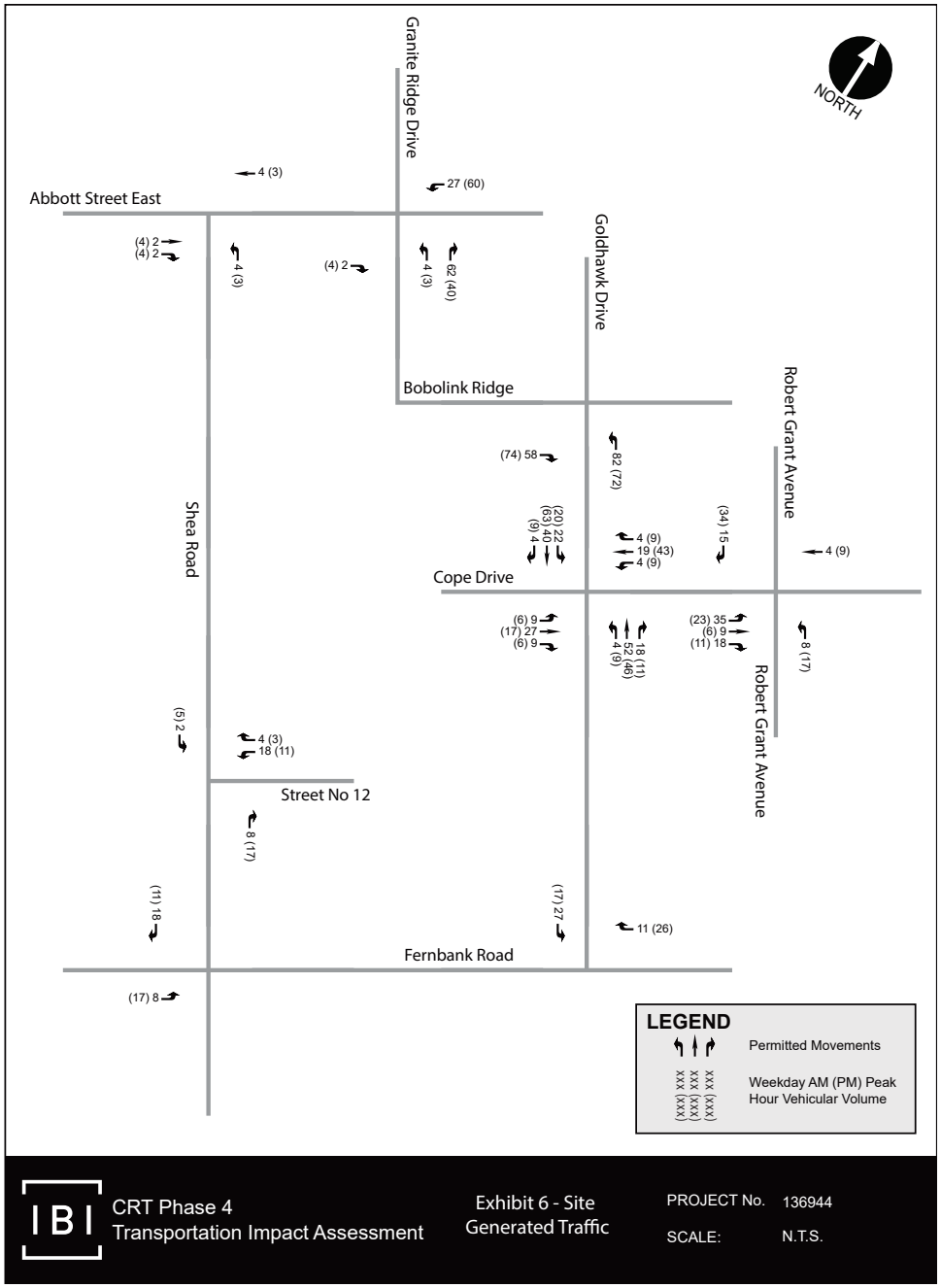
PARSONS

Figure 9: Pass-ByTraffic

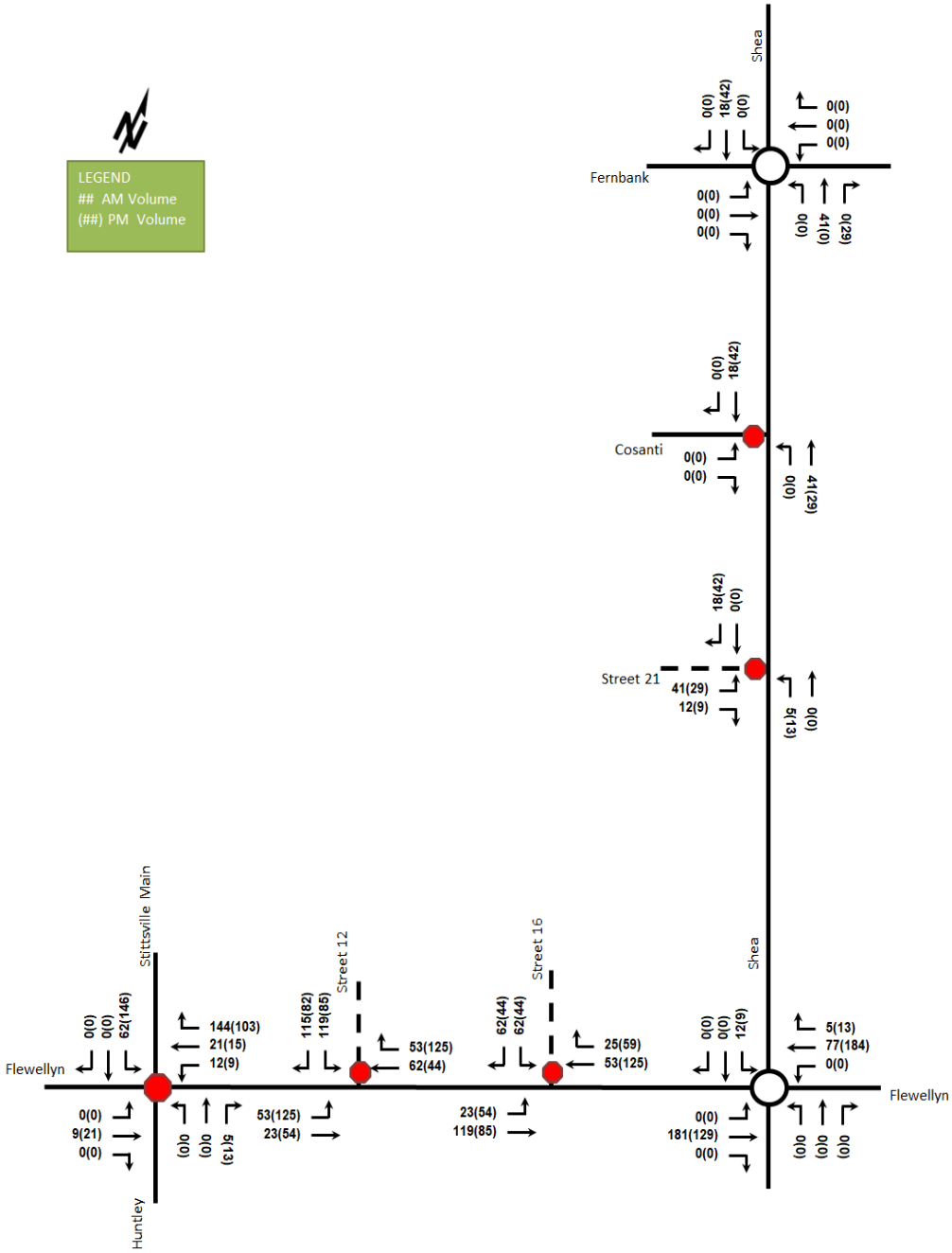
5725 Fernbank Road (CRT Phase 3) (IBI Group, 2021)



5500 Abbott Street & 1555 Shea Road (CRT Phase 4) (IBI Group, 2022)



5993 & 6115 Flewellyn Road & 6070 Fernbank Road & 59 Aridus Crescent (TIA is not available) (CGH, 2024)



Appendix M

Synchro and Sidra Intersection Worksheets – 2030 Future Background Conditions

Intersection	
Intersection Delay, s/veh	21.4
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	38	164	15	19	146	173	17	232	17	101	259	53
Future Vol, veh/h	38	164	15	19	146	173	17	232	17	101	259	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	164	15	19	146	173	17	232	17	101	259	53
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	15.8	20	18.2	27.5
HCM LOS	C	C	C	D

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	6%	18%	6%	24%
Vol Thru, %	87%	76%	43%	63%
Vol Right, %	6%	7%	51%	13%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	266	217	338	413
LT Vol	17	38	19	101
Through Vol	232	164	146	259
RT Vol	17	15	173	53
Lane Flow Rate	266	217	338	413
Geometry Grp	1	1	1	1
Degree of Util (X)	0.531	0.435	0.622	0.758
Departure Headway (Hd)	7.187	7.218	6.628	6.608
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	500	497	548	549
Service Time	5.251	5.285	4.654	4.633
HCM Lane V/C Ratio	0.532	0.437	0.617	0.752
HCM Control Delay	18.2	15.8	20	27.5
HCM Lane LOS	C	C	C	D
HCM 95th-tile Q	3.1	2.2	4.2	6.7

Intersection	
Int Delay, s/veh	16.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	60	306	26	2	169	22	8	184	13	37	193	51
Future Vol, veh/h	60	306	26	2	169	22	8	184	13	37	193	51
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	7	2	4	2	2	12	13	5	2	2	3	8
Mvmt Flow	60	306	26	2	169	22	8	184	13	37	193	51

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	191	0	0	332	0	0	745	634	319	722	636	180
Stage 1	-	-	-	-	-	-	439	439	-	184	184	-
Stage 2	-	-	-	-	-	-	306	195	-	538	452	-
Critical Hdwy	4.17	-	-	4.12	-	-	7.23	6.55	6.22	7.12	6.53	6.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.23	5.55	-	6.12	5.53	-
Follow-up Hdwy	2.263	-	-	2.218	-	-	3.617	4.045	3.318	3.518	4.027	3.372
Pot Cap-1 Maneuver	1353	-	-	1227	-	-	317	393	722	342	394	848
Stage 1	-	-	-	-	-	-	576	573	-	818	746	-
Stage 2	-	-	-	-	-	-	681	734	-	527	569	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1353	-	-	1227	-	-	169	371	722	197	372	848
Mov Cap-2 Maneuver	-	-	-	-	-	-	169	371	-	197	372	-
Stage 1	-	-	-	-	-	-	544	541	-	773	745	-
Stage 2	-	-	-	-	-	-	473	733	-	323	538	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0.1	26.8	40.9
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	365	1353	-	-	1227	-	-	366
HCM Lane V/C Ratio	0.562	0.044	-	-	0.002	-	-	0.768
HCM Control Delay (s)	26.8	7.8	0	-	7.9	0	-	40.9
HCM Lane LOS	D	A	A	-	A	A	-	E
HCM 95th %tile Q(veh)	3.3	0.1	-	-	0	-	-	6.2

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	41	12	5	261	269	18
Future Vol, veh/h	41	12	5	261	269	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	12	5	261	269	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	549	278	287	0	-	0
Stage 1	278	-	-	-	-	-
Stage 2	271	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	497	761	1275	-	-	-
Stage 1	769	-	-	-	-	-
Stage 2	775	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	495	761	1275	-	-	-
Mov Cap-2 Maneuver	495	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	775	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.4	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1275	-	538	-	-
HCM Lane V/C Ratio	0.004	-	0.099	-	-
HCM Control Delay (s)	7.8	0	12.4	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	330	204	25	62	62
Future Vol, veh/h	23	330	204	25	62	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	15	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	330	204	25	62	62

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	229	0	-	0	593	217
Stage 1	-	-	-	-	217	-
Stage 2	-	-	-	-	376	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1339	-	-	-	468	823
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1339	-	-	-	460	823
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	694	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1339	-	-	-	590
HCM Lane V/C Ratio	0.017	-	-	-	0.21
HCM Control Delay (s)	7.7	-	-	-	12.7
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	234	213	53	119	115
Future Vol, veh/h	53	234	213	53	119	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	234	213	53	119	115

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	266	0	-	0	580	240
Stage 1	-	-	-	-	240	-
Stage 2	-	-	-	-	340	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1298	-	-	-	477	799
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	721	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1298	-	-	-	457	799
Mov Cap-2 Maneuver	-	-	-	-	457	-
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	721	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	15.4
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1298	-	-	-	579
HCM Lane V/C Ratio	0.041	-	-	-	0.404
HCM Control Delay (s)	7.9	-	-	-	15.4
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.9

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	296	266	12
Future Vol, veh/h	43	21	6	296	266	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	5	3	2
Mvmt Flow	43	21	6	296	266	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	580	272	278	0	-	0
Stage 1	272	-	-	-	-	-
Stage 2	308	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	477	767	1285	-	-	-
Stage 1	774	-	-	-	-	-
Stage 2	745	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	474	767	1285	-	-	-
Mov Cap-2 Maneuver	474	-	-	-	-	-
Stage 1	769	-	-	-	-	-
Stage 2	745	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.5	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1285	-	542	-	-
HCM Lane V/C Ratio	0.005	-	0.118	-	-
HCM Control Delay (s)	7.8	0	12.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FB2030 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.655	22.1	LOS C	4.2	31.5	0.84	0.98	1.39	40.9
2	T1	All MCs	236	6.0	236	6.0	0.655	21.0	LOS C	4.2	31.5	0.84	0.98	1.39	41.5
3	R2	All MCs	92	13.0	92	13.0	0.655	23.6	LOS C	4.2	31.5	0.84	0.98	1.39	41.2
Approach			346	7.2	346	7.2	0.655	22.4	LOS C	4.2	31.5	0.84	0.98	1.39	41.4
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.576	14.3	LOS B	4.5	32.5	0.78	0.80	1.19	44.6
5	T1	All MCs	265	4.0	265	4.0	0.576	14.2	LOS B	4.5	32.5	0.78	0.80	1.19	45.3
6	R2	All MCs	75	2.0	75	2.0	0.576	13.9	LOS B	4.5	32.5	0.78	0.80	1.19	45.1
Approach			427	3.9	427	3.9	0.576	14.1	LOS B	4.5	32.5	0.78	0.80	1.19	45.2
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.598	12.6	LOS B	5.8	42.7	0.74	0.69	1.09	45.2
8	T1	All MCs	184	7.0	184	7.0	0.598	12.9	LOS B	5.8	42.7	0.74	0.69	1.09	45.9
9	R2	All MCs	222	5.0	222	5.0	0.598	12.7	LOS B	5.8	42.7	0.74	0.69	1.09	45.7
Approach			537	5.4	537	5.4	0.598	12.8	LOS B	5.8	42.7	0.74	0.69	1.09	45.6
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.841	26.9	LOS D	18.1	130.6	1.00	1.30	2.30	38.5
11	T1	All MCs	401	3.0	401	3.0	0.841	26.8	LOS D	18.1	130.6	1.00	1.30	2.30	39.0
12	R2	All MCs	33	3.0	33	3.0	0.841	26.8	LOS D	18.1	130.6	1.00	1.30	2.30	38.8
Approach			739	3.4	739	3.4	0.841	26.8	LOS D	18.1	130.6	1.00	1.30	2.30	38.7
All Vehicles			2049	4.7	2049	4.7	0.841	19.7	LOS C	18.1	130.6	0.86	0.98	1.60	42.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	37.1
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	44	131	14	15	196	174	27	234	27	179	272	47
Future Vol, veh/h	44	131	14	15	196	174	27	234	27	179	272	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	131	14	15	196	174	27	234	27	179	272	47
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	17.3	30.8	22	58.1
HCM LOS	C	D	C	F

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	9%	23%	4%	36%
Vol Thru, %	81%	69%	51%	55%
Vol Right, %	9%	7%	45%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	288	189	385	498
LT Vol	27	44	15	179
Through Vol	234	131	196	272
RT Vol	27	14	174	47
Lane Flow Rate	288	189	385	498
Geometry Grp	1	1	1	1
Degree of Util (X)	0.612	0.43	0.773	0.964
Departure Headway (Hd)	7.648	8.187	7.225	7.105
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	472	440	504	513
Service Time	5.676	6.231	5.242	5.105
HCM Lane V/C Ratio	0.61	0.43	0.764	0.971
HCM Control Delay	22	17.3	30.8	58.1
HCM Lane LOS	C	C	D	F
HCM 95th-tile Q	4	2.1	6.9	12.4

Intersection	
Int Delay, s/veh	44.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	59	236	11	2	350	46	16	213	17	23	255	71
Future Vol, veh/h	59	236	11	2	350	46	16	213	17	23	255	71
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	100	100	100	100	100	100	100	100	100	100	100	100
Heavy Vehicles, %	5	2	18	2	2	2	6	2	6	2	2	3
Mvmt Flow	59	236	11	2	350	46	16	213	17	23	255	71

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	396	0	0	247	0	0	900	760	242	852	742	373
Stage 1	-	-	-	-	-	-	360	360	-	377	377	-
Stage 2	-	-	-	-	-	-	540	400	-	475	365	-
Critical Hdwy	4.15	-	-	4.12	-	-	7.16	6.52	6.26	7.12	6.52	6.23
Critical Hdwy Stg 1	-	-	-	-	-	-	6.16	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.16	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.245	-	-	2.218	-	-	3.554	4.018	3.354	3.518	4.018	3.327
Pot Cap-1 Maneuver	1146	-	-	1319	-	-	255	336	787	280	344	671
Stage 1	-	-	-	-	-	-	650	626	-	644	616	-
Stage 2	-	-	-	-	-	-	519	602	-	570	623	-
Platoon blocked, %			-			-						
Mov Cap-1 Maneuver	1146	-	-	1319	-	-	76	315	787	120	323	671
Mov Cap-2 Maneuver	-	-	-	-	-	-	76	315	-	120	323	-
Stage 1	-	-	-	-	-	-	611	588	-	605	615	-
Stage 2	-	-	-	-	-	-	271	601	-	334	586	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.6	0	74.1	112.5
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	271	1146	-	-	1319	-	-	321
HCM Lane V/C Ratio	0.908	0.051	-	-	0.002	-	-	1.087
HCM Control Delay (s)	74.1	8.3	0	-	7.7	0	-	112.5
HCM Lane LOS	F	A	A	-	A	A	-	F
HCM 95th %tile Q(veh)	8.2	0.2	-	-	0	-	-	13.3

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↙			↑	↑	
Traffic Vol, veh/h	29	9	13	305	340	42
Future Vol, veh/h	29	9	13	305	340	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	9	13	305	340	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	692	361	382	0	-	0
Stage 1	361	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	410	684	1176	-	-	-
Stage 1	705	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	405	684	1176	-	-	-
Mov Cap-2 Maneuver	405	-	-	-	-	-
Stage 1	696	-	-	-	-	-
Stage 2	728	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.8	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1176	-	448	-	-
HCM Lane V/C Ratio	0.011	-	0.085	-	-
HCM Control Delay (s)	8.1	0	13.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	54	262	378	59	44	44
Future Vol, veh/h	54	262	378	59	44	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	15	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	262	378	59	44	44

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	437	0	-	0	778	408
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	370	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1123	-	-	-	365	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	699	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1123	-	-	-	347	643
Mov Cap-2 Maneuver	-	-	-	-	347	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	699	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	14.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1123	-	-	-	451
HCM Lane V/C Ratio	0.048	-	-	-	0.195
HCM Control Delay (s)	8.4	-	-	-	14.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	125	231	297	125	85	82
Future Vol, veh/h	125	231	297	125	85	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	231	297	125	85	82

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	422	0	-	0	841	360
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	481	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1137	-	-	-	335	684
Stage 1	-	-	-	-	706	-
Stage 2	-	-	-	-	622	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1137	-	-	-	298	684
Mov Cap-2 Maneuver	-	-	-	-	298	-
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	622	-

Approach	EB	WB	SB
HCM Control Delay, s	3	0	19.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1137	-	-	-	412
HCM Lane V/C Ratio	0.11	-	-	-	0.405
HCM Control Delay (s)	8.6	-	-	-	19.6
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	1.9

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	313	370	43
Future Vol, veh/h	24	12	21	313	370	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	24	12	21	313	370	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	747	392	413	0	-	0
Stage 1	392	-	-	-	-	-
Stage 2	355	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	381	657	1146	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	710	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	373	657	1146	-	-	-
Mov Cap-2 Maneuver	373	-	-	-	-	-
Stage 1	668	-	-	-	-	-
Stage 2	710	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1146	-	436	-	-
HCM Lane V/C Ratio	0.018	-	0.083	-	-
HCM Control Delay (s)	8.2	0	14	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FB2030 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.580	15.8	LOS C	4.0	28.7	0.80	0.85	1.21	44.0
2	T1	All MCs	217	3.0	217	3.0	0.680	16.8	LOS C	4.0	28.7	0.80	0.86	1.21	44.7
3	R2	All MCs	128	6.0	128	6.0	0.580	16.3	LOS C	4.0	28.7	0.80	0.85	1.21	44.3
Approach			375	4.0	375	4.0	0.580	15.9	LOS C	4.0	28.7	0.80	0.85	1.21	44.5
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.883	32.4	LOS D	24.3	175.4	1.00	1.50	2.65	36.8
5	T1	All MCs	551	3.0	551	3.0	0.883	31.9	LOS D	24.3	175.4	1.00	1.50	2.65	37.4
6	R2	All MCs	115	2.0	115	2.0	0.883	31.8	LOS D	24.3	175.4	1.00	1.50	2.65	37.2
Approach			796	3.7	796	3.7	0.883	31.9	LOS D	24.3	175.4	1.00	1.50	2.65	37.3
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.791	28.6	LOS D	8.2	59.5	0.93	1.17	1.90	38.1
8	T1	All MCs	293	2.0	293	2.0	0.791	28.6	LOS D	8.2	59.5	0.93	1.17	1.90	38.6
9	R2	All MCs	144	9.0	144	9.0	0.791	29.8	LOS D	8.2	59.5	0.93	1.17	1.90	38.3
Approach			497	4.0	497	4.0	0.791	28.9	LOS D	8.2	59.5	0.93	1.17	1.90	38.4
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.818	26.3	LOS D	13.9	99.9	0.98	1.24	2.17	39.1
11	T1	All MCs	495	3.0	495	3.0	0.818	26.0	LOS D	13.9	99.9	0.98	1.24	2.17	39.7
12	R2	All MCs	34	3.0	34	3.0	0.818	26.0	LOS D	13.9	99.9	0.98	1.24	2.17	39.5
Approach			662	3.4	662	3.4	0.818	26.1	LOS D	13.9	99.9	0.98	1.24	2.17	39.5
All Vehicles			2330	3.7	2330	3.7	0.883	27.1	LOS D	24.3	175.4	0.95	1.25	2.12	39.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix N

Synchro and Sidra Intersection Worksheets – 2030 Future Background Conditions – Mitigation Measures

CGH TRANSPORTATION

Intersection	
Intersection Delay, s/veh	17.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	164	15	19	146	173	17	232	17	101	259	53
Future Vol, veh/h	38	164	15	19	146	173	17	232	17	101	259	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	164	15	19	146	173	17	232	17	101	259	53
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	15.1	18.7	17.8	17.9
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	18%	6%	100%	0%
Vol Thru, %	87%	76%	43%	0%	83%
Vol Right, %	6%	7%	51%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	266	217	338	101	312
LT Vol	17	38	19	101	0
Through Vol	232	164	146	0	259
RT Vol	17	15	173	0	53
Lane Flow Rate	266	217	338	101	312
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.524	0.421	0.6	0.211	0.601
Departure Headway (Hd)	7.095	6.989	6.395	7.528	6.93
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	505	512	561	476	518
Service Time	5.173	5.07	4.465	5.299	4.7
HCM Lane V/C Ratio	0.527	0.424	0.602	0.212	0.602
HCM Control Delay	17.8	15.1	18.7	12.3	19.7
HCM Lane LOS	C	C	C	B	C
HCM 95th-tile Q	3	2.1	3.9	0.8	3.9

Intersection	
Intersection Delay, s/veh	20.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	131	14	15	196	174	27	234	27	179	272	47
Future Vol, veh/h	44	131	14	15	196	174	27	234	27	179	272	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	131	14	15	196	174	27	234	27	179	272	47
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	15.5	24.5	19.8	19.3
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	23%	4%	100%	0%
Vol Thru, %	81%	69%	51%	0%	85%
Vol Right, %	9%	7%	45%	0%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	288	189	385	179	319
LT Vol	27	44	15	179	0
Through Vol	234	131	196	0	272
RT Vol	27	14	174	0	47
Lane Flow Rate	288	189	385	179	319
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.58	0.397	0.709	0.389	0.63
Departure Headway (Hd)	7.247	7.57	6.738	7.832	7.225
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	501	476	539	462	504
Service Time	5.25	5.594	4.738	5.544	4.925
HCM Lane V/C Ratio	0.575	0.397	0.714	0.387	0.633
HCM Control Delay	19.8	15.5	24.5	15.5	21.4
HCM Lane LOS	C	C	C	C	C
HCM 95th-tile Q	3.6	1.9	5.7	1.8	4.3

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FB2030 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.236	7.2	LOS A	1.1	7.7	0.54	0.40	0.54	55.8
2	T1	All MCs	184	6.0	184	6.0	0.236	6.6	LOS A	1.1	7.7	0.54	0.40	0.54	59.2
3	R2	All MCs	13	2.0	13	2.0	0.236	6.3	LOS A	1.1	7.7	0.54	0.40	0.54	59.3
Approach			205	5.1	205	5.1	0.236	6.6	LOS A	1.1	7.7	0.54	0.40	0.54	59.0
East: Flewellyn															
4	L2	All MCs	2	12.0	2	12.0	0.185	5.7	LOS A	0.9	6.1	0.43	0.27	0.43	57.4
5	T1	All MCs	169	2.0	169	2.0	0.185	5.1	LOS A	0.9	6.1	0.43	0.27	0.43	61.4
6	R2	All MCs	22	2.0	22	2.0	0.185	5.1	LOS A	0.9	6.1	0.43	0.27	0.43	60.8
Approach			193	2.1	193	2.1	0.185	5.1	LOS A	0.9	6.1	0.43	0.27	0.43	61.3
North: Shea															
7	L2	All MCs	37	8.0	37	8.0	0.251	5.7	LOS A	1.3	9.1	0.38	0.21	0.38	57.6
8	T1	All MCs	193	3.0	193	3.0	0.251	5.5	LOS A	1.3	9.1	0.38	0.21	0.38	60.3
9	R2	All MCs	51	2.0	51	2.0	0.251	5.4	LOS A	1.3	9.1	0.38	0.21	0.38	59.9
Approach			281	3.5	281	3.5	0.251	5.5	LOS A	1.3	9.1	0.38	0.21	0.38	59.8
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.369	7.4	LOS A	2.1	14.8	0.49	0.30	0.49	56.3
11	T1	All MCs	306	2.0	306	2.0	0.369	7.1	LOS A	2.1	14.8	0.49	0.30	0.49	58.8
12	R2	All MCs	26	4.0	26	4.0	0.369	7.2	LOS A	2.1	14.8	0.49	0.30	0.49	57.8
Approach			392	2.9	392	2.9	0.369	7.2	LOS A	2.1	14.8	0.49	0.30	0.49	58.3
All Vehicles			1071	3.3	1071	3.3	0.369	6.3	LOS A	2.1	14.8	0.46	0.29	0.46	59.4

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FB2030 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.253	6.4	LOS A	1.2	8.6	0.50	0.34	0.50	57.8
2	T1	All MCs	213	2.0	213	2.0	0.253	6.2	LOS A	1.2	8.6	0.50	0.34	0.50	60.1
3	R2	All MCs	17	6.0	17	6.0	0.253	6.4	LOS A	1.2	8.6	0.50	0.34	0.50	58.6
Approach			246	2.5	246	2.5	0.253	6.2	LOS A	1.2	8.6	0.50	0.34	0.50	59.8
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.395	7.8	LOS A	2.2	15.7	0.55	0.36	0.55	57.6
5	T1	All MCs	350	2.0	350	2.0	0.395	7.8	LOS A	2.2	15.7	0.55	0.36	0.55	58.8
6	R2	All MCs	46	2.0	46	2.0	0.395	7.8	LOS A	2.2	15.7	0.55	0.36	0.55	58.3
Approach			398	2.0	398	2.0	0.395	7.8	LOS A	2.2	15.7	0.55	0.36	0.55	58.8
North: Shea															
7	L2	All MCs	23	3.0	23	3.0	0.376	8.1	LOS A	2.0	14.1	0.59	0.43	0.59	56.9
8	T1	All MCs	255	2.0	255	2.0	0.376	8.1	LOS A	2.0	14.1	0.59	0.43	0.59	58.4
9	R2	All MCs	71	2.0	71	2.0	0.376	8.1	LOS A	2.0	14.1	0.59	0.43	0.59	57.9
Approach			349	2.1	349	2.1	0.376	8.1	LOS A	2.0	14.1	0.59	0.43	0.59	58.2
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.303	6.7	LOS A	1.5	11.1	0.50	0.32	0.50	57.1
11	T1	All MCs	236	2.0	236	2.0	0.303	6.5	LOS A	1.5	11.1	0.50	0.32	0.50	59.1
12	R2	All MCs	11	18.0	11	18.0	0.303	7.6	LOS A	1.5	11.1	0.50	0.32	0.50	55.1
Approach			306	3.2	306	3.2	0.303	6.6	LOS A	1.5	11.1	0.50	0.32	0.50	58.6
All Vehicles			1299	2.4	1299	2.4	0.395	7.3	LOS A	2.2	15.7	0.54	0.37	0.54	58.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix O

Synchro and Sidra Intersection Worksheets – 2035 Future Background Conditions

Intersection	
Intersection Delay, s/veh	18.6
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	164	15	19	156	173	17	240	17	101	269	53
Future Vol, veh/h	38	164	15	19	156	173	17	240	17	101	269	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	164	15	19	156	173	17	240	17	101	269	53
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	15.6	20	18.8	19
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	18%	5%	100%	0%
Vol Thru, %	88%	76%	45%	0%	84%
Vol Right, %	6%	7%	50%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	274	217	348	101	322
LT Vol	17	38	19	101	0
Through Vol	240	164	156	0	269
RT Vol	17	15	173	0	53
Lane Flow Rate	274	217	348	101	322
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.548	0.43	0.628	0.214	0.629
Departure Headway (Hd)	7.203	7.127	6.501	7.627	7.031
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	499	501	553	469	512
Service Time	5.294	5.221	4.582	5.409	4.813
HCM Lane V/C Ratio	0.549	0.433	0.629	0.215	0.629
HCM Control Delay	18.8	15.6	20	12.5	21.1
HCM Lane LOS	C	C	C	B	C
HCM 95th-tile Q	3.3	2.1	4.3	0.8	4.3

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	41	12	5	284	317	18
Future Vol, veh/h	41	12	5	284	317	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	12	5	284	317	18

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	620	326	335	0	-	0
Stage 1	326	-	-	-	-	-
Stage 2	294	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	452	715	1224	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	756	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	450	715	1224	-	-	-
Mov Cap-2 Maneuver	450	-	-	-	-	-
Stage 1	727	-	-	-	-	-
Stage 2	756	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.2	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1224	-	491	-	-
HCM Lane V/C Ratio	0.004	-	0.108	-	-
HCM Control Delay (s)	8	0	13.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	23	330	214	25	62	62
Future Vol, veh/h	23	330	214	25	62	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	15	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	23	330	214	25	62	62

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	239	0	-	0	603	227
Stage 1	-	-	-	-	227	-
Stage 2	-	-	-	-	376	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1328	-	-	-	462	812
Stage 1	-	-	-	-	811	-
Stage 2	-	-	-	-	694	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1328	-	-	-	454	812
Mov Cap-2 Maneuver	-	-	-	-	454	-
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	694	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	12.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1328	-	-	-	582
HCM Lane V/C Ratio	0.017	-	-	-	0.213
HCM Control Delay (s)	7.8	-	-	-	12.9
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.8

Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	53	234	223	53	119	115
Future Vol, veh/h	53	234	223	53	119	115
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	53	234	223	53	119	115

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	276	0	-	0	590	250
Stage 1	-	-	-	-	250	-
Stage 2	-	-	-	-	340	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1287	-	-	-	470	789
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	721	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1287	-	-	-	451	789
Mov Cap-2 Maneuver	-	-	-	-	451	-
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	721	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	15.6
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1287	-	-	-	571
HCM Lane V/C Ratio	0.041	-	-	-	0.41
HCM Control Delay (s)	7.9	-	-	-	15.6
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	2

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	319	314	12
Future Vol, veh/h	43	21	6	319	314	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	5	3	2
Mvmt Flow	43	21	6	319	314	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	651	320	326	0	-	0
Stage 1	320	-	-	-	-	-
Stage 2	331	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	433	721	1234	-	-	-
Stage 1	736	-	-	-	-	-
Stage 2	728	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	430	721	1234	-	-	-
Mov Cap-2 Maneuver	430	-	-	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	728	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1234	-	496	-	-
HCM Lane V/C Ratio	0.005	-	0.129	-	-
HCM Control Delay (s)	7.9	0	13.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FB2035 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.697	24.7	LOS C	4.9	36.2	0.86	1.03	1.51	39.8
2	T1	All MCs	269	6.0	269	6.0	0.697	24.6	LOS C	4.9	36.2	0.86	1.03	1.51	40.4
3	R2	All MCs	92	13.0	92	13.0	0.697	26.2	LOS D	4.9	36.2	0.86	1.03	1.51	40.0
Approach			369	7.0	369	7.0	0.697	24.9	LOS C	4.9	36.2	0.86	1.03	1.51	40.2
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.618	16.0	LOS C	5.2	37.5	0.81	0.87	1.32	43.8
5	T1	All MCs	285	4.0	285	4.0	0.618	15.9	LOS C	5.2	37.5	0.81	0.87	1.32	44.4
6	R2	All MCs	75	2.0	75	2.0	0.618	15.6	LOS C	5.2	37.5	0.81	0.87	1.32	44.2
Approach			447	3.9	447	3.9	0.618	15.9	LOS C	5.2	37.5	0.81	0.87	1.32	44.3
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.667	15.1	LOS C	7.8	57.2	0.81	0.82	1.33	44.0
8	T1	All MCs	232	7.0	232	7.0	0.667	15.4	LOS C	7.8	57.2	0.81	0.82	1.33	44.6
9	R2	All MCs	222	5.0	222	5.0	0.667	15.2	LOS C	7.8	57.2	0.81	0.82	1.33	44.4
Approach			585	5.6	585	5.6	0.667	15.3	LOS C	7.8	57.2	0.81	0.82	1.33	44.4
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.886	34.6	LOS D	21.2	152.4	1.00	1.53	2.74	35.7
11	T1	All MCs	401	3.0	401	3.0	0.886	34.4	LOS D	21.2	152.4	1.00	1.53	2.74	36.1
12	R2	All MCs	33	3.0	33	3.0	0.886	34.4	LOS D	21.2	152.4	1.00	1.53	2.74	35.9
Approach			739	3.4	739	3.4	0.886	34.5	LOS D	21.2	152.4	1.00	1.53	2.74	35.9
All Vehicles			2140	4.7	2140	4.7	0.886	23.7	LOS C	21.2	152.4	0.89	1.11	1.85	40.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FB2035 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.262	7.5	LOS A	1.2	8.7	0.55	0.41	0.55	55.6
2	T1	All MCs	207	6.0	207	6.0	0.262	6.0	LOS A	1.2	8.7	0.55	0.41	0.55	58.9
3	R2	All MCs	13	2.0	13	2.0	0.262	6.7	LOS A	1.2	8.7	0.55	0.41	0.55	59.0
Approach			228	5.1	228	5.1	0.262	6.9	LOS A	1.2	8.7	0.55	0.41	0.55	58.8
East: Flewellyn															
4	L2	All MCs	2	12.0	2	12.0	0.199	6.0	LOS A	0.9	6.6	0.45	0.29	0.45	57.2
5	T1	All MCs	179	2.0	179	2.0	0.199	5.4	LOS A	0.9	6.6	0.45	0.29	0.45	61.1
6	R2	All MCs	22	2.0	22	2.0	0.199	5.4	LOS A	0.9	6.6	0.45	0.29	0.45	60.6
Approach			203	2.1	203	2.1	0.199	5.4	LOS A	0.9	6.6	0.45	0.29	0.45	61.0
North: Shea															
7	L2	All MCs	37	8.0	37	8.0	0.296	6.3	LOS A	1.6	11.3	0.41	0.23	0.41	57.2
8	T1	All MCs	241	3.0	241	3.0	0.296	6.0	LOS A	1.6	11.3	0.41	0.23	0.41	59.8
9	R2	All MCs	51	2.0	51	2.0	0.296	6.0	LOS A	1.6	11.3	0.41	0.23	0.41	59.5
Approach			329	3.4	329	3.4	0.296	6.1	LOS A	1.6	11.3	0.41	0.23	0.41	59.5
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.388	8.0	LOS A	2.2	15.4	0.54	0.36	0.54	55.9
11	T1	All MCs	306	2.0	306	2.0	0.388	7.7	LOS A	2.2	15.4	0.54	0.36	0.54	58.3
12	R2	All MCs	26	4.0	26	4.0	0.388	7.8	LOS A	2.2	15.4	0.54	0.36	0.54	57.3
Approach			392	2.9	392	2.9	0.388	7.7	LOS A	2.2	15.4	0.54	0.36	0.54	57.8
All Vehicles			1152	3.3	1152	3.3	0.388	6.7	LOS A	2.2	15.4	0.49	0.32	0.49	59.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	22.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	142	14	15	196	174	27	245	27	179	281	47
Future Vol, veh/h	44	142	14	15	196	174	27	245	27	179	281	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	142	14	15	196	174	27	245	27	179	281	47
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	16.5	27	21.5	21
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	22%	4%	100%	0%
Vol Thru, %	82%	71%	51%	0%	86%
Vol Right, %	9%	7%	45%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	299	200	385	179	328
LT Vol	27	44	15	179	0
Through Vol	245	142	196	0	281
RT Vol	27	14	174	0	47
Lane Flow Rate	299	200	385	179	328
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.613	0.429	0.739	0.396	0.669
Departure Headway (Hd)	7.377	7.719	6.913	7.959	7.342
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	487	466	527	451	492
Service Time	5.441	5.787	4.913	5.72	5.103
HCM Lane V/C Ratio	0.614	0.429	0.731	0.397	0.667
HCM Control Delay	21.5	16.5	27	15.9	23.8
HCM Lane LOS	C	C	D	C	C
HCM 95th-tile Q	4.1	2.1	6.2	1.9	4.9

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	29	9	13	352	370	42
Future Vol, veh/h	29	9	13	352	370	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	9	13	352	370	42

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	769	391	412	0	-	0
Stage 1	391	-	-	-	-	-
Stage 2	378	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	369	658	1147	-	-	-
Stage 1	683	-	-	-	-	-
Stage 2	693	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	364	658	1147	-	-	-
Mov Cap-2 Maneuver	364	-	-	-	-	-
Stage 1	673	-	-	-	-	-
Stage 2	693	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.8	0.3	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1147	-	407	-	-
HCM Lane V/C Ratio	0.011	-	0.093	-	-
HCM Control Delay (s)	8.2	0	14.8	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	54	273	378	59	44	44
Future Vol, veh/h	54	273	378	59	44	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	15	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	54	273	378	59	44	44

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	437	0	-	0	789	408
Stage 1	-	-	-	-	408	-
Stage 2	-	-	-	-	381	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1123	-	-	-	359	643
Stage 1	-	-	-	-	671	-
Stage 2	-	-	-	-	691	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1123	-	-	-	342	643
Mov Cap-2 Maneuver	-	-	-	-	342	-
Stage 1	-	-	-	-	639	-
Stage 2	-	-	-	-	691	-

Approach	EB	WB	SB
HCM Control Delay, s	1.4	0	15
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1123	-	-	-	447
HCM Lane V/C Ratio	0.048	-	-	-	0.197
HCM Control Delay (s)	8.4	-	-	-	15
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	125	242	297	125	85	82
Future Vol, veh/h	125	242	297	125	85	82
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	30	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	125	242	297	125	85	82

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	422	0	-	0	852	360
Stage 1	-	-	-	-	360	-
Stage 2	-	-	-	-	492	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1137	-	-	-	330	684
Stage 1	-	-	-	-	706	-
Stage 2	-	-	-	-	615	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1137	-	-	-	294	684
Mov Cap-2 Maneuver	-	-	-	-	294	-
Stage 1	-	-	-	-	628	-
Stage 2	-	-	-	-	615	-

Approach	EB	WB	SB
HCM Control Delay, s	2.9	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1137	-	-	-	408
HCM Lane V/C Ratio	0.11	-	-	-	0.409
HCM Control Delay (s)	8.6	-	-	-	19.8
HCM Lane LOS	A	-	-	-	C
HCM 95th %tile Q(veh)	0.4	-	-	-	2

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	360	400	43
Future Vol, veh/h	24	12	21	360	400	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	24	12	21	360	400	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	824	422	443	0	-	0
Stage 1	422	-	-	-	-	-
Stage 2	402	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	343	632	1117	-	-	-
Stage 1	662	-	-	-	-	-
Stage 2	676	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	335	632	1117	-	-	-
Mov Cap-2 Maneuver	335	-	-	-	-	-
Stage 1	646	-	-	-	-	-
Stage 2	676	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1117	-	397	-	-
HCM Lane V/C Ratio	0.019	-	0.091	-	-
HCM Control Delay (s)	8.3	0	15	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FB2035 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.680	20.8	LOS C	5.4	38.9	0.86	0.98	1.46	41.6
2	T1	All MCs	264	3.0	264	3.0	0.680	20.8	LOS C	5.4	38.9	0.86	0.98	1.46	42.2
3	R2	All MCs	128	6.0	128	6.0	0.680	21.3	LOS C	5.4	38.9	0.86	0.98	1.46	41.9
Approach			422	3.9	422	3.9	0.680	20.9	LOS C	5.4	38.9	0.86	0.98	1.46	42.0
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.928	43.2	LOS E	29.1	210.3	1.00	1.82	3.30	33.3
5	T1	All MCs	551	3.0	551	3.0	0.928	42.6	LOS E	29.1	210.3	1.00	1.82	3.30	33.7
6	R2	All MCs	115	2.0	115	2.0	0.928	42.5	LOS E	29.1	210.3	1.00	1.82	3.30	33.6
Approach			796	3.7	796	3.7	0.928	42.7	LOS E	29.1	210.3	1.00	1.82	3.30	33.7
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.837	34.2	LOS D	10.1	73.1	0.96	1.29	2.20	36.0
8	T1	All MCs	323	2.0	323	2.0	0.837	34.2	LOS D	10.1	73.1	0.96	1.29	2.20	36.5
9	R2	All MCs	144	9.0	144	9.0	0.837	35.4	LOS E	10.1	73.1	0.96	1.29	2.20	36.2
Approach			527	3.9	527	3.9	0.837	34.5	LOS D	10.1	73.1	0.96	1.29	2.20	36.4
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.894	37.9	LOS E	19.8	142.7	1.00	1.57	2.86	34.9
11	T1	All MCs	534	3.0	534	3.0	0.894	37.7	LOS E	19.8	142.7	1.00	1.57	2.86	35.3
12	R2	All MCs	34	3.0	34	3.0	0.894	37.7	LOS E	19.8	142.7	1.00	1.57	2.86	35.2
Approach			701	3.4	701	3.4	0.894	37.7	LOS E	19.8	142.7	1.00	1.57	2.86	35.2
All Vehicles			2446	3.7	2446	3.7	0.928	35.8	LOS E	29.1	210.3	0.97	1.49	2.62	35.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FB2035 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.304	7.1	LOS A	1.5	10.9	0.53	0.37	0.53	57.2
2	T1	All MCs	260	2.0	260	2.0	0.304	6.8	LOS A	1.5	10.9	0.53	0.37	0.53	60.6
3	R2	All MCs	17	6.0	17	6.0	0.304	7.1	LOS A	1.5	10.9	0.53	0.37	0.53	58.0
Approach			293	2.5	293	2.5	0.304	6.9	LOS A	1.5	10.9	0.53	0.37	0.53	59.3
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.414	8.4	LOS A	2.3	16.4	0.59	0.41	0.59	57.0
5	T1	All MCs	350	2.0	350	2.0	0.414	8.4	LOS A	2.3	16.4	0.59	0.41	0.59	58.3
6	R2	All MCs	46	2.0	46	2.0	0.414	8.4	LOS A	2.3	16.4	0.59	0.41	0.59	57.8
Approach			398	2.0	398	2.0	0.414	8.4	LOS A	2.3	16.4	0.59	0.41	0.59	58.2
North: Shea															
7	L2	All MCs	23	3.0	23	3.0	0.408	8.6	LOS A	2.2	15.7	0.61	0.44	0.61	56.5
8	T1	All MCs	285	2.0	285	2.0	0.408	8.5	LOS A	2.2	15.7	0.61	0.44	0.61	57.9
9	R2	All MCs	71	2.0	71	2.0	0.408	8.5	LOS A	2.2	15.7	0.61	0.44	0.61	57.4
Approach			379	2.1	379	2.1	0.408	8.5	LOS A	2.2	15.7	0.61	0.44	0.61	57.7
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.324	7.2	LOS A	1.7	11.9	0.53	0.36	0.53	56.8
11	T1	All MCs	247	2.0	247	2.0	0.324	7.0	LOS A	1.7	11.9	0.53	0.36	0.53	58.8
12	R2	All MCs	11	18.0	11	18.0	0.324	8.1	LOS A	1.7	11.9	0.53	0.36	0.53	54.7
Approach			317	3.1	317	3.1	0.324	7.0	LOS A	1.7	11.9	0.53	0.36	0.53	58.2
All Vehicles			1387	2.4	1387	2.4	0.414	7.8	LOS A	2.3	16.4	0.57	0.40	0.57	58.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix P

Synchro and Sidra Intersection Worksheets – 2030 Future Total Conditions

Intersection	
Intersection Delay, s/veh	20.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	166	15	22	151	209	17	232	18	117	259	53
Future Vol, veh/h	38	166	15	22	151	209	17	232	18	117	259	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	166	15	22	151	209	17	232	18	117	259	53
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	16.2	23.7	19.5	19.4
HCM LOS	C	C	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	17%	6%	100%	0%
Vol Thru, %	87%	76%	40%	0%	83%
Vol Right, %	7%	7%	55%	0%	17%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	267	219	382	117	312
LT Vol	17	38	22	117	0
Through Vol	232	166	151	0	259
RT Vol	18	15	209	0	53
Lane Flow Rate	267	219	382	117	312
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.554	0.447	0.701	0.256	0.631
Departure Headway (Hd)	7.472	7.347	6.61	7.883	7.282
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	483	491	550	457	496
Service Time	5.526	5.402	4.628	5.606	5.005
HCM Lane V/C Ratio	0.553	0.446	0.695	0.256	0.629
HCM Control Delay	19.5	16.2	23.7	13.3	21.7
HCM Lane LOS	C	C	C	B	C
HCM 95th-tile Q	3.3	2.3	5.5	1	4.3

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	15	6	261	269	23
Future Vol, veh/h	51	15	6	261	269	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	15	6	261	269	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	554	281	292	0	-	0
Stage 1	281	-	-	-	-	-
Stage 2	273	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	493	758	1270	-	-	-
Stage 1	767	-	-	-	-	-
Stage 2	773	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	490	758	1270	-	-	-
Mov Cap-2 Maneuver	490	-	-	-	-	-
Stage 1	762	-	-	-	-	-
Stage 2	773	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1270	-	533	-	-
HCM Lane V/C Ratio	0.005	-	0.124	-	-
HCM Control Delay (s)	7.8	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection						
Int Delay, s/veh	3					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	360	218	31	78	78
Future Vol, veh/h	29	360	218	31	78	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	360	218	31	78	78

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	249	0	-	0	652	234
Stage 1	-	-	-	-	234	-
Stage 2	-	-	-	-	418	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1317	-	-	-	433	805
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	664	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1317	-	-	-	421	805
Mov Cap-2 Maneuver	-	-	-	-	421	-
Stage 1	-	-	-	-	782	-
Stage 2	-	-	-	-	664	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	14
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1317	-	-	-	553
HCM Lane V/C Ratio	0.022	-	-	-	0.282
HCM Control Delay (s)	7.8	0	-	-	14
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2

Intersection						
Int Delay, s/veh	7					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	67	240	229	67	149	144
Future Vol, veh/h	67	240	229	67	149	144
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	240	229	67	149	144

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	296	0	-	0	637	263
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	374	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1265	-	-	-	441	776
Stage 1	-	-	-	-	781	-
Stage 2	-	-	-	-	696	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1265	-	-	-	414	776
Mov Cap-2 Maneuver	-	-	-	-	414	-
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	696	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	19.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1265	-	-	-	537
HCM Lane V/C Ratio	0.053	-	-	-	0.546
HCM Control Delay (s)	8	0	-	-	19.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	3.3

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	306	271	12
Future Vol, veh/h	43	21	6	306	271	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	5	3	2
Mvmt Flow	43	21	6	306	271	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	595	277	283	0	-	0
Stage 1	277	-	-	-	-	-
Stage 2	318	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	467	762	1279	-	-	-
Stage 1	770	-	-	-	-	-
Stage 2	738	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	464	762	1279	-	-	-
Mov Cap-2 Maneuver	464	-	-	-	-	-
Stage 1	765	-	-	-	-	-
Stage 2	738	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1279	-	532	-	-
HCM Lane V/C Ratio	0.005	-	0.12	-	-
HCM Control Delay (s)	7.8	0	12.7	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FT2030 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.673	23.2	LOS C	4.5	33.5	0.85	1.00	1.44	40.4
2	T1	All MCs	246	6.0	246	6.0	0.673	23.0	LOS C	4.5	33.5	0.85	1.00	1.44	41.0
3	R2	All MCs	92	13.0	92	13.0	0.673	24.6	LOS C	4.5	33.5	0.85	1.00	1.44	40.7
Approach			356	7.1	356	7.1	0.673	23.4	LOS C	4.5	33.5	0.85	1.00	1.44	40.9
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.582	14.6	LOS B	4.6	33.1	0.78	0.82	1.21	44.5
5	T1	All MCs	265	4.0	265	4.0	0.582	14.5	LOS B	4.6	33.1	0.78	0.82	1.21	45.2
6	R2	All MCs	75	2.0	75	2.0	0.582	14.2	LOS B	4.6	33.1	0.78	0.82	1.21	44.9
Approach			427	3.9	427	3.9	0.582	14.5	LOS B	4.6	33.1	0.78	0.82	1.21	45.0
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.604	12.8	LOS B	6.0	43.8	0.75	0.70	1.10	45.2
8	T1	All MCs	189	7.0	189	7.0	0.604	13.1	LOS B	6.0	43.8	0.75	0.70	1.10	45.8
9	R2	All MCs	222	5.0	222	5.0	0.604	12.9	LOS B	6.0	43.8	0.75	0.70	1.10	45.6
Approach			542	5.5	542	5.5	0.604	12.9	LOS B	6.0	43.8	0.75	0.70	1.10	45.6
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.845	27.5	LOS D	18.4	132.5	1.00	1.32	2.34	38.2
11	T1	All MCs	401	3.0	401	3.0	0.845	27.4	LOS D	18.4	132.5	1.00	1.32	2.34	38.7
12	R2	All MCs	33	3.0	33	3.0	0.845	27.4	LOS D	18.4	132.5	1.00	1.32	2.34	38.5
Approach			739	3.4	739	3.4	0.845	27.5	LOS D	18.4	132.5	1.00	1.32	2.34	38.5
All Vehicles			2064	4.7	2064	4.7	0.845	20.3	LOS C	18.4	132.5	0.86	1.00	1.63	41.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FT2030 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.248	7.7	LOS A	1.1	8.0	0.57	0.44	0.57	55.5
2	T1	All MCs	184	6.0	184	6.0	0.248	7.0	LOS A	1.1	8.0	0.57	0.44	0.57	58.7
3	R2	All MCs	13	2.0	13	2.0	0.248	6.8	LOS A	1.1	8.0	0.57	0.44	0.57	58.9
Approach			205	5.1	205	5.1	0.248	7.0	LOS A	1.1	8.0	0.57	0.44	0.57	58.6
East: Flewellyn															
4	L2	All MCs	2	12.0	2	12.0	0.205	5.9	LOS A	1.0	6.9	0.44	0.28	0.44	57.2
5	T1	All MCs	189	2.0	189	2.0	0.205	5.3	LOS A	1.0	6.9	0.44	0.28	0.44	61.2
6	R2	All MCs	23	2.0	23	2.0	0.205	5.3	LOS A	1.0	6.9	0.44	0.28	0.44	60.6
Approach			214	2.1	214	2.1	0.205	5.4	LOS A	1.0	6.9	0.44	0.28	0.44	61.1
North: Shea															
7	L2	All MCs	40	8.0	40	8.0	0.259	5.9	LOS A	1.3	9.4	0.41	0.24	0.41	57.4
8	T1	All MCs	193	3.0	193	3.0	0.259	5.7	LOS A	1.3	9.4	0.41	0.24	0.41	60.0
9	R2	All MCs	51	2.0	51	2.0	0.259	5.6	LOS A	1.3	9.4	0.41	0.24	0.41	59.7
Approach			284	3.5	284	3.5	0.259	5.7	LOS A	1.3	9.4	0.41	0.24	0.41	59.6
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.413	8.1	LOS A	2.4	17.4	0.52	0.32	0.52	55.8
11	T1	All MCs	352	2.0	352	2.0	0.413	7.8	LOS A	2.4	17.4	0.52	0.32	0.52	58.3
12	R2	All MCs	26	4.0	26	4.0	0.413	7.9	LOS A	2.4	17.4	0.52	0.32	0.52	57.3
Approach			438	2.8	438	2.8	0.413	7.8	LOS A	2.4	17.4	0.52	0.32	0.52	57.9
All Vehicles			1141	3.3	1141	3.3	0.413	6.7	LOS A	2.4	17.4	0.49	0.31	0.49	59.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	24.1
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↱	
Traffic Vol, veh/h	44	136	14	17	200	200	27	234	30	216	272	47
Future Vol, veh/h	44	136	14	17	200	200	27	234	30	216	272	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	136	14	17	200	200	27	234	30	216	272	47
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	16.7	32.5	21.8	21.5
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	23%	4%	100%	0%
Vol Thru, %	80%	70%	48%	0%	85%
Vol Right, %	10%	7%	48%	0%	15%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	291	194	417	216	319
LT Vol	27	44	17	216	0
Through Vol	234	136	200	0	272
RT Vol	30	14	200	0	47
Lane Flow Rate	291	194	417	216	319
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.61	0.425	0.803	0.485	0.661
Departure Headway (Hd)	7.551	7.894	6.933	8.085	7.465
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	477	456	525	445	482
Service Time	5.618	5.964	4.933	5.847	5.227
HCM Lane V/C Ratio	0.61	0.425	0.794	0.485	0.662
HCM Control Delay	21.8	16.7	32.5	18.3	23.7
HCM Lane LOS	C	C	D	C	C
HCM 95th-tile Q	4	2.1	7.7	2.6	4.7

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	36	11	16	305	340	53
Future Vol, veh/h	36	11	16	305	340	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	11	16	305	340	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	704	367	393	0	-	0
Stage 1	367	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	403	678	1166	-	-	-
Stage 1	701	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	396	678	1166	-	-	-
Mov Cap-2 Maneuver	396	-	-	-	-	-
Stage 1	689	-	-	-	-	-
Stage 2	723	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.2	0.4	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1166	-	439	-	-
HCM Lane V/C Ratio	0.014	-	0.107	-	-
HCM Control Delay (s)	8.1	0	14.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	68	283	410	74	55	55
Future Vol, veh/h	68	283	410	74	55	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	283	410	74	55	55

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	484	0	-	0	866	447
Stage 1	-	-	-	-	447	-
Stage 2	-	-	-	-	419	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1079	-	-	-	324	612
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	664	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1079	-	-	-	300	612
Mov Cap-2 Maneuver	-	-	-	-	300	-
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	664	-

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	17.3
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1079	-	-	-	403
HCM Lane V/C Ratio	0.063	-	-	-	0.273
HCM Control Delay (s)	8.6	0	-	-	17.3
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	157	245	308	157	106	103
Future Vol, veh/h	157	245	308	157	106	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	157	245	308	157	106	103

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	465	0	-	0	946	387
Stage 1	-	-	-	-	387	-
Stage 2	-	-	-	-	559	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1096	-	-	-	290	661
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	572	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1096	-	-	-	242	661
Mov Cap-2 Maneuver	-	-	-	-	242	-
Stage 1	-	-	-	-	572	-
Stage 2	-	-	-	-	572	-

Approach	EB	WB	SB
HCM Control Delay, s	3.4	0	29.1
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1096	-	-	-	352
HCM Lane V/C Ratio	0.143	-	-	-	0.594
HCM Control Delay (s)	8.8	0	-	-	29.1
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.5	-	-	-	3.6

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	320	381	43
Future Vol, veh/h	24	12	21	320	381	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	24	12	21	320	381	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	765	403	424	0	-	0
Stage 1	403	-	-	-	-	-
Stage 2	362	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	371	647	1135	-	-	-
Stage 1	675	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	362	647	1135	-	-	-
Mov Cap-2 Maneuver	362	-	-	-	-	-
Stage 1	659	-	-	-	-	-
Stage 2	704	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	14.3	0.5	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1135	-	424	-	-
HCM Lane V/C Ratio	0.019	-	0.085	-	-
HCM Control Delay (s)	8.2	0	14.3	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FT2030 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.592	16.2	LOS C	4.1	29.8	0.80	0.86	1.23	43.8
2	T1	All MCs	217	3.0	217	3.0	0.592	16.2	LOS C	4.1	29.8	0.80	0.86	1.23	44.4
3	R2	All MCs	135	6.0	135	6.0	0.592	16.6	LOS C	4.1	29.8	0.80	0.86	1.23	44.1
Approach			382	4.1	382	4.1	0.592	16.3	LOS C	4.1	29.8	0.80	0.86	1.23	44.3
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.883	32.4	LOS D	24.3	175.3	1.00	1.50	2.65	36.8
5	T1	All MCs	551	3.0	551	3.0	0.883	31.9	LOS D	24.3	175.3	1.00	1.50	2.65	37.4
6	R2	All MCs	115	2.0	115	2.0	0.883	31.8	LOS D	24.3	175.3	1.00	1.50	2.65	37.2
Approach			796	3.7	796	3.7	0.883	31.9	LOS D	24.3	175.3	1.00	1.50	2.65	37.3
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.808	30.4	LOS D	8.8	64.0	0.94	1.21	2.00	37.4
8	T1	All MCs	304	2.0	304	2.0	0.808	30.4	LOS D	8.8	64.0	0.94	1.21	2.00	37.9
9	R2	All MCs	144	9.0	144	9.0	0.808	31.7	LOS D	8.8	64.0	0.94	1.21	2.00	37.6
Approach			508	4.0	508	4.0	0.808	30.8	LOS D	8.8	64.0	0.94	1.21	2.00	37.7
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.827	27.6	LOS D	14.3	102.7	0.99	1.27	2.24	38.6
11	T1	All MCs	495	3.0	495	3.0	0.827	27.3	LOS D	14.3	102.7	0.99	1.27	2.24	39.1
12	R2	All MCs	34	3.0	34	3.0	0.827	27.3	LOS D	14.3	102.7	0.99	1.27	2.24	38.9
Approach			662	3.4	662	3.4	0.827	27.4	LOS D	14.3	102.7	0.99	1.27	2.24	39.0
All Vehicles			2348	3.7	2348	3.7	0.883	27.9	LOS D	24.3	175.3	0.95	1.27	2.16	38.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FT2030 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.262	6.7	LOS A	1.2	8.9	0.53	0.37	0.53	57.5
2	T1	All MCs	213	2.0	213	2.0	0.262	6.4	LOS A	1.2	8.9	0.53	0.37	0.53	60.8
3	R2	All MCs	17	6.0	17	6.0	0.262	6.7	LOS A	1.2	8.9	0.53	0.37	0.53	58.3
Approach			246	2.5	246	2.5	0.262	6.5	LOS A	1.2	8.9	0.53	0.37	0.53	59.5
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.444	8.6	LOS A	2.6	18.6	0.58	0.38	0.58	56.9
5	T1	All MCs	397	2.0	397	2.0	0.444	8.6	LOS A	2.6	18.6	0.58	0.38	0.58	58.1
6	R2	All MCs	49	2.0	49	2.0	0.444	8.6	LOS A	2.6	18.6	0.58	0.38	0.58	57.6
Approach			448	2.0	448	2.0	0.444	8.6	LOS A	2.6	18.6	0.58	0.38	0.58	58.1
North: Shea															
7	L2	All MCs	25	3.0	25	3.0	0.397	8.8	LOS A	2.1	14.8	0.62	0.47	0.63	56.3
8	T1	All MCs	255	2.0	255	2.0	0.397	8.7	LOS A	2.1	14.8	0.62	0.47	0.63	57.7
9	R2	All MCs	71	2.0	71	2.0	0.397	8.7	LOS A	2.1	14.8	0.62	0.47	0.63	57.3
Approach			351	2.1	351	2.1	0.397	8.7	LOS A	2.1	14.8	0.62	0.47	0.63	57.5
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.336	7.1	LOS A	1.8	12.7	0.51	0.34	0.51	56.8
11	T1	All MCs	269	2.0	269	2.0	0.336	7.0	LOS A	1.8	12.7	0.51	0.34	0.51	58.8
12	R2	All MCs	11	18.0	11	18.0	0.336	8.0	LOS A	1.8	12.7	0.51	0.34	0.51	54.8
Approach			339	3.0	339	3.0	0.336	7.0	LOS A	1.8	12.7	0.51	0.34	0.51	58.3
All Vehicles			1384	2.4	1384	2.4	0.444	7.9	LOS A	2.6	18.6	0.57	0.39	0.57	58.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix Q

Synchro and Sidra Intersection Worksheets – 2035 Future Total Conditions

Intersection	
Intersection Delay, s/veh	21.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	166	15	22	161	209	17	240	18	117	269	53
Future Vol, veh/h	38	166	15	22	161	209	17	240	18	117	269	53
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	4	2	2	2	3	18	10	2	3	5	2
Mvmt Flow	38	166	15	22	161	209	17	240	18	117	269	53
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	16.8	26.2	20.8	20.8
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	6%	17%	6%	100%	0%
Vol Thru, %	87%	76%	41%	0%	84%
Vol Right, %	7%	7%	53%	0%	16%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	275	219	392	117	322
LT Vol	17	38	22	117	0
Through Vol	240	166	161	0	269
RT Vol	18	15	209	0	53
Lane Flow Rate	275	219	392	117	322
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.581	0.457	0.735	0.259	0.66
Departure Headway (Hd)	7.602	7.511	6.753	7.979	7.381
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	473	477	537	449	489
Service Time	5.666	5.577	4.753	5.738	5.14
HCM Lane V/C Ratio	0.581	0.459	0.73	0.261	0.658
HCM Control Delay	20.8	16.8	26.2	13.5	23.4
HCM Lane LOS	C	C	D	B	C
HCM 95th-tile Q	3.6	2.4	6.2	1	4.7

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	51	15	6	284	317	23
Future Vol, veh/h	51	15	6	284	317	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	51	15	6	284	317	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	625	329	340	0	-	0
Stage 1	329	-	-	-	-	-
Stage 2	296	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	449	712	1219	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	755	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	446	712	1219	-	-	-
Mov Cap-2 Maneuver	446	-	-	-	-	-
Stage 1	725	-	-	-	-	-
Stage 2	755	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.2	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1219	-	487	-	-
HCM Lane V/C Ratio	0.005	-	0.136	-	-
HCM Control Delay (s)	8	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.5	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	29	360	228	31	78	78
Future Vol, veh/h	29	360	228	31	78	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	360	228	31	78	78

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	259	0	-	0	662	244
Stage 1	-	-	-	-	244	-
Stage 2	-	-	-	-	418	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1306	-	-	-	427	795
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	664	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1306	-	-	-	415	795
Mov Cap-2 Maneuver	-	-	-	-	415	-
Stage 1	-	-	-	-	775	-
Stage 2	-	-	-	-	664	-

Approach	EB	WB	SB
HCM Control Delay, s	0.6	0	14.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1306	-	-	-	545
HCM Lane V/C Ratio	0.022	-	-	-	0.286
HCM Control Delay (s)	7.8	0	-	-	14.2
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	1.2

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	67	240	239	67	149	144
Future Vol, veh/h	67	240	239	67	149	144
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	67	240	239	67	149	144

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	306	0	-	0	647	273
Stage 1	-	-	-	-	273	-
Stage 2	-	-	-	-	374	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1255	-	-	-	436	766
Stage 1	-	-	-	-	773	-
Stage 2	-	-	-	-	696	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1255	-	-	-	409	766
Mov Cap-2 Maneuver	-	-	-	-	409	-
Stage 1	-	-	-	-	725	-
Stage 2	-	-	-	-	696	-

Approach	EB	WB	SB
HCM Control Delay, s	1.8	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1255	-	-	-	531
HCM Lane V/C Ratio	0.053	-	-	-	0.552
HCM Control Delay (s)	8	0	-	-	19.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	3.3

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	43	21	6	329	319	12
Future Vol, veh/h	43	21	6	329	319	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	5	3	2
Mvmt Flow	43	21	6	329	319	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	666	325	331	0	-	0
Stage 1	325	-	-	-	-	-
Stage 2	341	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	425	716	1228	-	-	-
Stage 1	732	-	-	-	-	-
Stage 2	720	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	422	716	1228	-	-	-
Mov Cap-2 Maneuver	422	-	-	-	-	-
Stage 1	728	-	-	-	-	-
Stage 2	720	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1228	-	488	-	-
HCM Lane V/C Ratio	0.005	-	0.131	-	-
HCM Control Delay (s)	7.9	0	13.5	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FT2035 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	18	6.0	18	6.0	0.715	26.0	LOS D	5.2	38.5	0.87	1.05	1.57	39.2
2	T1	All MCs	269	6.0	269	6.0	0.715	26.8	LOS D	5.2	38.5	0.87	1.05	1.57	39.8
3	R2	All MCs	92	13.0	92	13.0	0.715	27.5	LOS D	5.2	38.5	0.87	1.05	1.57	39.5
Approach			379	7.0	379	7.0	0.715	26.2	LOS D	5.2	38.5	0.87	1.05	1.57	39.7
East: Fernbank															
4	L2	All MCs	87	5.0	87	5.0	0.625	16.4	LOS C	5.3	38.1	0.82	0.88	1.34	43.6
5	T1	All MCs	285	4.0	285	4.0	0.625	16.3	LOS C	5.3	38.1	0.82	0.88	1.34	44.2
6	R2	All MCs	75	2.0	75	2.0	0.625	16.0	LOS C	5.3	38.1	0.82	0.88	1.34	44.0
Approach			447	3.9	447	3.9	0.625	16.2	LOS C	5.3	38.1	0.82	0.88	1.34	44.1
North: Shea															
7	L2	All MCs	131	4.0	131	4.0	0.672	15.4	LOS C	8.0	58.7	0.82	0.83	1.35	43.8
8	T1	All MCs	237	7.0	237	7.0	0.672	15.6	LOS C	8.0	58.7	0.82	0.83	1.35	44.5
9	R2	All MCs	222	5.0	222	5.0	0.672	15.5	LOS C	8.0	58.7	0.82	0.83	1.35	44.2
Approach			590	5.6	590	5.6	0.672	15.5	LOS C	8.0	58.7	0.82	0.83	1.35	44.2
West: Fernbank															
10	L2	All MCs	305	4.0	305	4.0	0.890	35.6	LOS E	21.6	155.3	1.00	1.56	2.80	35.3
11	T1	All MCs	401	3.0	401	3.0	0.890	35.5	LOS E	21.6	155.3	1.00	1.56	2.80	35.8
12	R2	All MCs	33	3.0	33	3.0	0.890	35.5	LOS E	21.6	155.3	1.00	1.56	2.80	35.6
Approach			739	3.4	739	3.4	0.890	35.5	LOS E	21.6	155.3	1.00	1.56	2.80	35.6
All Vehicles			2155	4.7	2155	4.7	0.890	24.4	LOS C	21.6	155.3	0.89	1.13	1.88	40.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FT2035 AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	8	13.0	8	13.0	0.276	8.1	LOS A	1.2	9.1	0.58	0.45	0.58	55.2
2	T1	All MCs	207	6.0	207	6.0	0.276	7.4	LOS A	1.2	9.1	0.58	0.45	0.58	58.4
3	R2	All MCs	13	2.0	13	2.0	0.276	7.1	LOS A	1.2	9.1	0.58	0.45	0.58	58.6
Approach			228	5.1	228	5.1	0.276	7.4	LOS A	1.2	9.1	0.58	0.45	0.58	58.3
East: Flewellyn															
4	L2	All MCs	2	12.0	2	12.0	0.220	6.2	LOS A	1.0	7.4	0.46	0.30	0.46	57.0
5	T1	All MCs	199	2.0	199	2.0	0.220	5.6	LOS A	1.0	7.4	0.46	0.30	0.46	60.9
6	R2	All MCs	23	2.0	23	2.0	0.220	5.6	LOS A	1.0	7.4	0.46	0.30	0.46	60.4
Approach			224	2.1	224	2.1	0.220	5.6	LOS A	1.0	7.4	0.46	0.30	0.46	60.8
North: Shea															
7	L2	All MCs	40	8.0	40	8.0	0.306	6.5	LOS A	1.6	11.6	0.44	0.26	0.44	57.0
8	T1	All MCs	241	3.0	241	3.0	0.306	6.2	LOS A	1.6	11.6	0.44	0.26	0.44	59.6
9	R2	All MCs	51	2.0	51	2.0	0.306	6.2	LOS A	1.6	11.6	0.44	0.26	0.44	59.3
Approach			332	3.4	332	3.4	0.306	6.3	LOS A	1.6	11.6	0.44	0.26	0.44	59.2
West: Flewellyn															
10	L2	All MCs	60	7.0	60	7.0	0.435	8.7	LOS A	2.5	18.1	0.57	0.38	0.57	55.3
11	T1	All MCs	352	2.0	352	2.0	0.435	8.4	LOS A	2.5	18.1	0.57	0.38	0.57	57.7
12	R2	All MCs	26	4.0	26	4.0	0.435	8.5	LOS A	2.5	18.1	0.57	0.38	0.57	56.8
Approach			438	2.8	438	2.8	0.435	8.4	LOS A	2.5	18.1	0.57	0.38	0.57	57.3
All Vehicles			1222	3.3	1222	3.3	0.435	7.1	LOS A	2.5	18.1	0.52	0.34	0.52	58.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Intersection	
Intersection Delay, s/veh	25.8
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕		↰	↱	
Traffic Vol, veh/h	44	147	14	17	200	200	27	245	30	216	281	47
Future Vol, veh/h	44	147	14	17	200	200	27	245	30	216	281	47
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	2	2	7	2	2	2	4	2	7	2	2	2
Mvmt Flow	44	147	14	17	200	200	27	245	30	216	281	47
Number of Lanes	0	1	0	0	1	0	0	1	0	1	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	2	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	2	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	2	1	1
HCM Control Delay	17.8	34.6	23.9	23.1
HCM LOS	C	D	C	C

Lane	NBLn1	EBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	9%	21%	4%	100%	0%
Vol Thru, %	81%	72%	48%	0%	86%
Vol Right, %	10%	7%	48%	0%	14%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	302	205	417	216	328
LT Vol	27	44	17	216	0
Through Vol	245	147	200	0	281
RT Vol	30	14	200	0	47
Lane Flow Rate	302	205	417	216	328
Geometry Grp	4a	2	2	5	5
Degree of Util (X)	0.646	0.459	0.817	0.494	0.694
Departure Headway (Hd)	7.704	8.053	7.055	8.237	7.618
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	468	447	513	436	472
Service Time	5.77	6.125	5.11	6	5.381
HCM Lane V/C Ratio	0.645	0.459	0.813	0.495	0.695
HCM Control Delay	23.9	17.8	34.6	18.8	26
HCM Lane LOS	C	C	D	C	D
HCM 95th-tile Q	4.5	2.4	7.9	2.7	5.3

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	36	11	16	352	370	53
Future Vol, veh/h	36	11	16	352	370	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	36	11	16	352	370	53

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	781	397	423	0	-	0
Stage 1	397	-	-	-	-	-
Stage 2	384	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	363	652	1136	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	356	652	1136	-	-	-
Mov Cap-2 Maneuver	356	-	-	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	688	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.3	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1136	-	398	-	-
HCM Lane V/C Ratio	0.014	-	0.118	-	-
HCM Control Delay (s)	8.2	0	15.3	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0	-	0.4	-	-

Intersection	
Int Delay, s/veh	2.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	68	294	410	74	55	55
Future Vol, veh/h	68	294	410	74	55	55
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	68	294	410	74	55	55

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	484	0	-	0	877	447
Stage 1	-	-	-	-	447	-
Stage 2	-	-	-	-	430	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1079	-	-	-	319	612
Stage 1	-	-	-	-	644	-
Stage 2	-	-	-	-	656	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1079	-	-	-	295	612
Mov Cap-2 Maneuver	-	-	-	-	295	-
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	656	-

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	17.5
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1079	-	-	-	398
HCM Lane V/C Ratio	0.063	-	-	-	0.276
HCM Control Delay (s)	8.6	0	-	-	17.5
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.2	-	-	-	1.1

Intersection	
Int Delay, s/veh	7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	157	256	308	157	106	103
Future Vol, veh/h	157	256	308	157	106	103
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	157	256	308	157	106	103

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	465	0	-	0	957	387
Stage 1	-	-	-	-	387	-
Stage 2	-	-	-	-	570	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1096	-	-	-	286	661
Stage 1	-	-	-	-	686	-
Stage 2	-	-	-	-	566	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	1096	-	-	-	238	661
Mov Cap-2 Maneuver	-	-	-	-	238	-
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	566	-

Approach	EB	WB	SB
HCM Control Delay, s	3.4	0	29.7
HCM LOS			D

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1096	-	-	-	348
HCM Lane V/C Ratio	0.143	-	-	-	0.601
HCM Control Delay (s)	8.8	0	-	-	29.7
HCM Lane LOS	A	A	-	-	D
HCM 95th %tile Q(veh)	0.5	-	-	-	3.7

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	12	21	367	411	43
Future Vol, veh/h	24	12	21	367	411	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	2	2	2	3	2	2
Mvmt Flow	24	12	21	367	411	43

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	842	433	454	0	-	0
Stage 1	433	-	-	-	-	-
Stage 2	409	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	334	623	1107	-	-	-
Stage 1	654	-	-	-	-	-
Stage 2	671	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	326	623	1107	-	-	-
Mov Cap-2 Maneuver	326	-	-	-	-	-
Stage 1	638	-	-	-	-	-
Stage 2	671	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.2	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1107	-	388	-	-
HCM Lane V/C Ratio	0.019	-	0.093	-	-
HCM Control Delay (s)	8.3	0	15.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

MOVEMENT SUMMARY

Site: 101 [Fernbank at Shea FT2035 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	30	3.0	30	3.0	0.692	21.4	LOS C	5.6	40.5	0.86	1.00	1.49	41.3
2	T1	All MCs	264	3.0	264	3.0	0.692	21.4	LOS C	5.6	40.5	0.86	1.00	1.49	41.9
3	R2	All MCs	135	6.0	135	6.0	0.692	21.9	LOS C	5.6	40.5	0.86	1.00	1.49	41.6
Approach			429	3.9	429	3.9	0.692	21.6	LOS C	5.6	40.5	0.86	1.00	1.49	41.7
East: Fernbank															
4	L2	All MCs	130	8.0	130	8.0	0.928	43.2	LOS E	29.1	210.3	1.00	1.82	3.30	33.3
5	T1	All MCs	551	3.0	551	3.0	0.928	42.6	LOS E	29.1	210.3	1.00	1.82	3.30	33.7
6	R2	All MCs	115	2.0	115	2.0	0.928	42.5	LOS E	29.1	210.3	1.00	1.82	3.30	33.6
Approach			796	3.7	796	3.7	0.928	42.7	LOS E	29.1	210.3	1.00	1.82	3.30	33.7
North: Shea															
7	L2	All MCs	60	2.0	60	2.0	0.854	36.8	LOS E	11.0	79.3	0.98	1.34	2.34	35.2
8	T1	All MCs	334	2.0	334	2.0	0.854	36.8	LOS E	11.0	79.3	0.98	1.34	2.34	35.6
9	R2	All MCs	144	9.0	144	9.0	0.854	38.0	LOS E	11.0	79.3	0.98	1.34	2.34	35.3
Approach			538	3.9	538	3.9	0.854	37.1	LOS E	11.0	79.3	0.98	1.34	2.34	35.5
West: Fernbank															
10	L2	All MCs	133	5.0	133	5.0	0.904	40.4	LOS E	20.7	148.8	1.00	1.63	2.99	34.1
11	T1	All MCs	534	3.0	534	3.0	0.904	40.2	LOS E	20.7	148.8	1.00	1.63	2.99	34.5
12	R2	All MCs	34	3.0	34	3.0	0.904	40.2	LOS E	20.7	148.8	1.00	1.63	2.99	34.4
Approach			701	3.4	701	3.4	0.904	40.2	LOS E	20.7	148.8	1.00	1.63	2.99	34.4
All Vehicles			2464	3.7	2464	3.7	0.928	37.1	LOS E	29.1	210.3	0.97	1.52	2.69	35.5

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 101 [Shea at Flewellyn FT2035 PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shea															
1	L2	All MCs	16	6.0	16	6.0	0.316	7.5	LOS A	1.6	11.2	0.56	0.40	0.56	56.9
2	T1	All MCs	260	2.0	260	2.0	0.316	7.2	LOS A	1.6	11.2	0.56	0.40	0.56	59.2
3	R2	All MCs	17	6.0	17	6.0	0.316	7.5	LOS A	1.6	11.2	0.56	0.40	0.56	57.7
Approach			293	2.5	293	2.5	0.316	7.2	LOS A	1.6	11.2	0.56	0.40	0.56	58.9
East: Flewellyn															
4	L2	All MCs	2	2.0	2	2.0	0.467	9.3	LOS A	2.9	21.0	0.63	0.45	0.67	56.3
5	T1	All MCs	397	2.0	397	2.0	0.467	9.3	LOS A	2.9	21.0	0.63	0.45	0.67	57.5
6	R2	All MCs	49	2.0	49	2.0	0.467	9.3	LOS A	2.9	21.0	0.63	0.45	0.67	57.0
Approach			448	2.0	448	2.0	0.467	9.3	LOS A	2.9	21.0	0.63	0.45	0.67	57.4
North: Shea															
7	L2	All MCs	25	3.0	25	3.0	0.431	9.3	LOS A	2.5	18.1	0.64	0.51	0.71	55.8
8	T1	All MCs	285	2.0	285	2.0	0.431	9.3	LOS A	2.5	18.1	0.64	0.51	0.71	57.3
9	R2	All MCs	71	2.0	71	2.0	0.431	9.3	LOS A	2.5	18.1	0.64	0.51	0.71	56.8
Approach			381	2.1	381	2.1	0.431	9.3	LOS A	2.5	18.1	0.64	0.51	0.71	57.1
West: Flewellyn															
10	L2	All MCs	59	5.0	59	5.0	0.358	7.6	LOS A	1.9	13.6	0.55	0.37	0.55	56.4
11	T1	All MCs	280	2.0	280	2.0	0.358	7.4	LOS A	1.9	13.6	0.55	0.37	0.55	58.4
12	R2	All MCs	11	18.0	11	18.0	0.358	8.6	LOS A	1.9	13.6	0.55	0.37	0.55	54.4
Approach			350	3.0	350	3.0	0.358	7.5	LOS A	1.9	13.6	0.55	0.37	0.55	57.9
All Vehicles			1472	2.3	1472	2.3	0.467	8.4	LOS A	2.9	21.0	0.60	0.44	0.63	57.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).

Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
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Roundabout Capacity Model: US HCM 6.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: Siegloch M1 implied by US HCM 6 Roundabout Capacity Model.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.