5993, 6115, 6141, 6159 Flewellyn Road & 6070 Fernbank Road (Stittsville South)

Transportation Impact Assessment

Step 1 Screening Report

Step 2 Scoping Report

Step 3 Strategy Report

Prepared for:

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PN: 2021-128

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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 a plan of subdivision application.

The subdivision lands are located within the W-4 Urban Expansion Area Lands (W-4 Lands) outlined in the City's Official Plan Schedule C17. The W-4 Lands related applications have been submitted to lift the Future Neighbourhood Overlay. The transportation report prepared in support of that submission will be the parent transportation study in the process that informs the concept plan for the future neighbourhood. This TIA will assess the plan of subdivision under the typical development review process and assess the impact of any changes between the overall concept plan and any revisions to the plan of subdivision.

2 Existing and Planned Conditions

2.1 Proposed Development

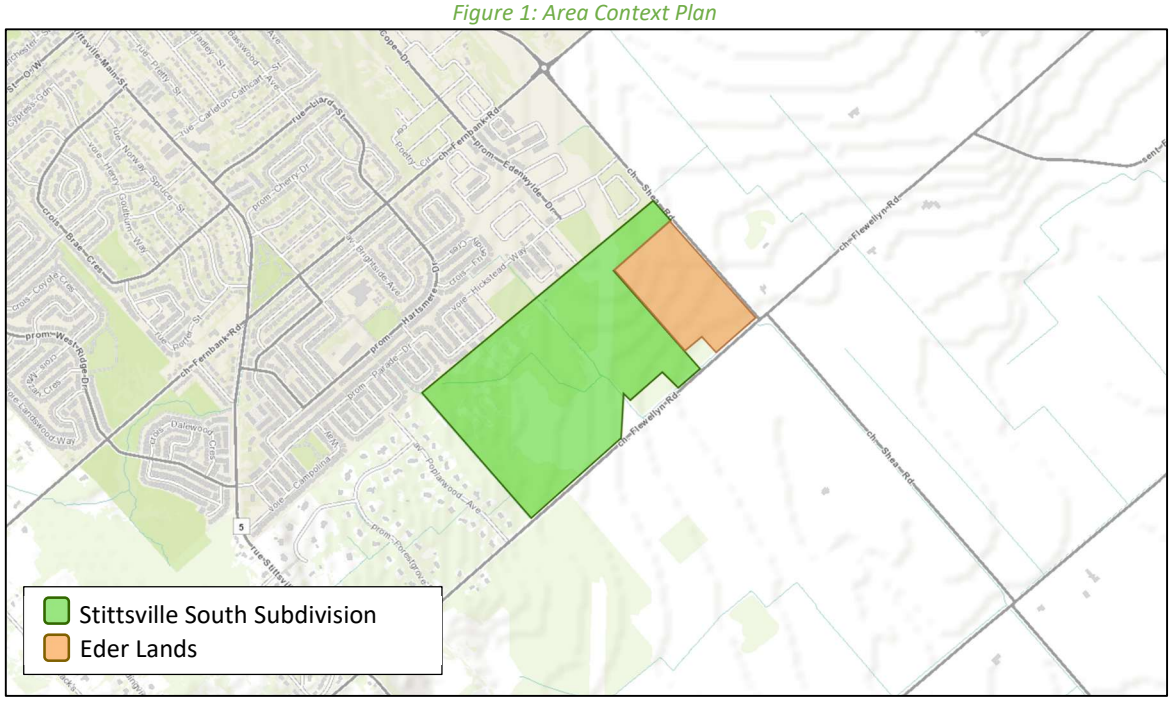
The proposed development, situated in the W-4 Urban Expansion boundary, is located at the northwest corner of Shea Road at Flewellyn Road intersection and bounded by the Eder Lands, Flewellyn Road, a separated estate home conclave along Poplarwood Avenue, and the existing community south of Hickstead Way. The proposed development current zoning is Rural (RU). The anticipated build-out year is 2030.

The plan of subdivision proposes a total of 615 townhomes, 527 single-detached homes, 550 stacked townhomes, and park/open space within the proposed development. The subject lands encompass 5993, 6115, 6141, and 6159 Flewellyn Road, 6070 Fernbank Road, 59 Aridus Crescent, the hydro corridor, Faulkner Drain, and stormwater maintenance ponds. New collector roads are proposed to connect to Shea Road and Flewellyn Road, while new local roads are proposed to connect to Painted Sky Way and Parade Drive at the Hickstead Way intersection.

The Eder Lands, adjacent to the proposed development, were considered within the W-4 Lands study and reside outside the urban boundary. They are not part of the proposed subdivision within this study.

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

Figure 1: Area Context Plan



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 11, 2025

CAIVAN

STITTSVILLE URBAN BOUNDARY

DRAWING: SK-13
DATE: 2025-02-20
AUTHOR: WF
SCALE: 1:4,000

Parade Dr
Parade Cr
Crescent
Shea Rd
Poplarwood Ave
Flewellyn Rd

PARK
2.45ha
(6.05ac)

SWM POND
1.14ha
(2.82ac)

CONDO BLOCK
1.85ha
(4.57ac)

PARK
0.95ha
(2.34ac)

SWM POND
2.11ha
(5.22ac)

SWM POND
2.15ha
(5.31ac)

SWM POND (total)
2.69ha
(6.65ac)

SWM POND
IN CORRIDOR
0.55ha
(1.36ac)

CONDO BLOCK
3.22ha
(7.96ac)

3.5m PATHWAY

18.0
24.0
5.5
R18.0

UNITS

837		TOWNS (19'-6")
243		SINGLES (35')
69		SINGLES (37')
167		SINGLES (42')
188		SINGLES (50')
550		STACKED CONDO BLOCK
2054		

NHS
UTILITY CORRIDOR
PARK
VISTA
SWM POND
ROW
ROAD WIDENING
PHASE LINE
BOUNDARY LINE
OWNERSHIP

UNIT BREAKDOWN

	UB	EDER	TOTAL
	615	222	**837**
	527	140	**667**
	550	0	**550**
	1692	**362**	**2054**

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 two-lane 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 gravel 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.

Painted Sky Way: Painted Sky Way is a City of Ottawa local road with a two-lane urban cross-section. The speed limit is assumed to be 40 km/h, consistent with the remainder of the adjacent subdivision, and the existing right of way is 18.0 metres.

Parade Drive: Parade Drive is a City of Ottawa local road with a two-lane urban cross-section. Sidewalks are present on both sides of the road. The posted speed limit is 40 km/h, and the existing right of way is 20.0 metres east of Hickstead Way and 24.0 metres west of Hickstead Way.

Hickstead Way: Hickstead Way is a City of Ottawa local road with a two-lane urban cross-section. Sidewalks are present on both sides of the road east of Parade Drive and on the north side of the road west of Parade Drive ending at a pathway block at the 90-degree bend towards Parade Drive. The speed limit is assumed to be consistent with Parade Drive at a posted 40 km/h, and the existing right of way is 18.0 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:

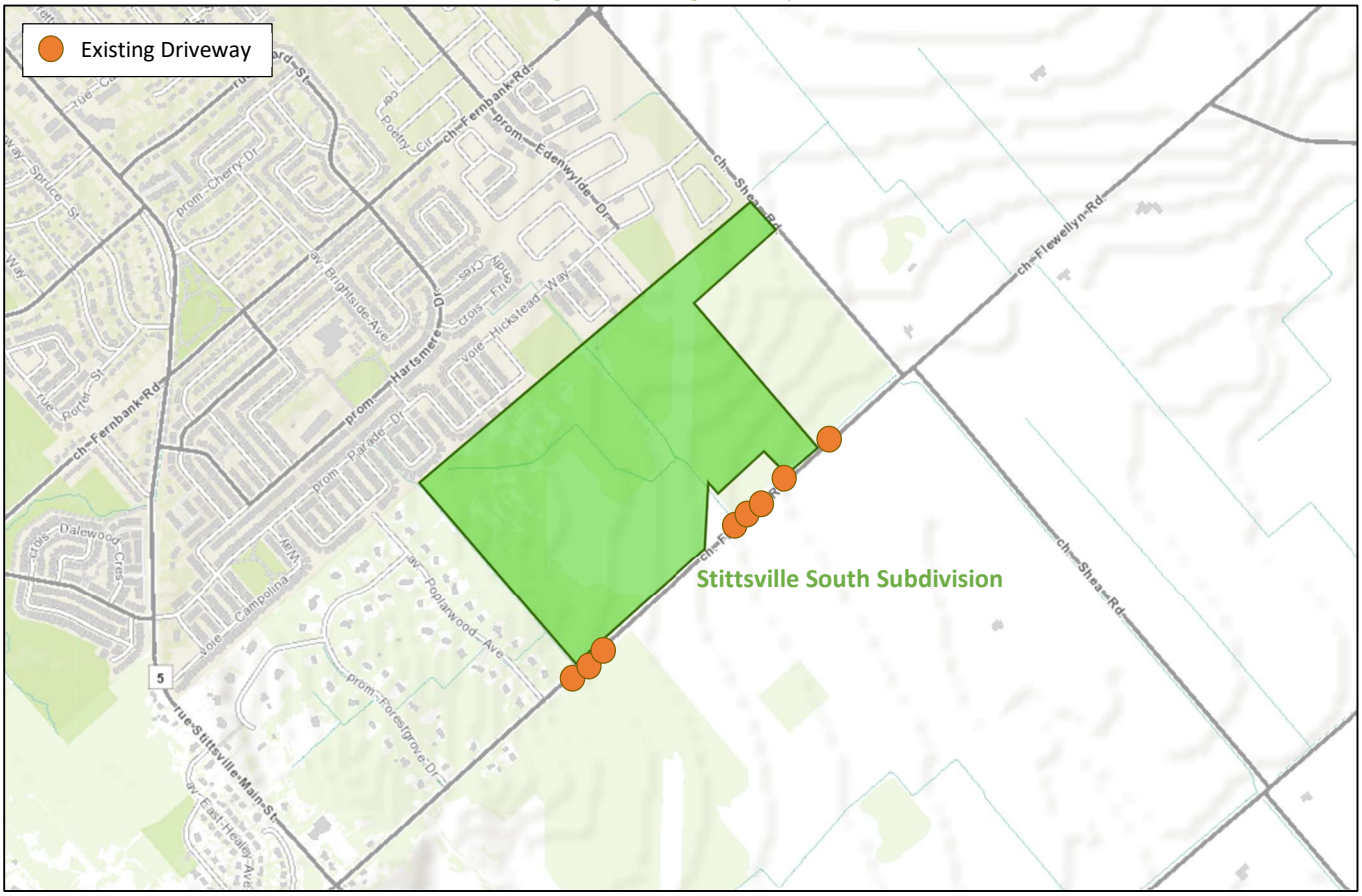
Shea Road at Fernbank Road	The intersection of Shea Road at Fernbank Road is a four-legged roundabout intersection. Each leg consists of a shared all-movement lane. Pedestrian crossovers are provided on each leg and a MUP circulates the roundabout. No turn restrictions were noted.
Shea Road at Flewellyn 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 accesses, driveways are present on both sides of Flewellyn Road to single detached dwellings. Figure 3 illustrates the existing driveways.

Figure 3: Existing Driveways



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 11, 2025

2.2.4 Cycling and Pedestrian Facilities

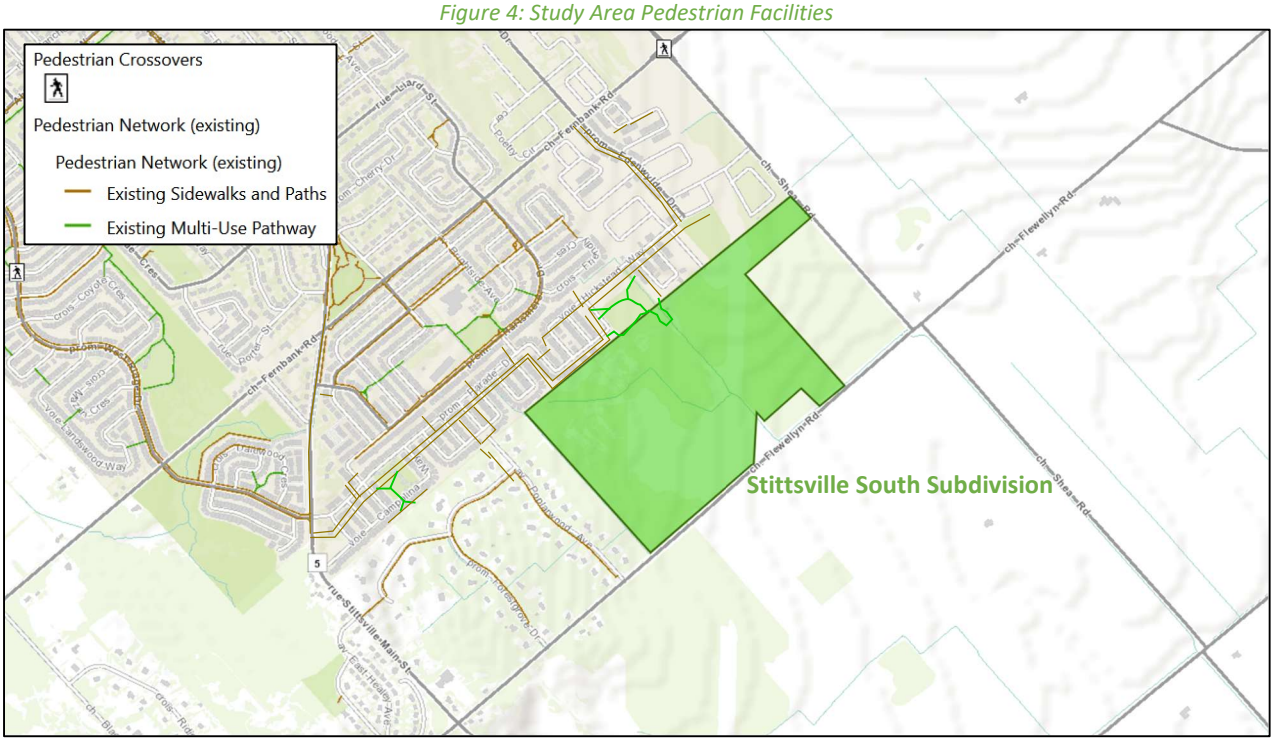
Figure 4 illustrates the pedestrian facilities in the study area and Figure 5 illustrates the cycling facilities in the study area. Considering the plans for other developments and the newly constructed pedestrian and cycling facilities, new community sidewalks and cycling pathways have been included in the figure, where possible, despite not being formalized within the City's pedestrian network in geoOttawa. As the area is 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, 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.

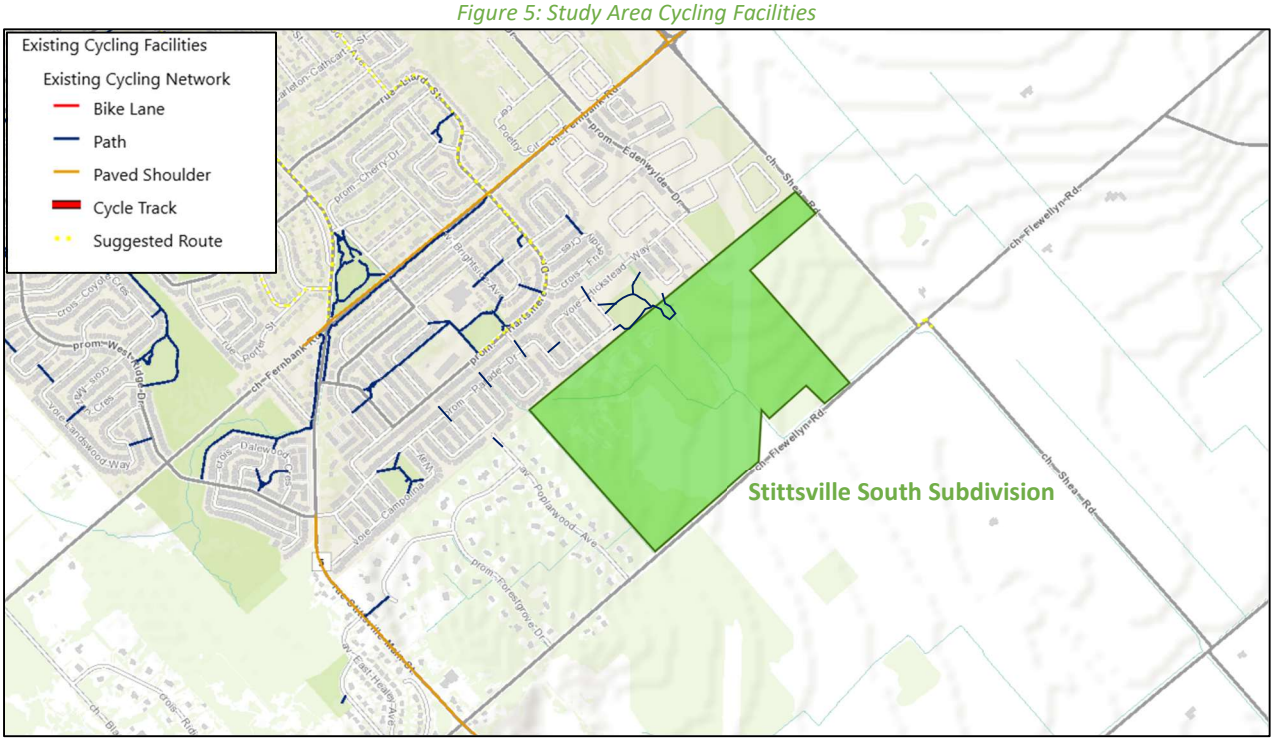
As requested by the City, it is noted that cycletracks are planned to be constructed on Cope Drive north of Fernbank Road as part of the 6041 Fernbank and 5957 and 5969 Fernbank subdivisions.

Figure 4: Study Area Pedestrian Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 11, 2025

Figure 5: Study Area Cycling Facilities



Source: http://maps.ottawa.ca/geoOttawa/ Accessed: February 11, 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 6 and Figure 7, respectively. The City of Ottawa notes that the collection data for active mode volumes may be lower than summer conditions, although this cannot be confirmed. It is also noted that no Pedestrian and cyclist volumes are available at the intersection of Shea Road at Cosanti Drive.

Figure 6: Existing Pedestrian Volumes

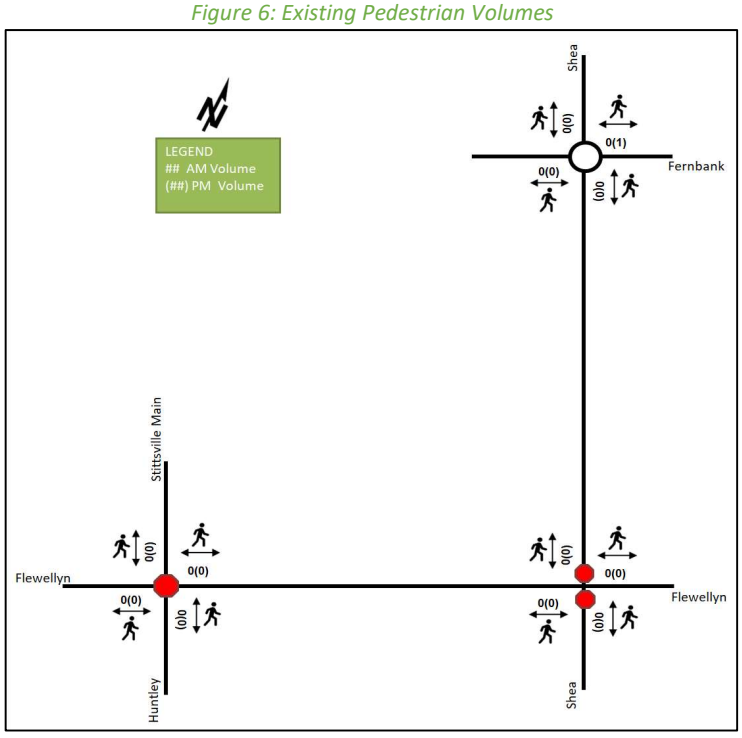
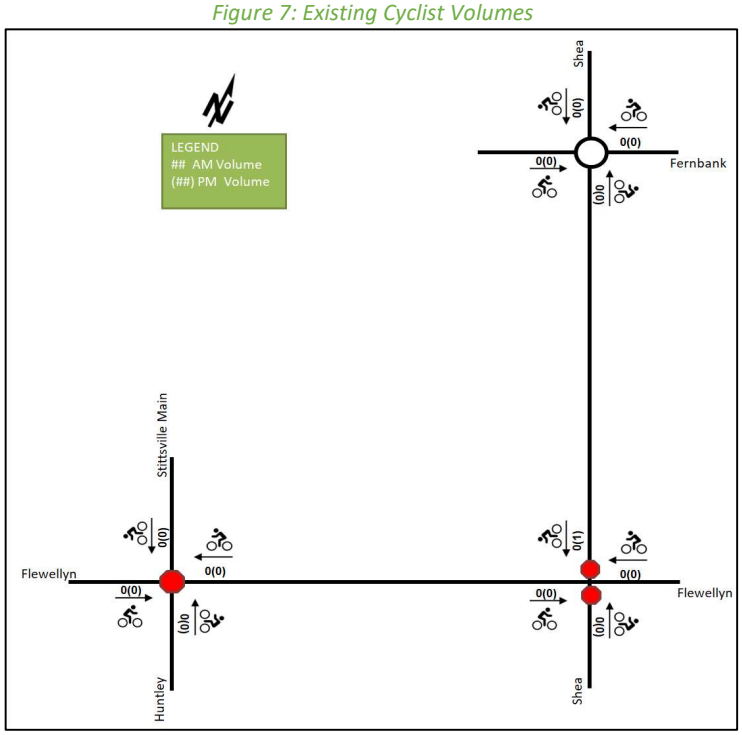


Figure 7: Existing Cyclist Volumes



2.2.5 Existing Transit

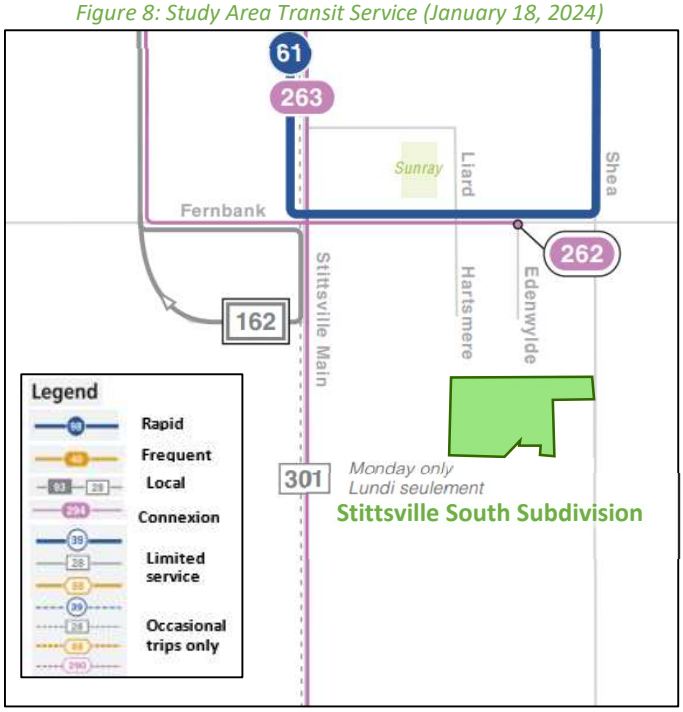
Figure 8 illustrates the existing transit system map in proximity to the proposed site and Figure 9 illustrates nearby transit stops. It is noted that no transit stops are present within 400 metres of the site. All transit information is from January 18, 2024, and is included for general information purposes and context to the surrounding area.

Route #61 currently travels along Shea Road and Fernbank Road, Stittsville Main Street, Route #162 currently travels along Stittsville Main Street, Fernbank Road, and West Ridge Drive, 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 January 18, 2024, service levels are:

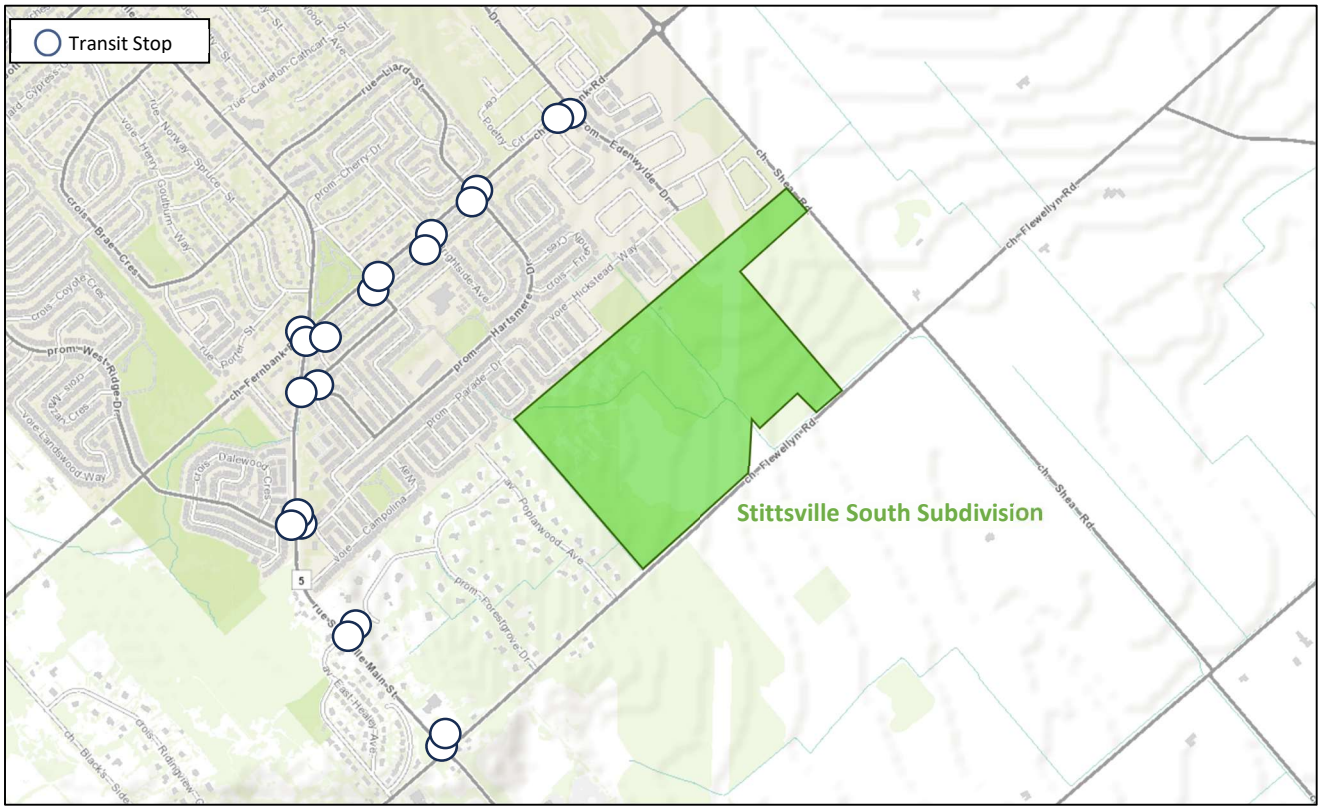
- Route # 61 – 30-minute service all day
- Route # 162 – Three afternoon buses and four evening buses per day
- Route # 262 – 30-minute service in the peak direction/period
- Route # 263 – Three morning buses and four afternoon buses per day in the peak direction
- Route #283 – One afternoon bus from Tunney's Pasture to Stittsville Main Street/ Carp Road
- Route # 301 – One morning bus and one afternoon bus on Monday in the peak direction

Figure 8: Study Area Transit Service (January 18, 2024)



Source: http://www.octranspo.com/ Accessed: January 18, 2024

Figure 9: Existing Study Area Transit Stops



Source: http://www.octranspo.com/ Accessed: February 11, 2025

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), and the trip generation are noted to be updated to the TRANS 2020 methodology.

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 10 illustrates the existing traffic counts and Table 2 summarizes the existing intersection operations. 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. Detailed turning movement count data is included in Appendix B and the synchro and sidra worksheets are provided in Appendix C.

Figure 10: Existing Traffic Counts

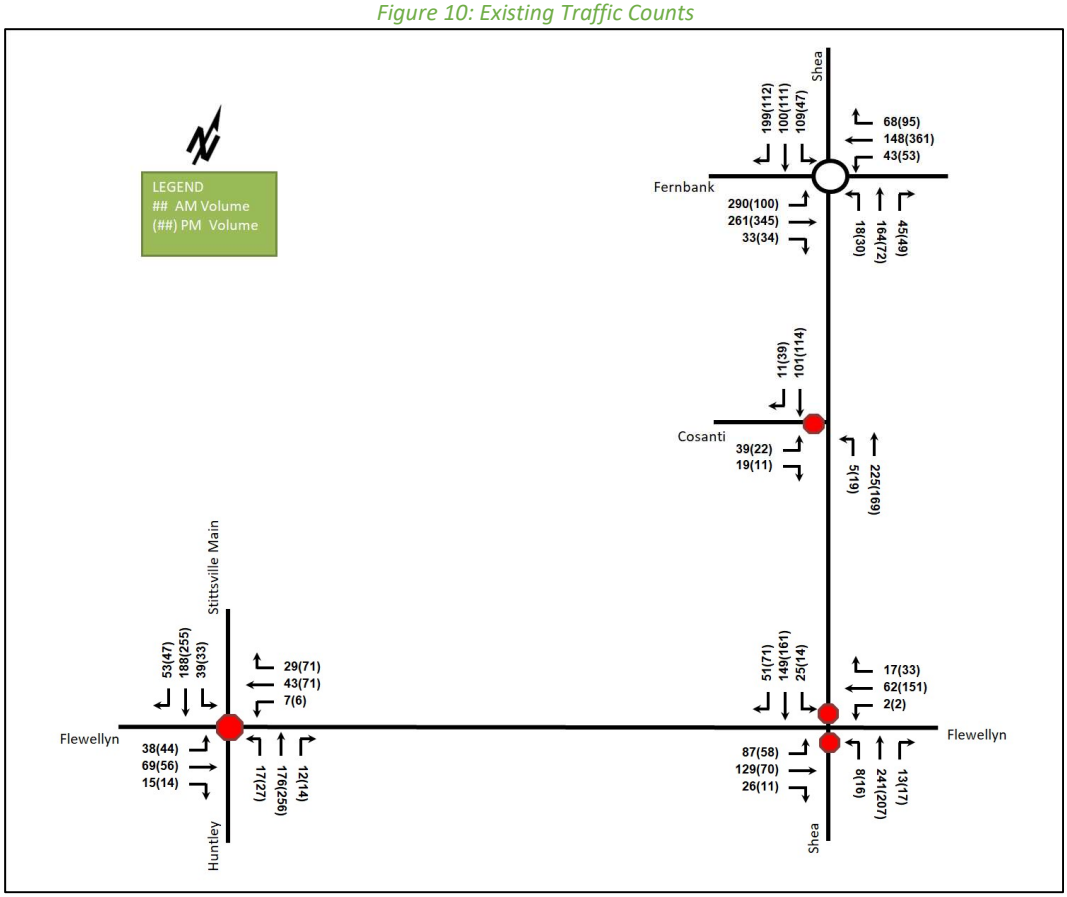


Table 2: Existing Intersection Operations

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	13.1	58.3	A	0.50	9.3	23.7
	WB	A	0.37	9.3	13.5	A	0.53	9.7	26.0
	NB	B	0.42	12.5	15.7	A	0.22	7.2	6.8
	SB	A	0.43	8.2	18.8	A	0.38	9.2	14.0
	Overall	**B**	**0.65**	**11.0**	**58.3**	**A**	**0.53**	**9.2**	**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**	**-**
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, and both intersections met the all-way stop-control warrants for consideration. Although warrants are met, 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 only and is can 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. Table 3 summarizes the collision types and conditions in the study area, Figure 11 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		**60**	**100%**
Classification	**Fatality**	0	0%
	Non-Fatal Injury	12	20%
	Property Damage Only	48	80%
Initial Impact Type	**Angle**	28	47%
	Sideswipe	1	2%
	Turning Movement	1	2%
	Turning Movement	1	2%
	SMV Other	16	27%
	Other	2	3%
Road Surface Condition	**Dry**	35	58%
	Wet	11	18%
	Loose Snow	4	7%
	Slush	1	2%
	Packed Snow	2	3%
	Ice	7	12%
Pedestrian Involved		0	0%
Cyclists Involved		0	0%

Figure 11: Study Area Collision Records, 2018-2022

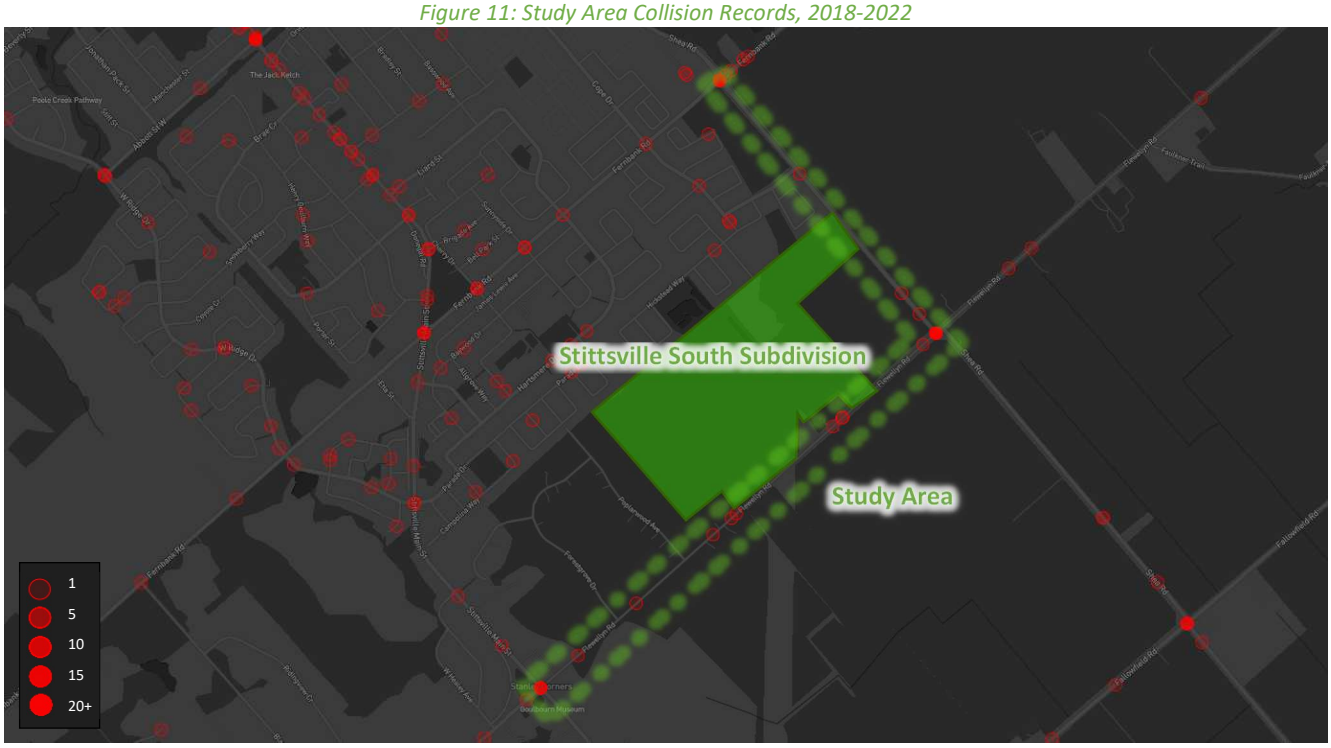


Table 4: Summary of Collision Locations, 2018-2022

	Number	%
Intersections / Segments	**60**	**100%**
Flewellyn Rd @ Shea Rd	23	38%
Fernbank Rd @ Shea Rd	15	25%
Flewellyn Rd btwn Poplarwood Ave & Shea Rd	7	12%
Stittsville Main St/Huntley Rd @ Flewellyn Rd	10	17%

	Number	%
Intersections / Segments	**60**	**100%**
Shea Rd btwn Fernbank Rd & Flewellyn Rd	3	5%
Flewellyn Rd btwn Forestgrove Dr & Stittsville Main St	1	2%
Flewellyn Rd btwn Forestgrove Dr & Poplarwood Ave	1	2%

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%
	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 sixteen 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 (9 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. The offset configuration of this intersection is considered the primary cause of these angled collisions.

Due to the property ownership, no ability exists for the subdivision to re-align Shea Road. The City is currently investigating the implementation of pavement markings, flashers and signage to reduce collisions 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.

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 fourteen 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 (5 out of 7), 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 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.

2.3.1.2 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.

2.3.1.3 Transportation Master Plan (2013)

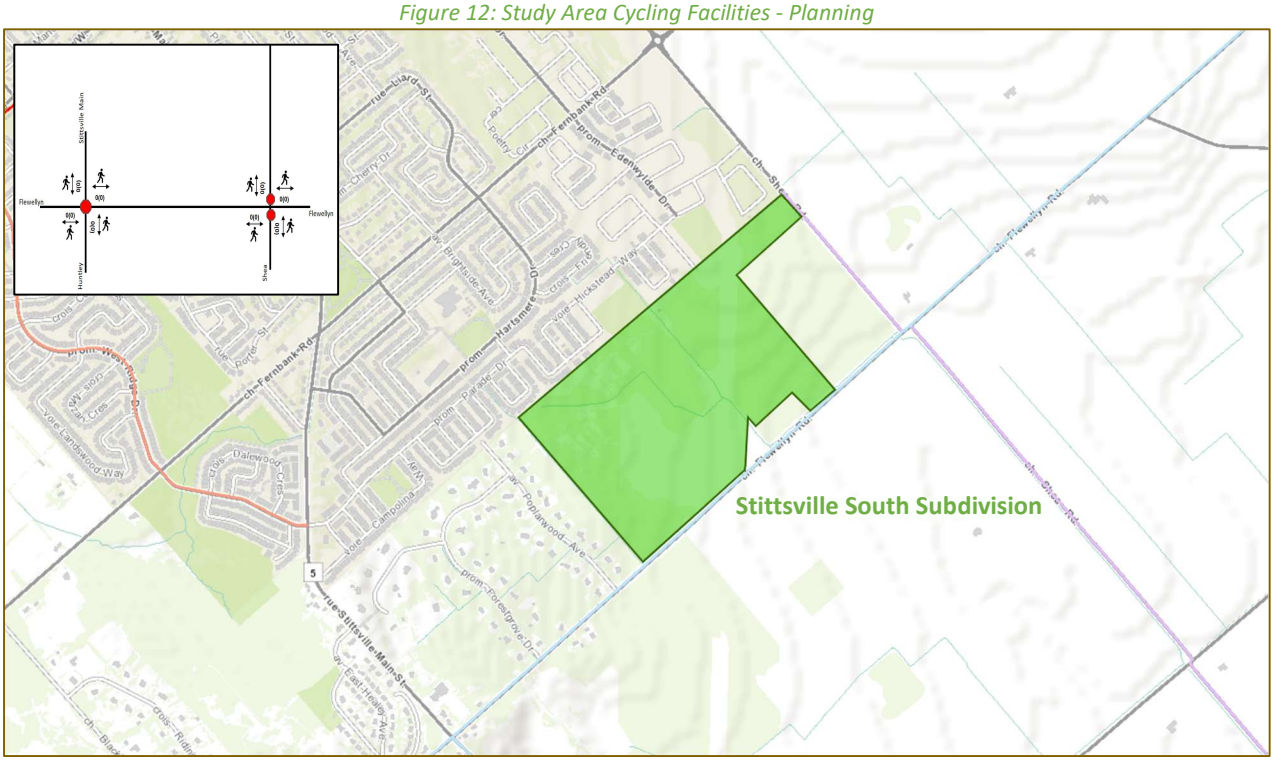
Fernbank Road widening from two to four lanes between Stittsville Main Street and Terry Fox Drive is identified in the Transportation Master Plan (2013) in the network concept; however, it is not in the 2031 affordable network concept. Since the timeline for this project is unknown, it is assumed that 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.

2.3.1.4 2023 Transportation Master Plan – Part 1

Within the Active Transportation Projects in 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. Figure 12 illustrates the planned cycling facilities in the study area.

Figure 12: Study Area Cycling Facilities - Planning

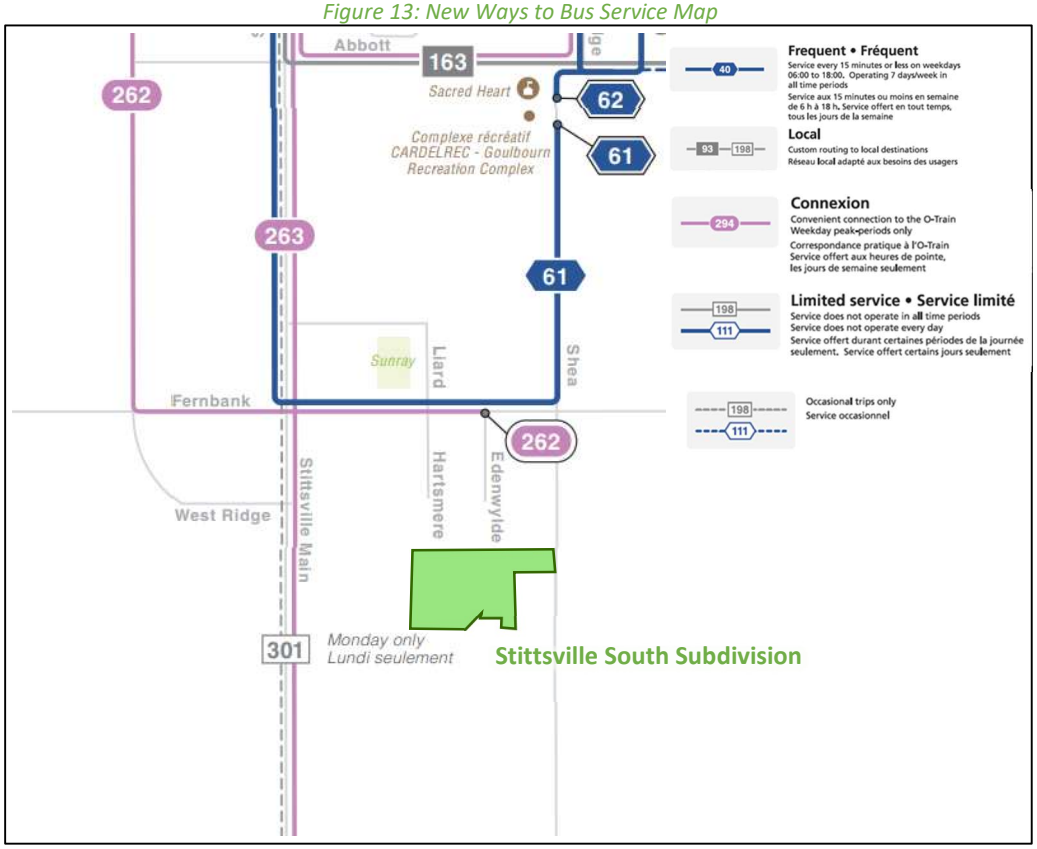


Source: http://maps.ottawa.ca/geoOttawa/ Accessed: January 9, 2025

2.3.1.5 OC Transpo's New Ways to Bus

Responding to recent ridership trends and anticipating the upcoming completion of the Stage 2 expansion of LRT service within the City, the OC Transpo bus service is planned to be recalibrated to focus on frequency, local service in neighbourhoods, and connections to key destinations. These changes are expected in April 2025, and the new service map is illustrated in Figure 13.

Figure 13: New Ways to Bus Service Map



Source: https://www.octranspo.com/en/plan-your-trip/service-changes/new-ways-to-bus#new-network Accessed: January 9, 2025

2.3.2 Other Study Area Developments

Figure 14 illustrates all the developments noted in the larger Stittsville context and Table 7 summarizes the details of each development.

Figure 14: Area Developments

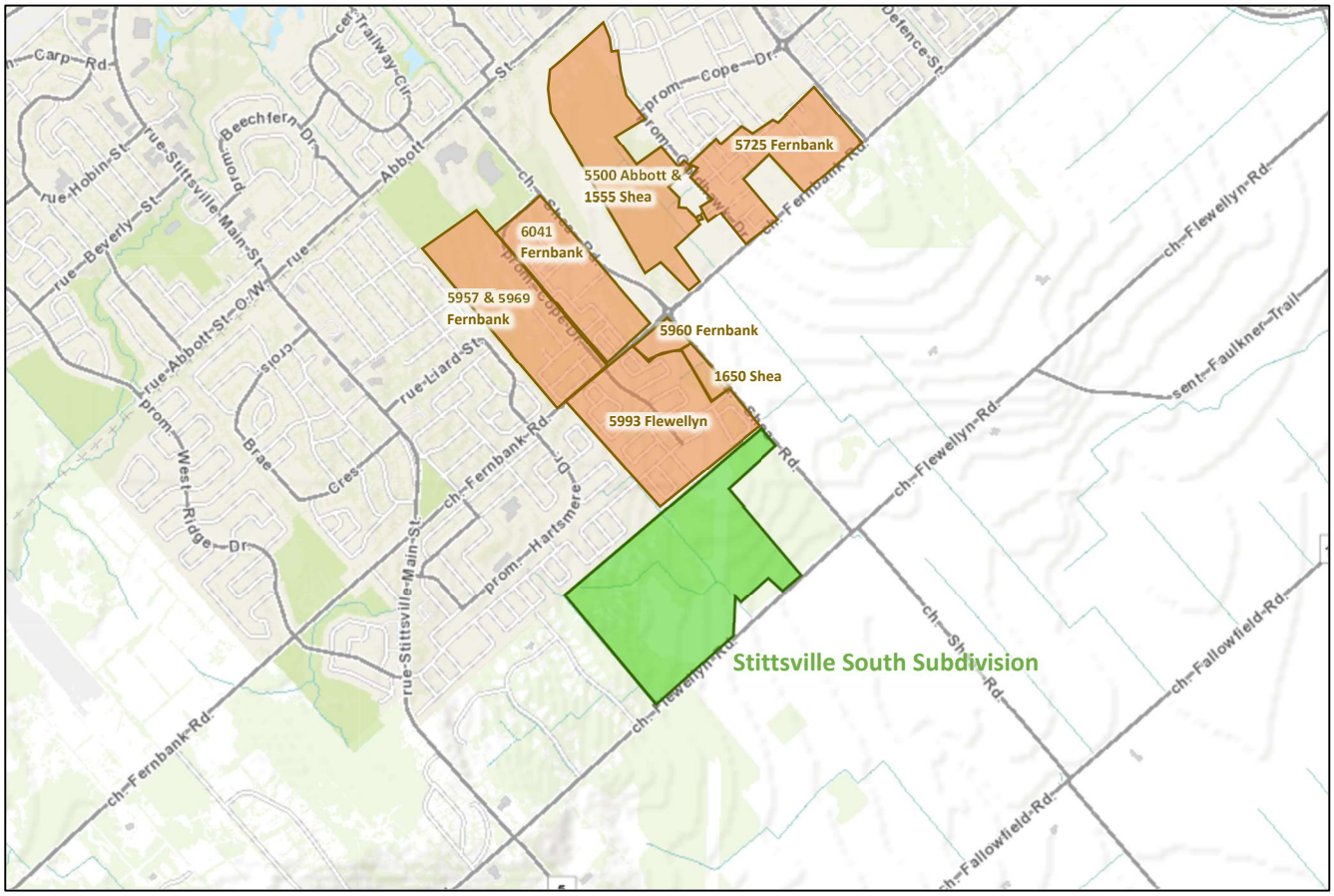


Table 7: Area Development Details

#	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

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 (Future Conditions)
  - Street 12 (Future Conditions)
  - Stittsville Main Street/ Huntley Road

The boundary road will be Shea Road and Flewellyn Road, and Screenline 56 is present within proximity to the site.

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 Person Trip Rates – Kanata/Stittsville

Travel Mode	Kanata/Stittsville					
	Single Detached		Multi-Unit (Low-Rise)		Multi-Unit (High-Rise)	
	AM	PM	AM	PM	AM	PM
Auto Driver	52%	56%	52%	58%	43%	55%
Auto Passenger	15%	19%	14%	17%	26%	19%
Transit	20%	14%	22%	17%	28%	21%
Cycling	1%	1%	0%	0%	0%	0%
Walking	12%	9%	11%	8%	4%	5%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 9: TRANS Trip Generation Person Trip Rates – Rural Southwest

Travel Mode	Rural Southwest					
	Single Detached		Multi-Unit (Low-Rise)		Multi-Unit (High-Rise)	
	AM	PM	AM	PM	AM	PM
Auto Driver	60%	67%	66%	62%	63%	64%
Auto Passenger	14%	17%	13%	19%	15%	18%
Transit	24%	14%	21%	16%	19%	16%
Cycling	2%	2%	1%	3%	0%	0%
Walking	0%	0%	0%	0%	3%	1%
Total	**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 10 summarizes the expected modes shares for the development area.

Table 10: Expected Development Mode Shares

Travel Mode	Single Detached		Multi-Unit (Low-Rise)		Multi-Unit (High-Rise)	
	AM	PM	AM	PM	AM	PM
Auto Driver	51%	59%	55%	58%	49%	57%
Auto Passenger	15%	19%	15%	19%	27%	21%
Transit	24%	14%	21%	16%	19%	16%
Cycling	2%	2%	2%	2%	2%	2%
Walking	8%	6%	7%	5%	3%	4%
Total	**100%**	**100%**	**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 11 summarizes the person trip rates for the proposed residential land uses for each peak period.

Table 11: 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
Multi-Unit (High-Rise)	221 & 222 (TRANS)	AM	0.80
		PM	0.90

Using the above person trip rates, the total person trip generation has been estimated. Table 12 summarizes the total person trip generation.

Table 12: 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	527	324	756	1080	810	497	1307
Multi-Unit (Low-Rise)	615	249	581	830	544	428	972
Multi-Unit (High-Rise)	550	136	304	440	287	208	495

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 13 summarizes the residential trip generation by mode and peak hour.

Table 13: 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%**	79	185	264	**59%**	210	129	339
	Auto Passenger	**15%**	23	55	78	**19%**	68	41	109
	Transit	**24%**	43	99	142	**14%**	53	33	86
	Cycling	**2%**	4	9	13	**2%**	7	5	12
	Walking	**8%**	15	35	50	**6%**	25	16	41
	Total	**100%**	**164**	**383**	**547**	**100%**	**363**	**224**	**587**
Multi-Unit (Low-Rise)	Auto Driver	**55%**	66	153	219	**58%**	139	109	248
	Auto Passenger	**15%**	18	42	60	**19%**	45	36	81
	Transit	**21%**	29	67	96	**16%**	41	32	73
	Cycling	**2%**	3	7	10	**2%**	5	4	9
	Walking	**7%**	10	24	34	**5%**	14	11	25
	Total	**100%**	**126**	**293**	**419**	**100%**	**244**	**192**	**436**
Multi-Unit (High-Rise)	Auto Driver	**49%**	31	73	104	**57%**	69	55	124
	Auto Passenger	**27%**	17	40	57	**21%**	26	20	46
	Transit	**19%**	14	32	46	**16%**	21	16	37
	Cycling	**2%**	2	4	5	**2%**	3	2	5
	Walking	**3%**	2	6	8	**4%**	6	4	10
	Total	**100%**	**66**	**155**	**220**	**100%**	**125**	**97**	**222**
Total	Auto Driver	-	176	411	587	-	418	293	711
	Auto Passenger	-	58	137	195	-	139	97	236
	Transit	-	86	198	284	-	115	81	196
	Cycling	-	9	20	28	-	15	11	26
	Walking	-	27	65	92	-	45	31	76
	Total	-	**356**	**831**	**1186**	-	**732**	**513**	**1245**

As shown above, a total of 587 AM and 711 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 11, Fernbank Road, east of Shea Road, during the PM peak hour in the westbound direction is expected to reach over 90% of its capacity in the future background conditions, therefore, no trip assignments are anticipated through Fernbank Road during the PM peak hour in the westbound direction. Table 14 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.

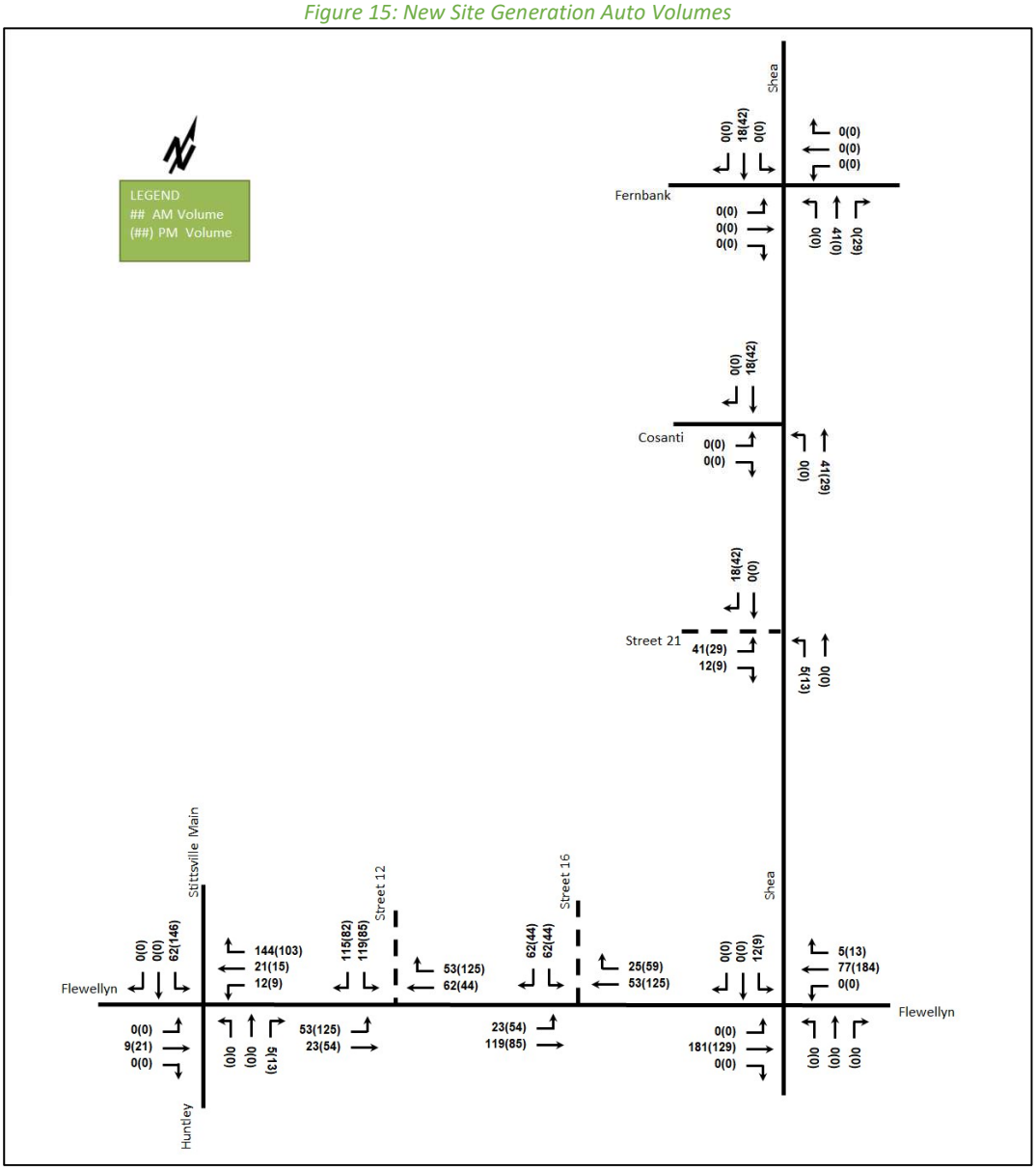
Table 14: OD Survey Distribution

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. The assignment has also been based on the Section 11 Network Concept review and screenline capacities. Of note, Fernbank Road, east of Shea Road, during the PM peak hour in the westbound direction is to reach over 90% of its capacity in the future background conditions, therefore, no trip assignments are anticipated through Fernbank Road during the PM peak hour in the westbound direction. Figure 15 illustrates the new site-generated volumes.

Figure 15: New Site Generation Auto Volumes



5 Exemption Review

Table 15 summarizes the exemptions for this TIA.

Table 15: 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
	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

Module	Element	Explanation	Exempt/Required
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 when the development generates more than 75 auto or transit trips	Required
3.3 Demand Rationalization		Only required when one or more other Network Impact Modules when the development generates more than 75 auto trips	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	Required

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

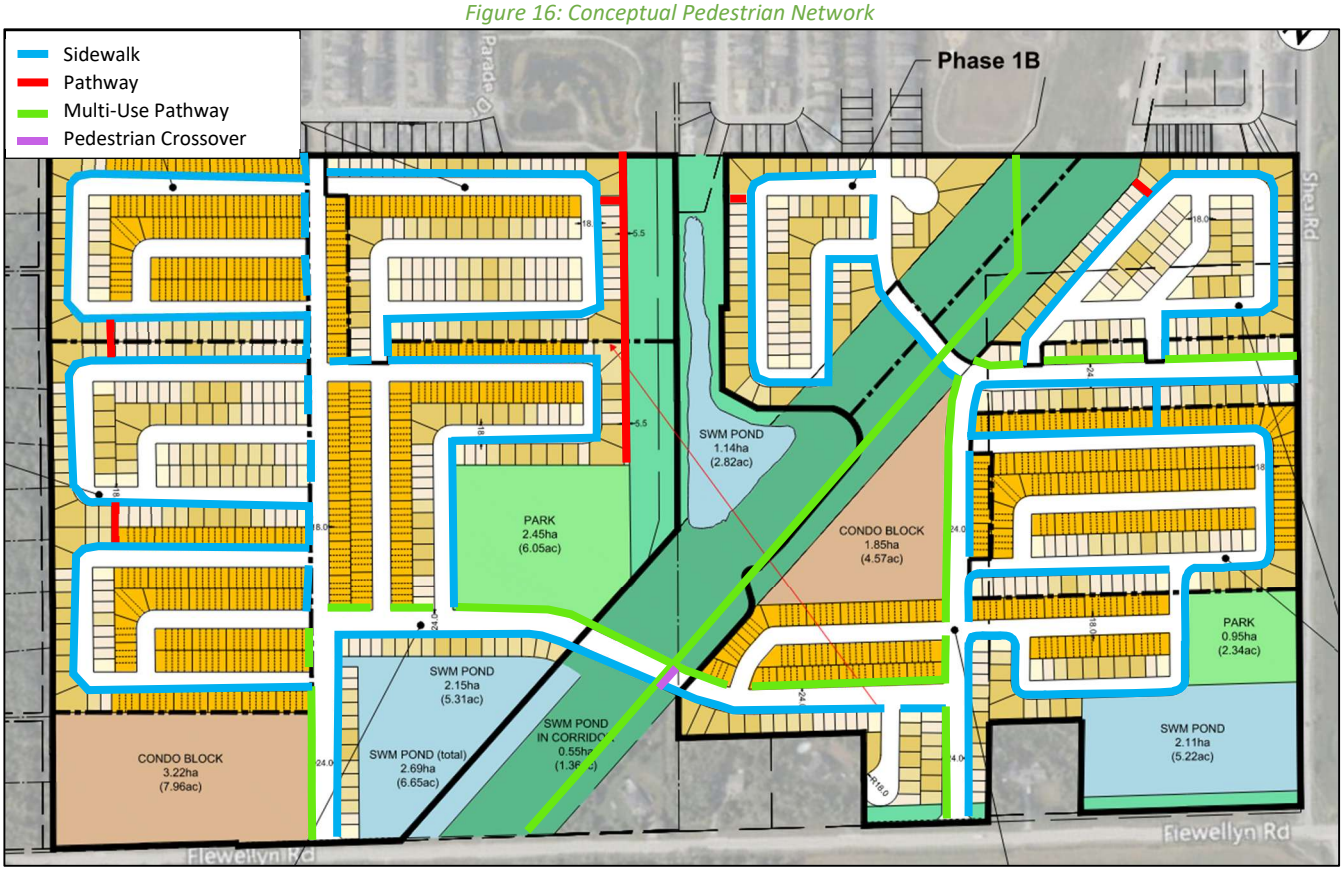
6 Development Design

6.1 Design for Sustainable Modes

The proposed development is a residential subdivision featuring driveways for each dwelling, garages for typical townhomes, and surface parking for stacked townhomes. Bicycle parking is assumed to be within the individual units.

The existing Hydro corridor and existing stormwater management ponds are noted within the subdivision, and two new proposed stormwater management pond areas and two parks are proposed. Sidewalks are provided on the new collector roads and key local roads to provide connectivity within the subdivision, to the boundary streets of Shea Road and Flewellyn Road and the northern community. Pedestrian crossovers are proposed at major active mode crossing locations and to facilitate future the Hydro corridor multi-use pathway links. Pathways are anticipated to be provided along the Hydro corridor, stormwater management ponds and improve connectivity to the area parks. Figure 16 illustrates the conceptual pedestrian network.

Figure 16: Conceptual Pedestrian Network



6.2 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 a single side and a 3.0-metre-wide MUP with a 0.7-metre-wide boulevard on the other side. The new collector roads are proposed to connect Shea Road and Flewellyn Road and serve as potential transit routes. 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 local roads are proposed to connect Painted Sky Way and Parade Drive, and sidewalks will be provided for connections from the proposed subdivision to Painted Sky Way and Parade Drive. 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.

Street 16 is approximately 320 meters west of the intersection of Shea Road and Flewellyn Road, while Street 12 is 575 meters further west of Street 16. Both Street 12 and Street 16 exceed the TAC's minimum corner clearance 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 features include bulb-outs to narrow approaches to intersections (e.g. reduced crossing distance), 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 was remove 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. Potential bus stop locations have been drafted for review, following the high-level locations outlined in Section 10. The locations match previous consultant with Transit Services. The location of the southbound stop on Street 12 will need to be confirmed by Transit Services, or if an alternative location on Stret 12 westbound is preferred.

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.

The conceptual traffic calming plan has been provided in Appendix H.

6.3 Boundary Street Design

Table 16 summarizes the MMLOS analysis for the boundary streets of Shea Road and Flewellyn Road, and the internal roads of new local and collector roads. As Shea Road Flewellyn Road are within “General Rural Area”, no MMLOS targets for the existing conditions. It is expected all roadways will be within the “General Urban Area”, and the MMLOS targets are present for future conditions. The MMLOS worksheets have been provided in Appendix I.

Table 16: Boundary Street MMLOS Analysis

	Segment	Condition	Pedestrian LOS		Bicycle LOS	
			PLOS	Target	BLOS	Target
Boundary Roadways	Shea Road	Existing	F	No target	F	No target
		Future	**F**	C	**F**	D
	Flewellyn Road	Existing	F	No target	F	No target
		Future	**F**	C	**F**	D
Internal Roadways	New local road (with sidewalk)	Future	A	C	B	D
	New local road (without 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 and bicycle modes in the existing conditions and no improvements are noted along the full extent of the roadways to improve this in the future. The City TMP paved shoulder improvement along Flewellyn Road has negligible impact on the LOS for the future conditions.

To meet the theoretical pedestrian LOS target on Shea Road and Flewellyn Road, a 2.0 metres sidewalk and a speed reduction to less than a 50 km/h operating speed would need to be implemented on both roadways. 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 for changes from 80 km/h to 50 km/h, and coordination through speed reduction programs to ensure compliance.

To meet the theoretical bicycle LOS target on Shea Road and Flewellyn Road, physically separated cycling facilities or operating speed lower or equal to 40 km/h would be needed. The barriers to implementation are the same as those noted for the pedestrian LOS.

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 roads will have LOS of A for both pedestrian and bicycle. Therefore, all of the internal roadways will meet the MMLOS targets.

The transit LOS and truck LOS are not applicable for the boundary roads and internal roadways, per the application of the MMLOS Guidelines.

7 Transportation Demand Management

7.1 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.

7.2 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 over 90% of its capacity in the future background conditions reviewed in Section 11. It is anticipated that future pedestrian facilities, cycling facilities provided within the subdivision to connect to northern communities, along with transit service will be 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.

7.3 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

8 Background Network Travel Demands

8.1 Transportation Network Plans

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

8.2 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 17 and the TRANS model plots are provided in Appendix K.

Table 17: 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%
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 18 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 18: 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%

8.3 Other Developments

The background developments explicitly considered in the background conditions (Section 2.3.2) include:

- 5957 & 5969 Fernbank Road
- 6041 Fernbank Road
- 5993 Flewellyn Road
- 5960 Fernbank Road
- 5500 Abbott & 1555 Shea Road
- 5725 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, 5993 Flewellyn Road, and 5500 Abbott Street and 1555 Shea Road trip generation are noted to be updated to the TRANS 2020 methodology. It is noted that 95% of the development at 5993 Flewellyn Road have been completed in 2024.

9 Demand Rationalization

9.1 2030 Future Background Intersection Operations

Typical of City of Ottawa requirements, 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 17 illustrates the 2030 background volumes and Table 19 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 intersection. Level of service is based on HCM 2010 delay for stop-controlled intersections, and Sidra HCM 6 for the roundabout intersection. The synchro and sidra worksheets for the 2030 future background horizon are provided in Appendix M.

Figure 17: 2030 Future Background Volumes

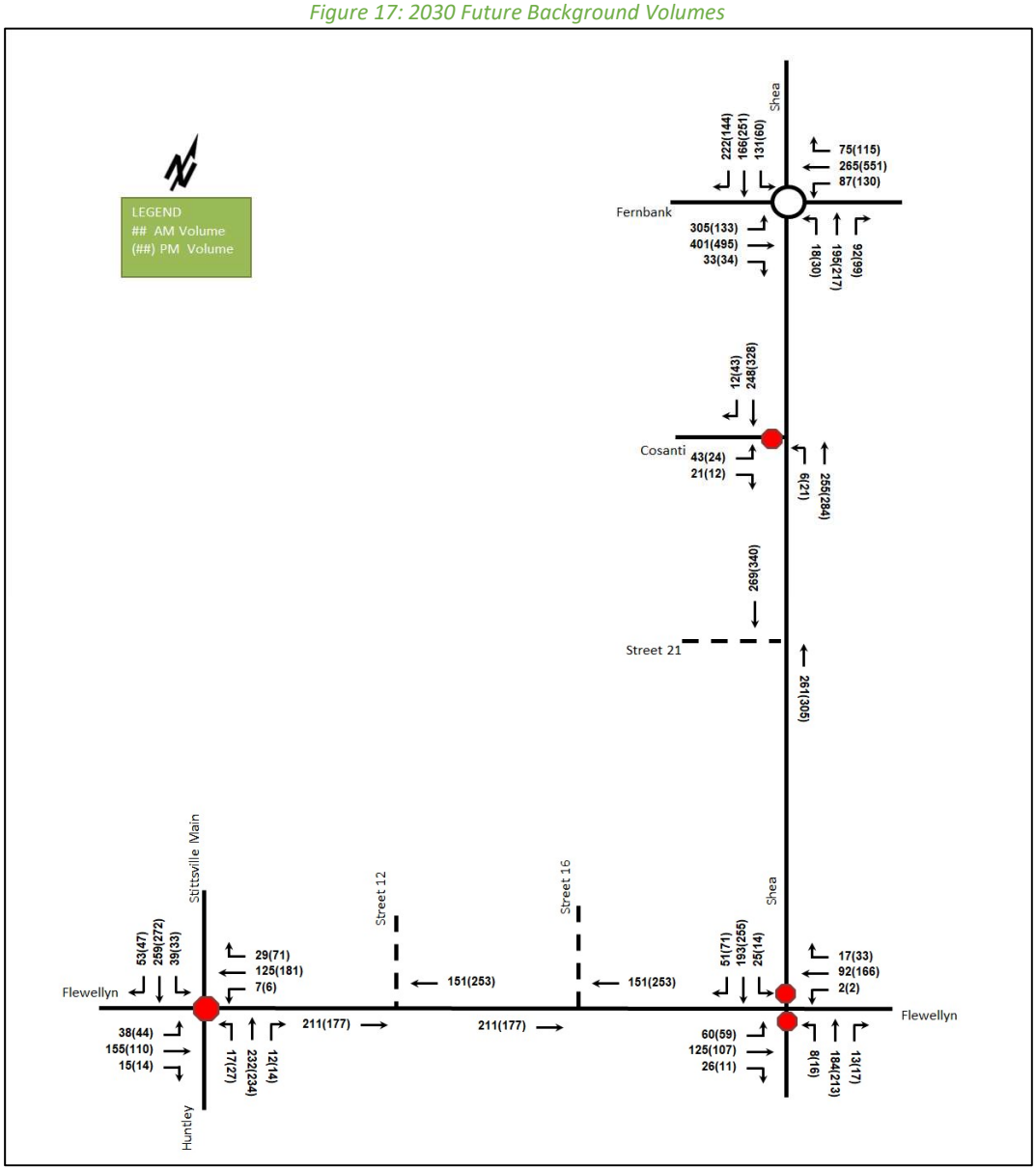


Table 19: 2030 Future Background Intersection Operations

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	C	0.82	24.7	124.1	C	0.78	22.1	90.5
	WB	B	0.55	13.0	30.5	D	0.88	31.9	175.5
	NB	C	0.58	18.8	24.8	B	0.54	14.5	24.5
	SB	B	0.58	12.2	38.8	C	0.73	23.5	46.2
	Overall	**C**	**0.82**	**18.0**	**124.1**	**C**	**0.88**	**24.7**	**175.5**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.04	7.6	0.8	A	0.04	7.8	0.8
	WB	A	0.00	7.5	0.0	A	0.00	7.5	0.0
	NB	C	0.39	16.0	13.5	C	0.53	20.9	22.5
	SB	C	0.49	17.7	20.3	C	0.65	23.4	34.5
	Overall	**B**	**-**	**10.7**	**-**	**B**	**-**	**14.1**	**-**
Stittsville Main Street / Huntley Road at Flewellyn Road *Unsignalized*	EB	B	0.35	12.2	11.3	B	0.30	12.1	9.0
	WB	B	0.27	11.3	8.3	B	0.43	13.5	16.5
	NB	B	0.43	13.3	15.8	B	0.46	14.0	18.0
	SB	B	0.54	14.7	24.0	C	0.56	15.7	25.5
	Overall	**B**	**-**	**13.2**	**-**	**B**	**-**	**14.1**	**-**
Shea Road at Cosanti Drive *Unsignalized*	EBL/R	B	0.11	12.0	3.0	B	0.08	13.2	1.5
	NBL/R	A	0.01	7.8	0.0	A	0.02	8.1	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.4**	**-**	**A**	**-**	**0.9**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.000
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.

As noted in the existing conditions, Shea Road at Flewellyn Road, and Shea Road at Cosanti Drive met the all-way stop control warrant for consideration during the existing conditions. These intersections are recommended remain as minor stop-control conditions. All-way stop control warrant calculation sheets are provided in Appendix D.

Signal warrant analysis of Justifications 7 was performed for the intersections of Shea Road at Flewellyn Road and Stittsville Main Street / Huntley Road at Flewellyn Road for 2030 future background conditions. None of the intersection met the Justifications 7 signal warrants. 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 2030 future background conditions, none of the intersections met a left-turn warrant for any approach. The left-turn warrant calculation sheets are provided in Appendix E.

9.2 2035 Future Background Intersection Operations

Figure 18 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 intersection. Level of service is based on HCM 2010 delay for stop-controlled intersections, and Sidra HCM 6 for the roundabout intersection. The synchro and sidra worksheets for the 2035 future background horizon are provided in Appendix N.

Figure 18: 2035 Future Background Volumes

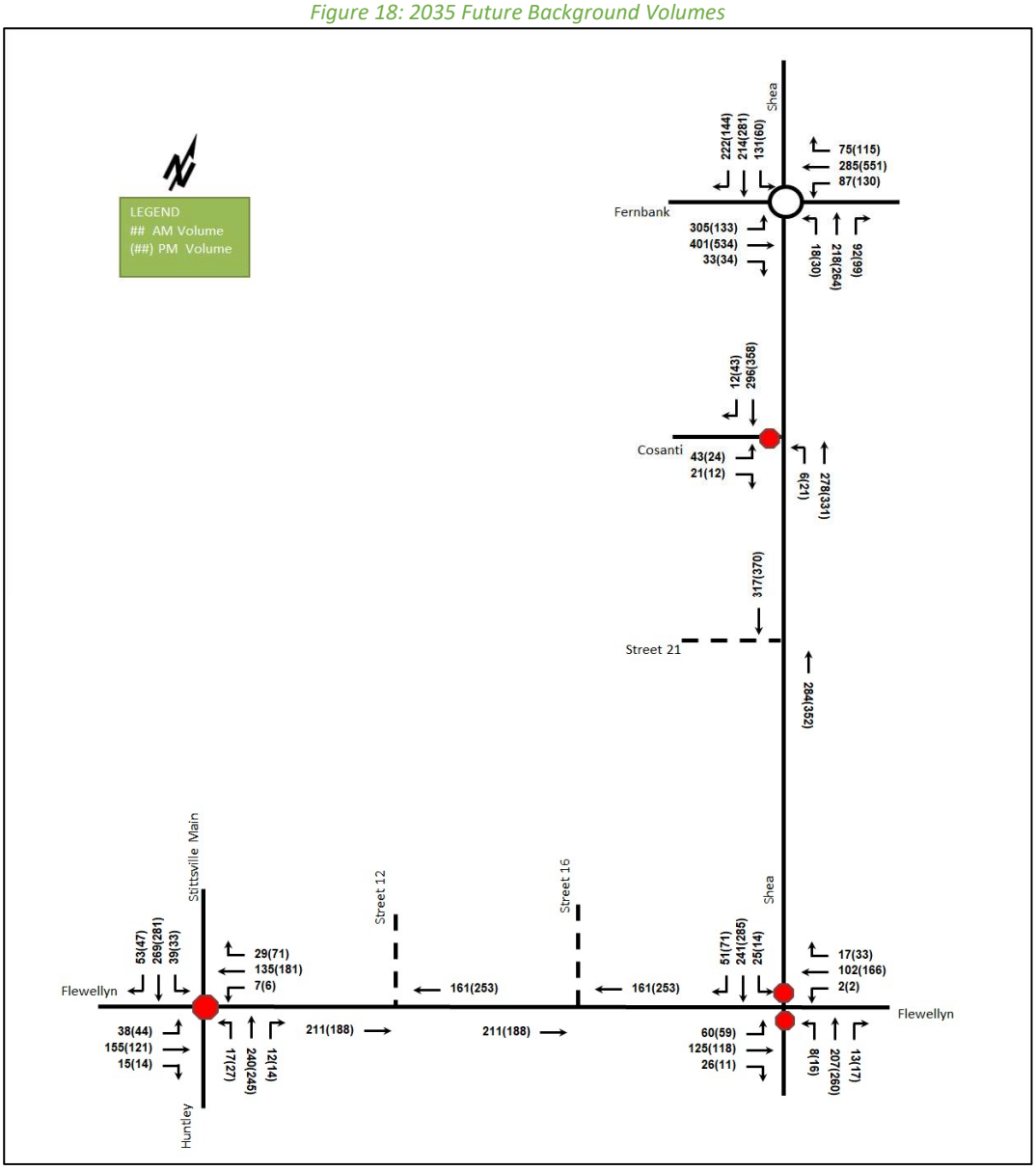


Table 20: 2035 Future Background Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Shea Road at Fernbank Road *Roundabout*	EB	D	0.87	31.2	143.2	D	0.86	30.2	124.0
	WB	B	0.59	14.4	35.2	E	0.93	42.7	210.6
	NB	C	0.62	20.7	28.3	C	0.63	18.5	33.0
	SB	B	0.65	14.5	52.1	D	0.77	27.1	55.2
	Overall	**C**	**0.87**	**21.4**	**143.2**	**D**	**0.93**	**31.8**	**210.6**
Shea Road at Flewellyn Road *Unsignalized*	EB	A	0.04	7.6	0.8	A	0.04	7.8	0.8
	WB	A	0.00	7.5	0.0	A	0.00	7.5	0.0
	NB	C	0.44	17.4	16.5	D	0.64	25.8	33.0
	SB	C	0.60	21.2	29.3	D	0.72	28.4	44.3
	Overall	**B**	-	**12.7**	-	**B**	-	**17.6**	-

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Stittsville Main Street / Huntley Road at Flewellyn Road ***Unsignalized***	EB	B	0.35	12.4	12.0	B	0.32	12.6	10.5
	WB	B	0.29	11.6	9.0	B	0.44	14.0	16.5
	NB	B	0.45	13.8	17.3	B	0.48	14.7	19.5
	SB	C	0.56	15.4	25.5	C	0.59	17.1	29.3
	Overall	**B**	**-**	**13.7**	**-**	**B**	**-**	**15.0**	**-**
Shea Road at Cosanti Drive ***Unsignalized***	EBL/R	B	0.12	12.7	3.0	B	0.08	14.0	2.3
	NBL/R	A	0.01	7.9	0.0	A	0.02	8.2	0.8
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.3**	**-**	**A**	**-**	**0.9**	**-**

Notes: Saturation flow rate of 1800 veh/h/lane
Queue is measured in metres
Peak Hour Factor = 1.000
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 intersections in the study area operate well. No capacity issues are noted.

The signalization and left-turn lane warrants and conclusions remain the same as noted in the 2030 future background conditions.

9.3 Network Rationalization

No capacity constraints are noted at the study area intersections in the background conditions. Section 11 documents the screenline review for Fernbank Road, east of Shea Road is noted to reach over 90% of its capacity during the PM peak hour in the westbound direction in the future conditions, with residual capacity on the other area roadways to support future development.

The TMP outlines the widening of Fernbank Road from two to four lanes between Stittsville Main Street and Terry Fox Drive to address capacity constraints along the roadway. While the widening of Fernbank Road remains a network improvement for the Stittsville/Kanata area, it is not required to support the proposed subdivision.

10 Transit

10.1 Route Capacity

In Section 5.1 the trip generation by mode was estimated, including an estimate of the number of transit trips that will be generated by the proposed development. Table 21 summarizes the transit trip generation.

Table 21: Trip Generation by Transit Mode

Travel Mode	Mode Share AM (PM)	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Transit	Varies	86	198	284	115	81	196

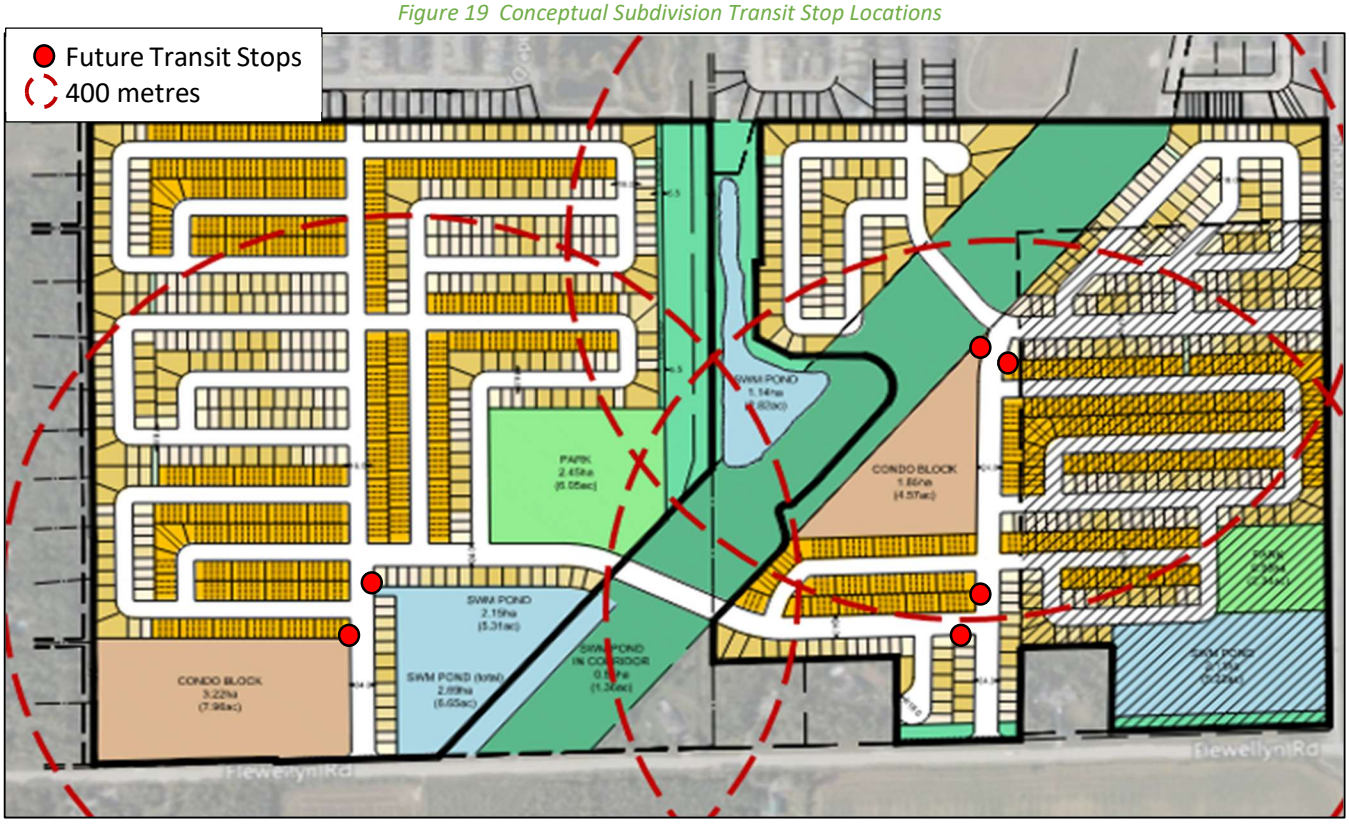
The proposed development is anticipated to generate 276 AM and 192 PM peak hour two-way transit trips. From the trip distribution found in Section 6.3 and given existing bus routing to the north and east of the site, these values were split to the north and east relative to the site. Table 22 summarizes the forecasted site-generated transit ridership trips by direction relative to the site and provides equivalent bus loads based on this ridership. future transit stops will be planned within the subdivision, which will be the primary bus stops for the residents within the subdivision.

Table 22: Forecasted Site-Generated Transit Ridership

General Destination To/From (relative to the site)	AM Peak Hour		PM Peak Hour		Service Type	Approximate Equivalent Peak Hour/Peak Direction Bus Loads
	In	Out	In	Out		
North	76	172	99	70	Bus	Three standard buses
East	10	26	16	11	Bus	Half of a standard bus

In total, a 10-15-minute AM peak hour service level is estimated to be required for the proposed lands to meet the transit demand, and a 20-minute PM peak hour service level. The future transit stops are proposed within the subdivision, as illustrated in Figure 19, with previous confirmation from Transit Services that locations are generally acceptable for the subdivision. Ultimately these routes are expected to form local service extending from the BRT station at Fernbank and Robert Grant Avenue. In the near term, a combination of a new dedicated route combined with the extension of the peak hour services to 15–20-minute service in the area (e.g. routes #61, #262, #263) would provide the service required for the community.

Figure 19 Conceptual Subdivision Transit Stop Locations



10.2 Transit Priority

No transit priority is required along the boundary or within the subdivision. Within the regional network, the westbound road capacity along Fernbank Road may require localized widening to improve transit service from Robert Grant Avenue to Shea Road to maintain service times along this segment of roadway. The single lane roundabout at Fernbank Road and Shea Road restricts the ability to provide priority measures for turning movements, therefore any widening for westbound travel would be for transit to queue jump the general travel lanes on Fernbank Road and access the roundabout quicker.

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 20. Table 23 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 20: Local Screenline

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

Table 23: Local Area Screenline Road Capacity

Horizon	Roadway	Classification	Estimated Lane Capacity	Volumes	Percent Utilization
Existing	**Stittsville Main Street**	Arterial	1000 cars/hour	225-405	22-41%
	Shea Road	Collector	800 cars/hour	245-440	30-55%
	Fernbank Road	Arterial	800 cars/hour	215-470	26-59%
	Flewellyn Road	Collector	800 cars/hour	65-175	8-22%
2030 Future Background	**Stittsville Main Street**	Arterial	1000 cars/hour	230-415	23-42%
	Shea Road	Collector	800 cars/hour	415-485	51-61%
	Fernbank Road	Arterial	800 cars/hour	355-735	44-92%
	Flewellyn Road	Collector	800 cars/hour	90-185	11-24%

Horizon	Roadway	Classification	Estimated Lane Capacity	Volumes	Percent Utilization
2035 Future Background	**Stittsville Main Street**	Arterial	1000 cars/hour	235-425	23-43%
	Shea Road	Collector	800 cars/hour	445-505	55-64%
	Fernbank Road	Arterial	800 cars/hour	375-735	46-92%
	Flewellyn Road	Collector	800 cars/hour	100-185	12-24%
2030 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	285-550	28-55%
	Shea Road	Collector	800 cars/hour	425-520	53-65%
	Fernbank Road	Arterial	800 cars/hour	355-735	44-92%
	Flewellyn Road	Collector	800 cars/hour	160-370	20-47%
2035 Future Total	**Stittsville Main Street**	Arterial	1000 cars/hour	290-560	29-56%
	Shea Road	Collector	800 cars/hour	470-540	56-68%
	Fernbank Road	Arterial	800 cars/hour	375-735	46-92%
	Flewellyn Road	Collector	800 cars/hour	170-370	21-47%

Notes:
Lane Capacity = single lane estimate
Volumes = directional volume range during AM or PM peak hours applied the City's peak period conversion factors, 0.84 and 0.92 for the morning and afternoon peak periods respectively
Percent Utilization = utilization range based on Volume for lane

Based on the percent utilization, all roadways have residual capacity in both the future background and total conditions. Although Fernbank Road, east of Shea Road, has the residual capacity, it is noted to reach over 90% of its 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 improve the capacity on Fernbank Road.

12 Intersection Design

12.1 Intersection Control

The new roadway intersections from the subdivision to Flewellyn Road and Shea Road are proposed as stop-controlled on the minor approach. Based on the collector roads and the bus stop locations, the three internal road intersections of Street 16 at Street 21, Street 13 at Street 16, and Street 12 at Street 12/Street 11 are recommended to be all-way stop-controlled to facilitate active mode crossing locations, and other internal road intersections are recommended to be stop-controlled on the minor approaches.

The new intersections along Shea Road and Flewellyn Road met the all-way stop control warrants for consideration for consideration of all-way stop-control. Although warrants were met for consideration, the operations are expected to be acceptable as a minor stop-control in all future horizons and compliance is anticipated to be low for travel along Shea Road and Flewellyn Road. All-way stop control warrant calculation sheets are provided in Appendix D.

12.2 Intersection Design

12.2.1 2030 Future Total Intersection Operations

The eastbound left turns at Flewellyn Road at Street12 during both peak hours and at Street 16 during the PM peak hour met the left-turn warrant for consideration in the 2030 future total conditions. Although the warrants were met, the operations are acceptable without the turn lane, and the queues are expected to be less than 8.6 metres. The Municipal Drain also constrains the ability to provide a left-turn lane for Street 16. It is noted that no left turn warrants were met at Shea Road at Street 21. The left-turn warrant calculation sheets are provided in Appendix F.

The 2030 future total intersection volumes are illustrated in Figure 21 and the intersection operations are summarized below in Table 24. 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 and sidra worksheets have been provided in Appendix O.

Figure 21: 2030 Future Total Volumes

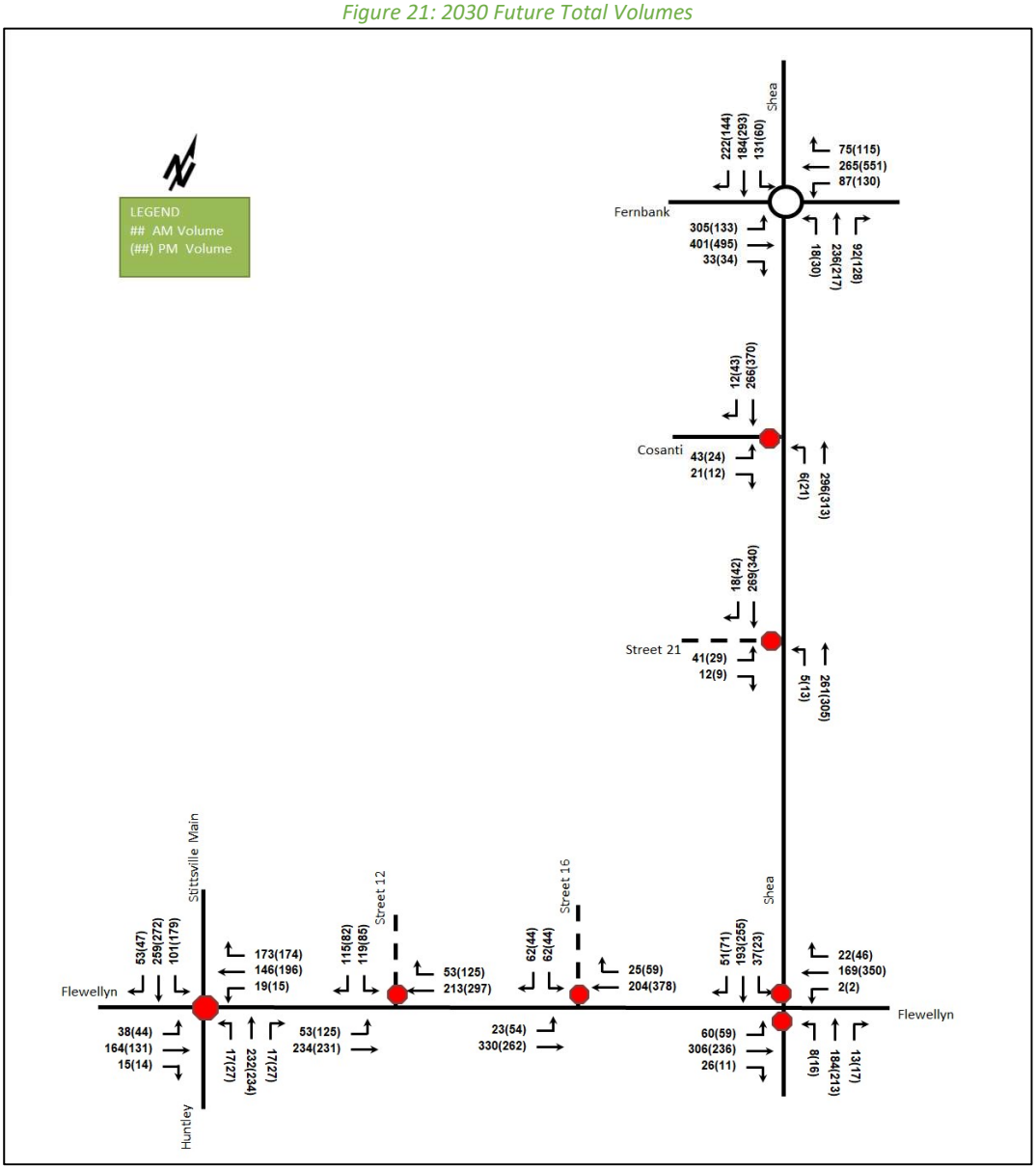


Table 24: 2030 Future Total Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
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	22.4	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*	EBL/R	B	0.10	12.4	2.3	B	0.09	13.8	2.3
	NBL/T	A	0.00	7.8	0.0	A	0.01	8.1	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.1**	**-**	**A**	**-**	**0.8**	**-**
Flewellyn Road at Street 16 *Unsignalized*	EBL/T	A	0.02	7.7	0.8	A	0.05	8.4	1.5
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.21	12.8	6.0	C	0.20	15.0	5.3
	Overall	**A**	**-**	**2.5**	**-**	**A**	**-**	**2.1**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL/T	A	0.04	7.9	0.8	A	0.11	8.6	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.41	15.4	15.0	C	0.41	19.9	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 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 the 2030 future total conditions. Signal warrant calculation sheets are provided in Appendix E. Given the existing geometric offset at the intersection and existing safety concern for this location, 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. It is noted that the City has indicated a preference for a roundabout at this location.

The southbound left turns met the warrant for consideration in the 2030 future total conditions during both peak hours at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road. 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 left-turn warrant calculation sheets are provided in Appendix F.

Based on the operational analysis and the warrants provided, geometric improvements and upgrading to a roundabout has been assessed at the intersection of Shea Road at Flewellyn Road, and a 45 metres auxiliary southbound left turn lane has been assessed at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road. Table 25 summarizes the 2030 future total operations of possible mitigation measures for the intersections of Shea Road at Flewellyn Road and Stittsville Main Street/Huntley Road at Flewellyn Road should these improvements be implemented. The Synchro and Sidra worksheets are provided in Appendix P.

Table 25: 2030 Future Total - 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**	**7.2**	**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

While not recommended, the inclusion of 30.0-metre auxiliary eastbound left-turn lane at the intersection of Flewellyn Road and Street 12 and a 15.0-metre auxiliary eastbound left-turn lane at Street 16, have been summarized in Table 26 for informational purposes only. The addition of the lanes has negligible change to the overall operations. The ability to provide the turn lane at Street 16 is limited by the Municipal Drain. The Synchro worksheets are provided in Appendix Q.

Table 26: 2030 Future Total - EBL at Flewellyn Road at Street 12 & at Street 16

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
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**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
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

12.2.2 2035 Future Total Intersection Operations

The 2035 future total intersection volumes are illustrated in Figure 22 and the intersection operations are summarized below in Table 27. As noted in the 2030 future total 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 mitigate operation constraints at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road. The intersection of Shea Road at Flewellyn Road will be analyzed as a roundabout intersection and a 45 metres auxiliary southbound left turn lane at the intersection of Stittsville Main Street/Huntley Road at Flewellyn Road will be analyzed in the 2035 future total conditions. Similar to the 2035 future total conditions, no left turn warrants were met at Shea Road at Street 21.

Synchro 11 has been used to model the unsignalized intersections and Sidra 9 to model the study area roundabout intersections. 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 R.

Figure 22: 2035 Future Total Volumes

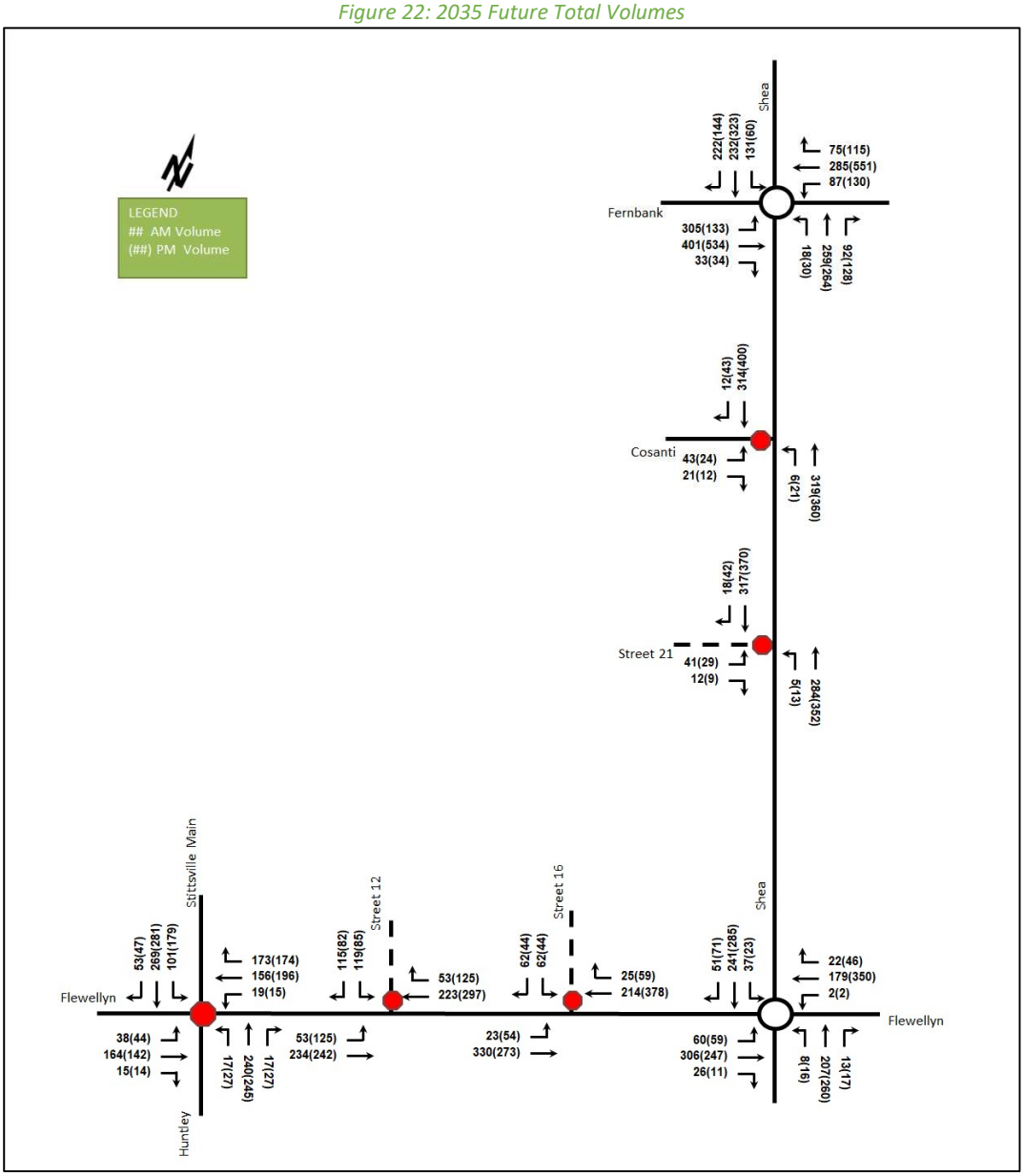


Table 27: 2035 Future Total Intersection Operations

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	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
	NB	C	0.70	24.9	36.2	C	0.68	20.9	38.9
	SB	C	0.67	15.3	57.2	D	0.84	34.5	73.1
	Overall	**C**	**0.89**	**23.7**	**152.4**	**E**	**0.93**	**35.8**	**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 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*	EBL/R	B	0.11	13.2	3.0	B	0.09	14.8	2.3
	NBL/T	A	0.00	8.0	0.0	A	0.01	8.2	0.0
	SBT/R	-	-	-	-	-	-	-	-
	Overall	**A**	**-**	**1.1**	**-**	**A**	**-**	**0.8**	**-**
Flewellyn Road at Street 16 *Unsignalized*	EBL/T	A	0.02	7.8	0.8	A	0.05	8.4	1.5
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	B	0.21	12.9	6.0	C	0.20	15.1	5.3
	Overall	**A**	**-**	**2.5**	**-**	**A**	**-**	**2.1**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL/T	A	0.04	7.9	0.8	A	0.11	8.6	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.41	15.7	15.0	C	0.42	20.2	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.

Simialar 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. The 2035 future total operations with a 30.0 metres auxiliary eastbound left turn lane at the intersections of Flewellyn Road at Street 12 and a 15.0 metres auxiliary eastbound left turn lane at Street 16 have been summarized in Table 28 for informational purposes only. The left-turn warrant calculation sheets are provided in Appendix F. The Synchro worksheets are provided in Appendix S.

Table 28: 2035 Future Total - EBL at Flewellyn Road at Street 12 & at Street 16

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
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**	**-**

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
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	0.41	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

12.2.3 Intersection MMLOS

All study area intersections are unsignalized intersections, therefore, no MMLOS is required.

12.2.4 Recommended Design Elements

Based on the operational analysis provided, the following network improvements are indicated for consideration by the 2030 future total horizon:

- Shea Road at Flewellyn Road:
  - Geometric improvements and upgrading to a roundabout/signal (requires City land acquisition)
- Stittsville Main Street/Huntley Road at Flewellyn Road:
  - A 45-metre auxiliary southbound left turn lane (requires City land acquisition)

12.3 Eder Lands Sensitivity

While the Eder Lands are not within the proposed subdivision limits, they are a gap in the urban boundary and were considered within the W-4 Lands review to ensure the area was planned wholistically. Given this, a sensitivity analysis of these extra lands will be provided to give a fulsome analysis of the expected transportation network impacts. The sensitivity analysis will be for the 2030 build-out year and consider the proposed subdivision and Eder Lands.

It is estimated that the Eder Lands to be comprised of approximately 222 townhomes and 140 single detached homes.

12.3.1 Eder Lands Trip Generation and Assignment

Using the same methodology outlined in Section 4, Table 29 summarizes the total person trip generation for the Eder Lands, Table 30 summarizes the trip generation by mode and peak hour and Figure 23 illustrates the new site-generated volumes for the Eder Lands.

Table 29: Eder Lands 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

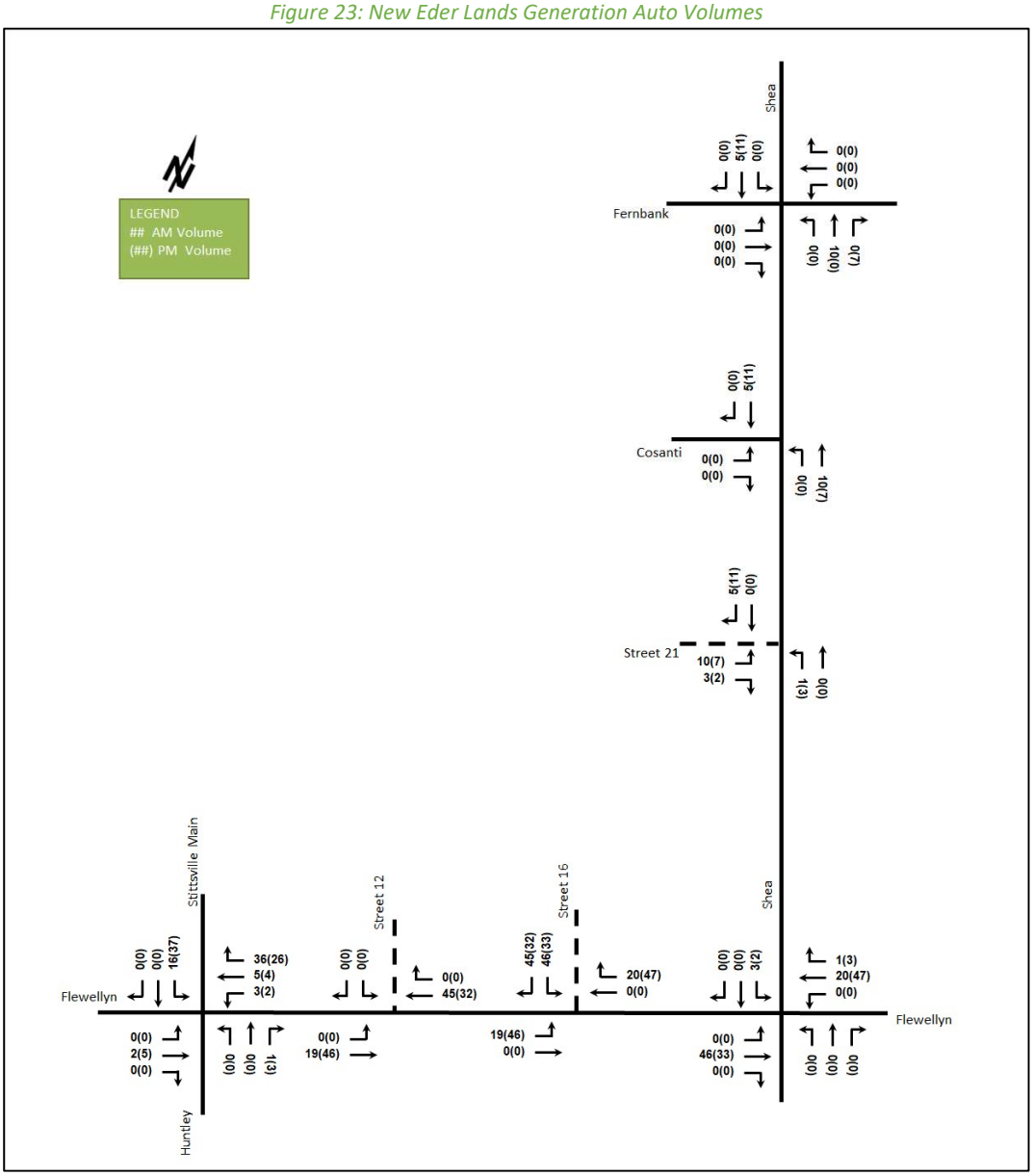
Table 30: Eder Lands Trip Generation by Mode

Travel Mode		AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
Total	Auto Driver	45	104	149	106	74	180
	Auto Passenger	13	30	43	34	24	58
	Transit	22	52	73	29	20	49

Travel Mode	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
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 Eder Lands.

Figure 23: New Eder Lands Generation Auto Volumes



With Eder Lands, the 2035 future total intersection volumes are illustrated in Figure 24 and the intersection operations are summarized below in Table 31. As noted in the 2035 future total 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 with Eder Lands.

Similar to the conditions without Eder Lands, although eastbound left turn warrants were met for consideration at the intersections of Flewellyn Road at Street 12 and at Street 16, the operations are acceptable without the turn lane. No left turn warrants were met at Shea Road at Street 21. The left-turn warrant calculation sheets are provided in Appendix F.

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 T.

Figure 24: 2035 Future Total Volumes– Sensitivity with Eder Lands

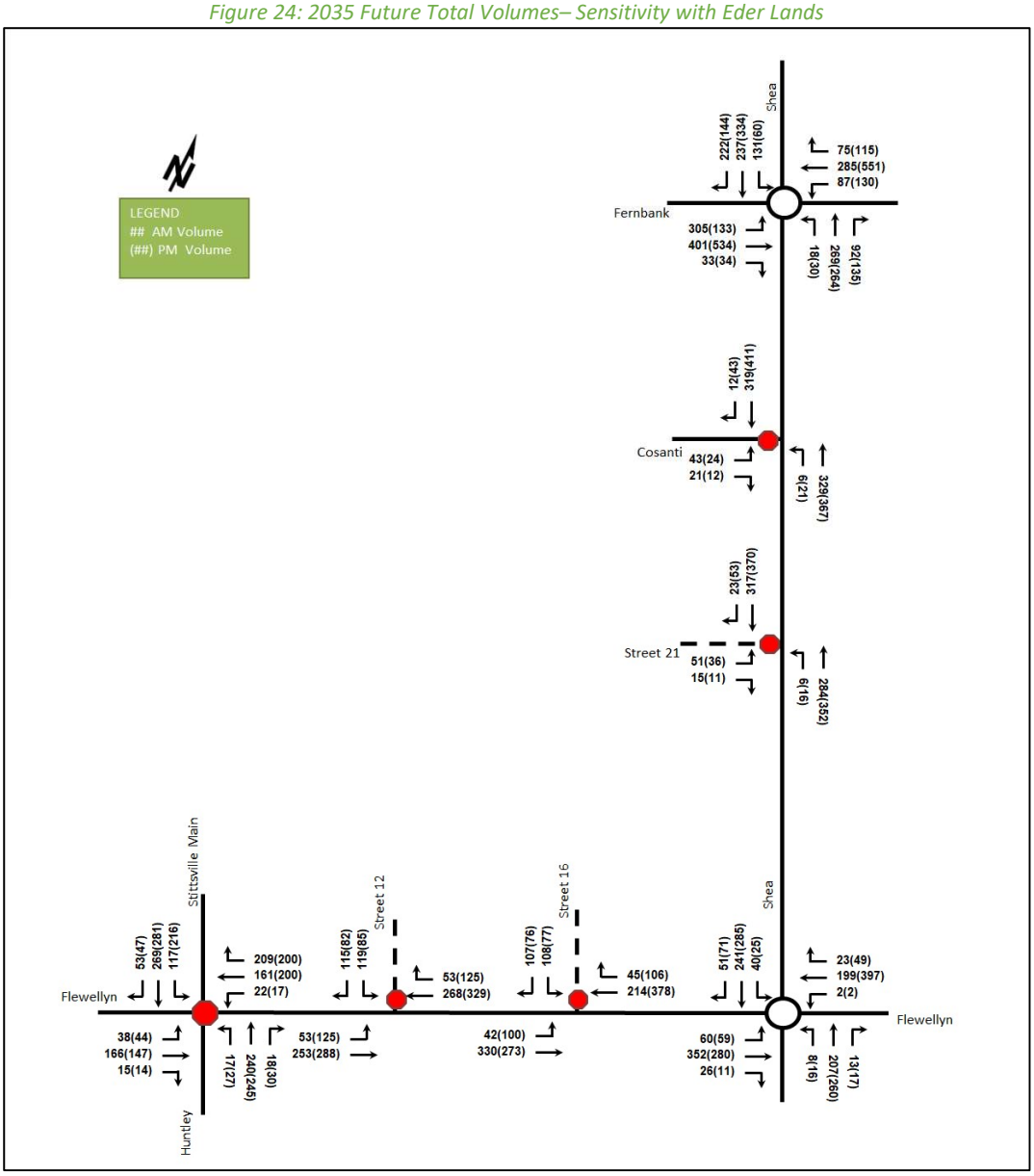


Table 31: 2035 Future Total Intersection Operations– Sensitivity with Eder Lands

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	0.47	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	13.5	3.0	C	0.09	15.2	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*	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/T	A	0.03	7.8	0.8	A	0.09	8.7	2.3
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.39	15.8	14.3	C	0.40	20.7	14.3
	Overall	**A**	**-**	**4.4**	**-**	**A**	**-**	**4.0**	**-**
Flewellyn Road at Street 12 *Unsignalized*	EBL/T	A	0.04	8.0	0.8	A	0.11	8.7	3.0
	WBT/R	-	-	-	-	-	-	-	-
	SBL/R	C	0.45	17.3	17.3	C	0.46	22.7	17.3
	Overall	**A**	**-**	**5.2**	**-**	**A**	**-**	**4.7**	**-**

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

With Eder Lands, the study area intersections are anticipated to operate well during both the AM and PM peak hours.

Simialar to the conditions without Eder Lands, Table 28 summarized the 2035 future total operations with a 30.0 metres auxiliary eastbound left turn lane at the intersections of Flewellyn Road at Street 12 and a 25.0 metres auxiliary eastbound left turn lane at Street 16 for informational purposes only. The Synchro worksheets are provided in Appendix U.

Table 32: 2035 Future Total – Sensitivity with Eder Lands, EBL at Flewellyn Road at Street 12 & at Street 16

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	V/C	Delay	Q (95th)	LOS	V/C	Delay	Q (95th)
Flewellyn Road at Street 16 ***Unsignalized***	EBL	A	0.03	7.8	0.8	A	0.09	8.7	2.3
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.39	15.7	13.5	C	0.40	20.4	14.3
	Overall	**A**	**-**	**4.4**	**-**	**A**	**-**	**3.9**	**-**
Flewellyn Road at Street 12 ***Unsignalized***	EBL	A	0.04	8.0	0.8	A	0.11	8.7	3.0
	EBT	-	-	-	-	-	-	-	-
	WB	-	-	-	-	-	-	-	-
	SB	C	0.44	17.1	16.5	C	0.45	22.2	16.5
	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

12.3.2 Recommended Design Elements

Similar to the scenario without Eder Lands, the intersection of Shea Road at Flewellyn Road should be realigned by the City to provide a higher order intersection control, and the City explore the land acquisition for the possible implementation of a southbound left-turn lane at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road.

13 W-4 Concept Plan

The plan of subdivision has undergone minor revisions from the concept proposed during the urban expansion process to remove the future neighbourhood overlay. The collector road network has remained consistent with the accesses similar to those originally proposed. The internal local road network has been refined for specific unit typologies, and the condo blocks have been reoriented from the Eder parcel into the subject subdivision and to the southwest corner. Pedestrian walkway blocks have been added to link the various west side local road loops, break up a number of larger block lengths and link to various parks or open space.

A unit increase has resulted from the various changes, increasing the subdivision area from 1,459 units (416 single family homes, 707 townhomes, 336 stacked condo) to 1,692 residential units (527 single family homes, 615 townhomes, 550 stacked condo), predominantly through an increase in the stacked condo units. The unit increase did not have a notable impact on the transportation network operations and can be supported through the recommendations of the W-4 concept plan work.

Overall, the refinements for the plan of subdivision are consistent with the previous studies from a transportation perspective.

14 Summary of Improvements Indicated and Modifications Options

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

Proposed Site and Screening

- The Eder Lands, adjacent to the proposed development, were considered within the W-4 Lands study and reside outside the urban boundary. They are not part of the proposed subdivision within this study
- The plan of subdivision proposed a total of 615 townhomes, 527 single-detached homes, 550 stacked townhomes, and park/open space within the proposed development

- New collector roadways are proposed to connect to Shea Road and Flewellyn Road, and new local roads to connect to Painted Sky Way and to Parade Drive at Hickstead Way intersection
- The anticipated build-out is assumed to be 2030
- The trip generation and safety triggers were met for the TIA Screening

Existing Conditions

- Stittsville Main Street, Huntley Road, and Fernbank Road are arterial roads, Shea Road is a collector road in the study area, and Painted Sky Way, Parade Drive, Hickstead Way, and Cosanti Drive are local roads
- 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, 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
- Shea Road at Flewellyn Road and Shea Road at Cosanti Drive met the all-way stop-control warrants for consideration, and the operations are acceptable to remain as minor stop-control conditions
- The Stittsville Main Street / Huntley Road at Flewellyn Road intersection met the Signal Justification 1 only and 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

Planned Conditions

- Robert Grant Avenue is a 2-lane arterial roadway between Abbott Street and Fernbank Road and is being extended northwards from Abbott Street to Hazeldean Road
- 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, the timeline for this project is unknown, and this project will not be included in the analysis
- Within the 2023 Transportation Master Plan – Part 1 identified a suggested route from Shea Road, located 640 metres north of Fernbank Road, to the south, and proposed paved shoulders along Flewellyn 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 1186 two-way people trips during the AM peak hour and 1245 two-way people trips during the PM peak hour
- Of the forecasted people trips, 587 two-way trips will be vehicle trips during the AM peak hour and 711 two-way trips will be vehicle trips during the PM peak hour

- Of the forecasted people trips, 284 two-way trips will be transit trips during the AM peak hour and 196 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, garages for typical townhomes, and surface parking for stacked townhomes
- Bicycle parking is assumed to be within the individual units
- The collector roads 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
- Pedestrian crossovers are proposed within the Hydro corridor to allow a continuous multi-use pathway and provide additional traffic calming through narrowings
- Pathways are anticipated to be provided along the Hydro corridor, stormwater management ponds and improve connectivity to the area parks
- The existing Hydro corridor and existing stormwater management ponds are noted within the subdivision, and two new proposed stormwater management pond areas and two parks are proposed

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 12, 16, and 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
- It is noted that the lateral shifts have potential impacts to transit service and maintenance operations, as well was remove 45 metres or more of on-street parking
- 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
- These are not intended to be the corner triangles ultimately provided, they are illustrative only to address City commentary
- 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 and bicycle LOS

- At least 2.0 metres sidewalks and less than 50 km/h of operating speed 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 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
- Both the internal local and collector 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 intersections in the study area operate well in the future background conditions
- No capacity constraints are noted at the study area intersections in the background conditions
- No intersection will meet warrants for consideration of signalization or left turn lanes in the future background conditions
- The TMP outlines the widening of Fernbank Road from two to four lanes between Stittsville Main Street and Terry Fox Drive to address capacity constraints along the roadway. The widening of Fernbank Road remains a network improvement for the Stitsville/Kanata area. It is not required to support the proposed subdivision

Transit

- The proposed development is anticipated to generate an additional 284 AM and 196 PM peak hour two-way transit trips
- It is noted that future transit stops will be planned within the subdivision, which will be the primary bus stops for residents within the subdivision
- Potential bus stop locations have been consultant with Transit Services, and the location of the southbound stop on Street 12 will need to be confirmed
- In total, a 10-15-minute AM peak hour service level is estimated to be required for the proposed lands to meet the transit demand, and a 20-minute PM peak hour service level
- In the near term, a combination of a new dedicated route combined with the extension of the peak hour services to 15–20-minute service in the area (e.g. routes #61, #262, #263) would provide the service required for the community

Network Concept

- Area roadways have the residual capacity in both the background and total conditions, therefore, site traffic can be accommodated from a regional network perspective
- Fernbank Road, east of Shea Road is noted to reach over 90% of its capacity during the PM peak hour in the westbound direction in the future conditions, with residual capacity on the other area roadways to support future development
- 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 intersections from the subdivision to Flewellyn Road and Shea Road are proposed as stop-controlled on the minor approach
- The three internal road intersections of Street 16 at Street 21, Street 13 at Street 16, and Street 12 at Street 12/Street 11 are recommended to be all-way stop-controlled for active mode crossing locations, and other internal road intersections are recommended to be stop-controlled on the minor approaches
- Although eastbound left turns at Flewellyn Road at Street 12 during both peak hours and at Street 16 during the PM peak hour met the left-turn warrants for consideration in the 2030 future total conditions, no turn lane is recommended
- No left turn warrants were met at Shea Road at Street 21 at any horizon
- 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 in 2030 future total conditions
- The Shea Road at Flewellyn Road intersection met Signal Justification 7 in the 2030 future total conditions
- The southbound left turns met the warrants for consideration in 2030 future total conditions during both peak hours at the intersection of Stittsville Main Street / Huntley Road at Flewellyn Road, and will require the City acquire land to implement an auxiliary southbound left turn lane
- 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
- 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 total horizon
- Both of the above mitigation measures are in constrained existing property and cannot be investigated without land acquisition by the City
- The study area intersections are anticipated to operate well during both peak hours in 2035 future total conditions with mitigation measures

Eder Lands Sensitivity

- A total of 149 AM and 180 PM new peak hour two-way vehicle trips are projected as a result of the Eder Lands
- The Eder Lands sensitivity analysis does not require additional mitigation measures at the study area intersections

15 Conclusion

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

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Appendix A

TIA Screening Form and PM Certification Form

Appendix B

Turning Movement Counts

Appendix C

Synchro and Sidra Intersection Worksheets – Existing Conditions

Appendix D

All-Way Stop-Control Warrant Calculation

CGH TRANSPORTATION

Appendix E

Signal Warrant Calculation

CGH TRANSPORTATION

Appendix F

Left-Turn Warrant Calculation

Appendix G

Collision Data

CGH TRANSPORTATION

Appendix H

Conceptual Traffic Calming Plan

CGH TRANSPORTATION

Appendix I

MMLOS Analysis

Appendix J

TDM Checklist

CGH TRANSPORTATION

Appendix K

TRANS Model

Appendix L

Background Development

CGH TRANSPORTATION

Appendix M

Synchro and Sidra Intersection Worksheets – 2030 Future Background Conditions

CGH TRANSPORTATION

Appendix N

Synchro and Sidra Intersection Worksheets – 2035 Future Background Conditions

Appendix O

Synchro and Sidra Intersection Worksheets – 2030 Future Total Conditions

Appendix P

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

Appendix Q

Synchro and Sidra Intersection Worksheets – 2030 Future Total - EBL at Flewellyn Road at Street 12 & at Street 16

Appendix R

Synchro and Sidra Intersection Worksheets – 2035 Future Total Conditions

Appendix S

Synchro and Sidra Intersection Worksheets – 2035 Future Total - EBL at Flewellyn Road at Street 12 & at Street 16

Appendix T

Synchro and Sidra Intersection Worksheets – 2035 Future Total Conditions Sensitivity

Appendix U

Synchro and Sidra Intersection Worksheets – 2035 Future Total – Sensitivity with Eder Lands, EBL at Flewellyn Road at Street 12 & at Street 16