Residential Development at 100 Weeping Willow, Ottawa

Traffic Impact Assessment – Strategy Report

Homestead Land Holdings Limited

September 13, 2021

→ The Power of Commitment

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1. Screening Form

GHD prepared a Transportation Impact Assessment (TIA) to support the new residential development at 100 Weeping Willow Lane, Ottawa, Ontario. The TIA was completed according to the City of Ottawa's Transportation Impact Assessment Guidelines (2017). This study consists of the five mandatory steps which are screening, scoping, forecasting, analysis, and reporting. All steps and their respective modules are completed in sequence. The purpose of this study is to forecast the potential impacts of the new development on the existing transportation network and determine any improvements needed to mitigate these impacts. The Screening form has been prepared and is included as Appendix A. As shown in the Screening form, the Trip Generation trigger is satisfied, and the TIA study must proceed to the next step.

2. Description of Proposed Development

The proposed development is located on the corner of Weeping Willow Lane (formerly Varley Lane) and Varley Drive with a civic address of 100 Weeping Willow Lane. The development will be built next to an existing apartment building.

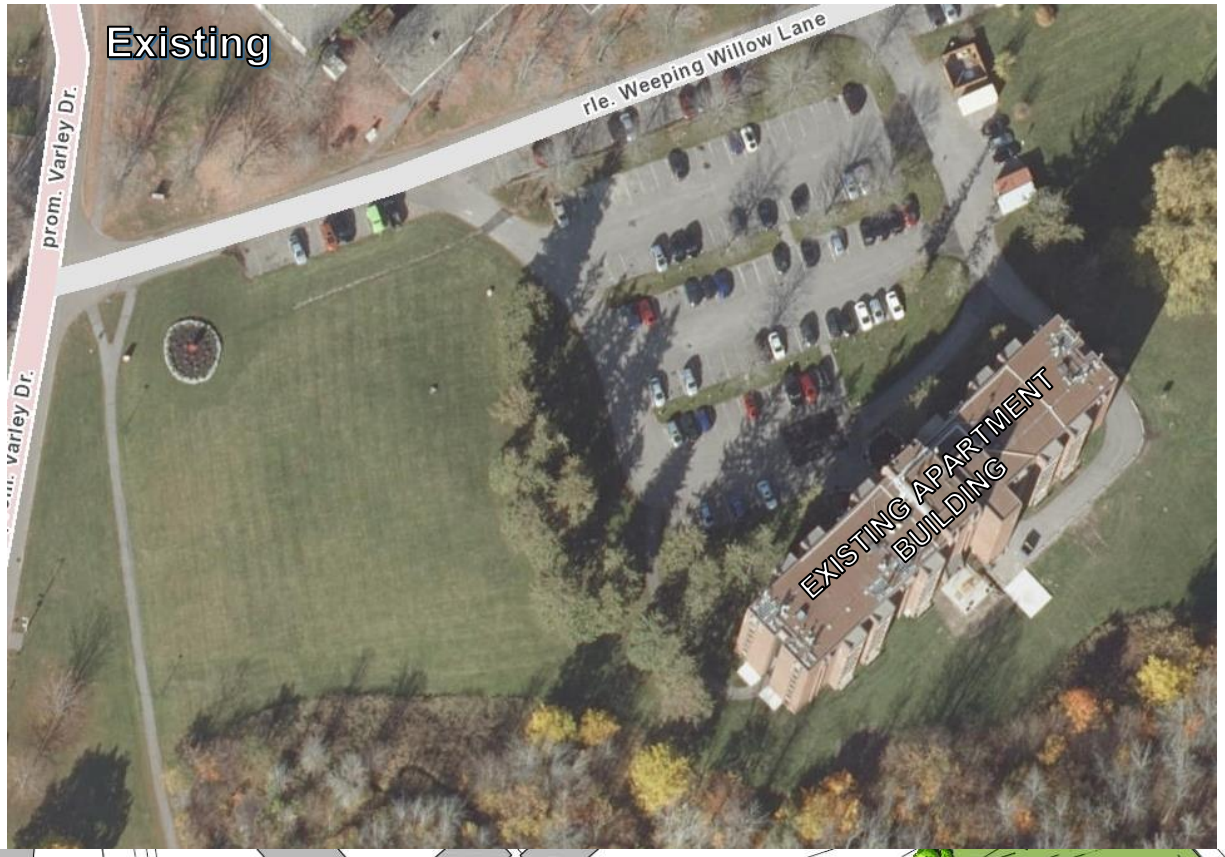
The subject lands are designated General Urban Area in the City's Official Plan and are zoned R5A [1533] H(30) S331 and R5A [1533] H(20) S331. Pursuant to Schedule B5 of the City of Ottawa's Draft Official Plan, the subject lands are identified within the Suburban Transect and Neighbourhood Designation.

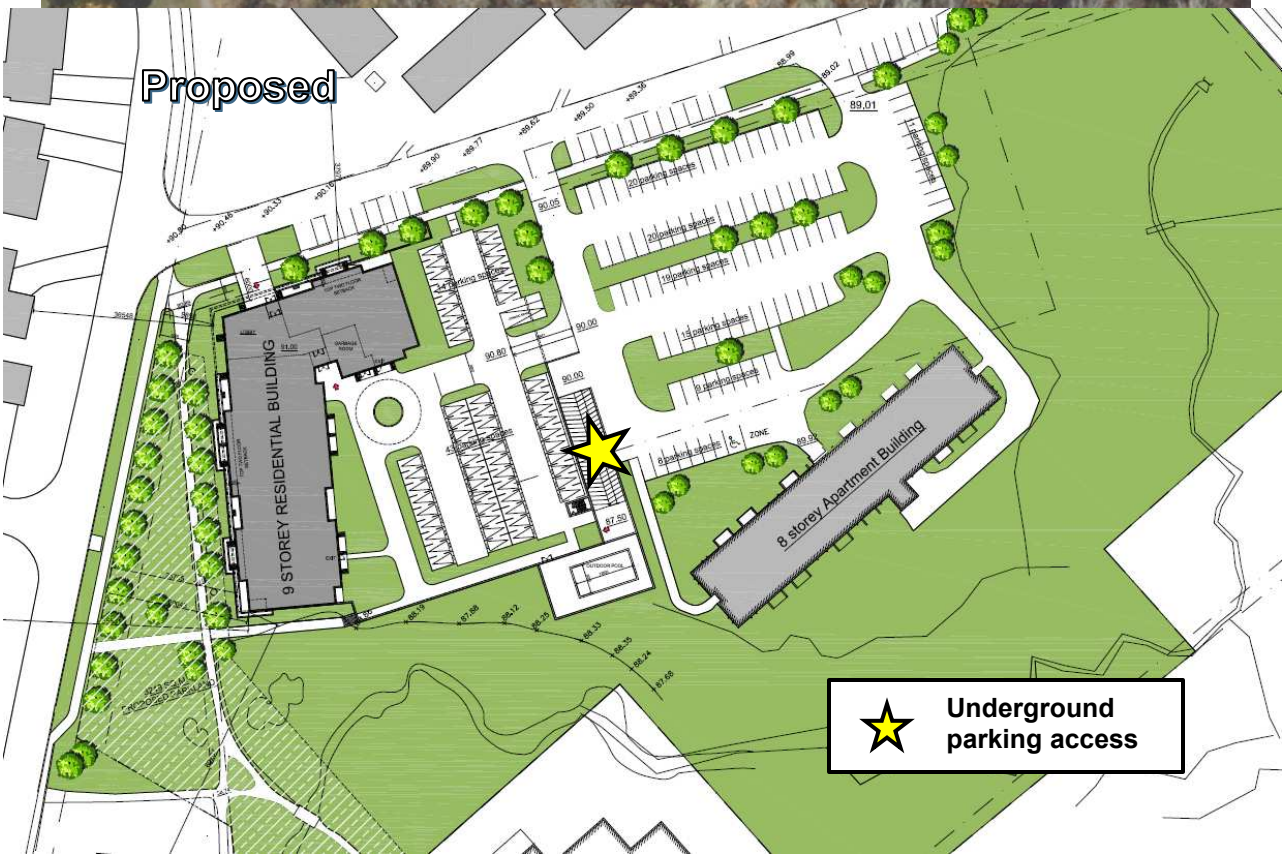
The proposed development involves constructing a 9-storey residential building on the land south-east of the intersection. A full-movement access will be provided to the surface and underground parking lots from Weeping Willow Lane. The existing accesses on Weeping Willow Lane will be used for the development. The western access will be approximately 10 meters farther from the intersection of Varley Drive than in the existing conditions and the existing parking in front of the existing apartment building will be optimized to improve vehicle circulation patterns.

Pedestrians can access the building using a north-facing entrance or a south-facing entrance. Sidewalks are planned along Weeping Willow Lane and south of the development to connect with the existing sidewalk on Varley Drive. The proposed development is not within a Design Priority Area.

The building will contain 142 residential units and provide 199 parking spaces with 142 underground spaces and 57 spaces at ground level. The construction is planned to start in 2022 and will be completed by the end of the year 2024 with occupancy starting in 2023.

Figure 1 – Existing site and proposed plan





3. Existing Conditions

3.1 Area Multi-Modal Network

Teron Road is a north-south major collector road with one lane per direction and a posted speed limit of 50 km/hr. There are bike lanes in both directions as shown in Figure 2.

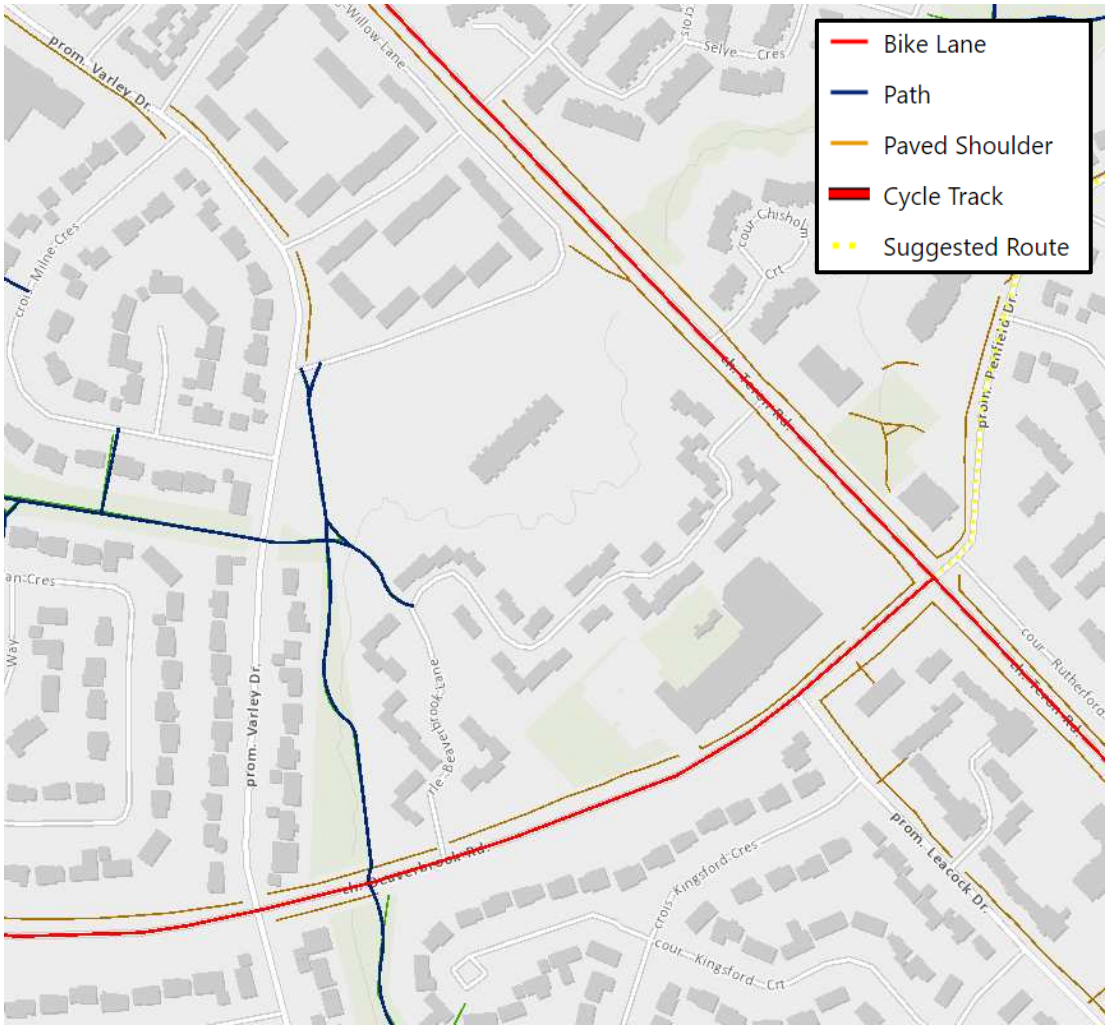
Varley Drive is a north-south collector road with one lane per direction and a posted speed limit of 40 km/hr. There is a multi-use path on the east side of the road to the south of Weeping Willow Lane.

Weeping Willow Lane is a U-shaped local street that gives access to the residents from Varley Drive. It has one lane per direction with perpendicular parking. There is no sidewalk.

Beaverbrook Road is an east-west collector road with one lane per direction. The posted speed limit is 40 km/hr and there is a sidewalk on the north side of the road. There are cycling lanes along the road in the vicinity of the intersection with Varley Drive and a bike path that crosses Beaverbrook Road approximately 80m east of Varley Drive.

There are no traffic management measures existing in the study area. The road classification is shown in Figure 3. There are no truck routes in the study area as shown on Figure 4.

Figure 2 – Cycling and pedestrian facilities

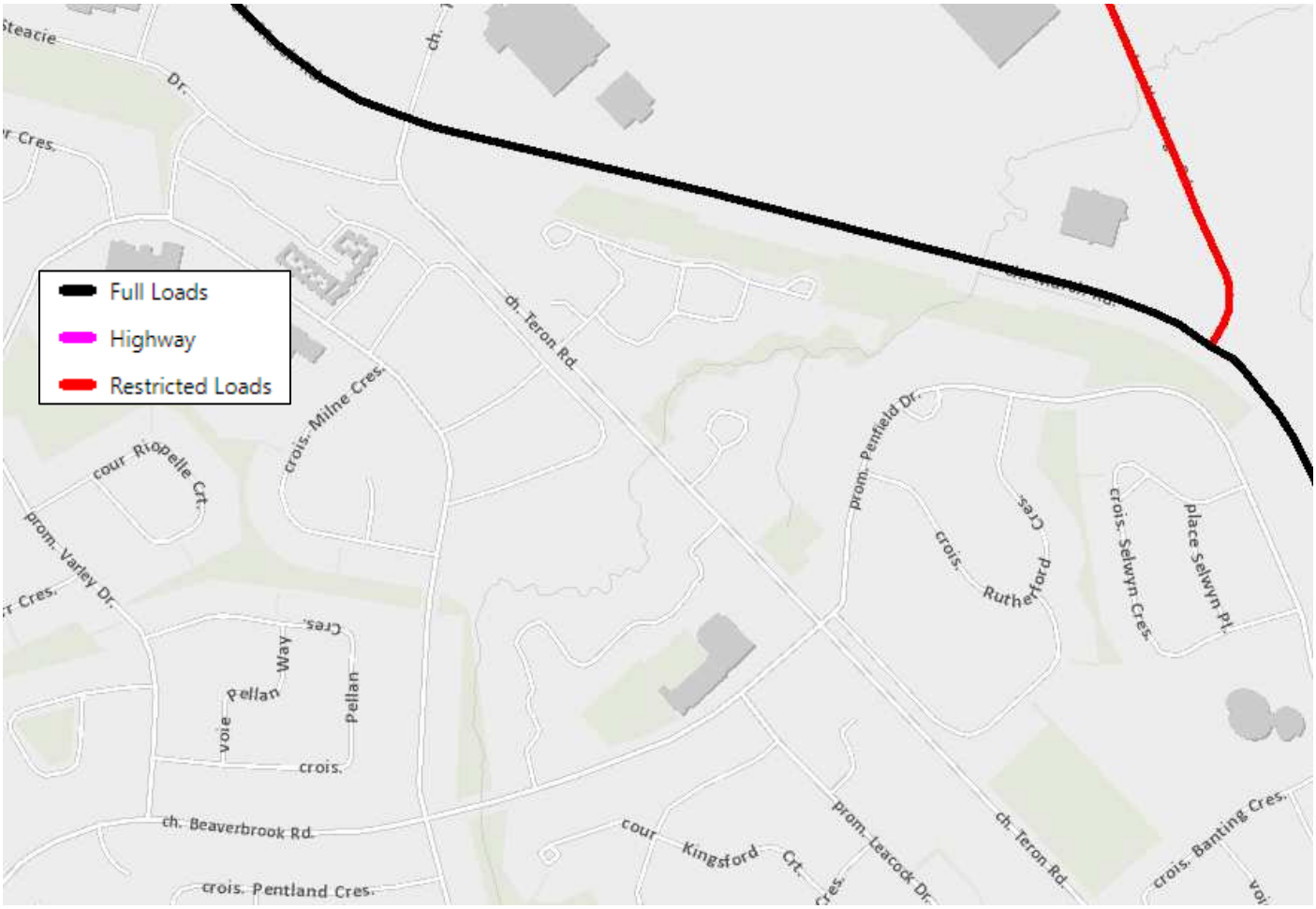


Source: geoOttawa

Figure 3 – Road Classification

Source: geoOttawa

Figure 4 – Truck routes



3.2 Intersections

Varley Drive / Weeping Willow Lane is controlled with a stop sign for westbound vehicles. All the approaches have only one lane that is shared for all movements.

Varley Drive / Beaverbrook Road is controlled by a stop sign for all approaches. All the approaches have only one lane that is shared for all movements.

Teron Road / Beaverbrook Road is controlled by traffic signals. All approaches have a left turn lane and a lane for the through and right movements.

The intersection configurations are shown in Table 1.

Table 1 – Intersection configuration

	Geometry	Control
Varley Drive / Weeping Willow Lane		
Northbound Varley Drive		None
Southbound Varley Drive		None
Westbound Weeping Willow Lane		
Varley Drive / Beaverbrook Road		
Northbound Varley Drive		
Southbound Varley Drive		
Eastbound Beaverbrook Road		
Westbound Beaverbrook Road		
Teron Road / Beaverbrook Road		
Northbound Teron Road		
Southbound Teron Road		
Eastbound Beaverbrook Road		
Westbound Beaverbrook Road		

3.3 Driveways

Two existing driveways will provide vehicular access to the site. The locations of driveways in the study area are summarized in Table 2.

Table 2 – Existing Driveways

ID	Land use	Location
1	Residential (proposed development main access)	Weeping Willow Lane – South side
2	Residential (proposed development secondary access)	Weeping Willow Lane – South side
3	Individual house	Varley Drive – West side
4	Individual house	Varley Drive – West side
5	Individual house	Varley Drive – West side
6	Individual house	Varley Drive – West side
7	Individual house	Varley Drive – West side
8	Individual house	Varley Drive – West side
9	Individual house	Varley Drive – West side

Figure 5 – Access locations

3.4 Transit

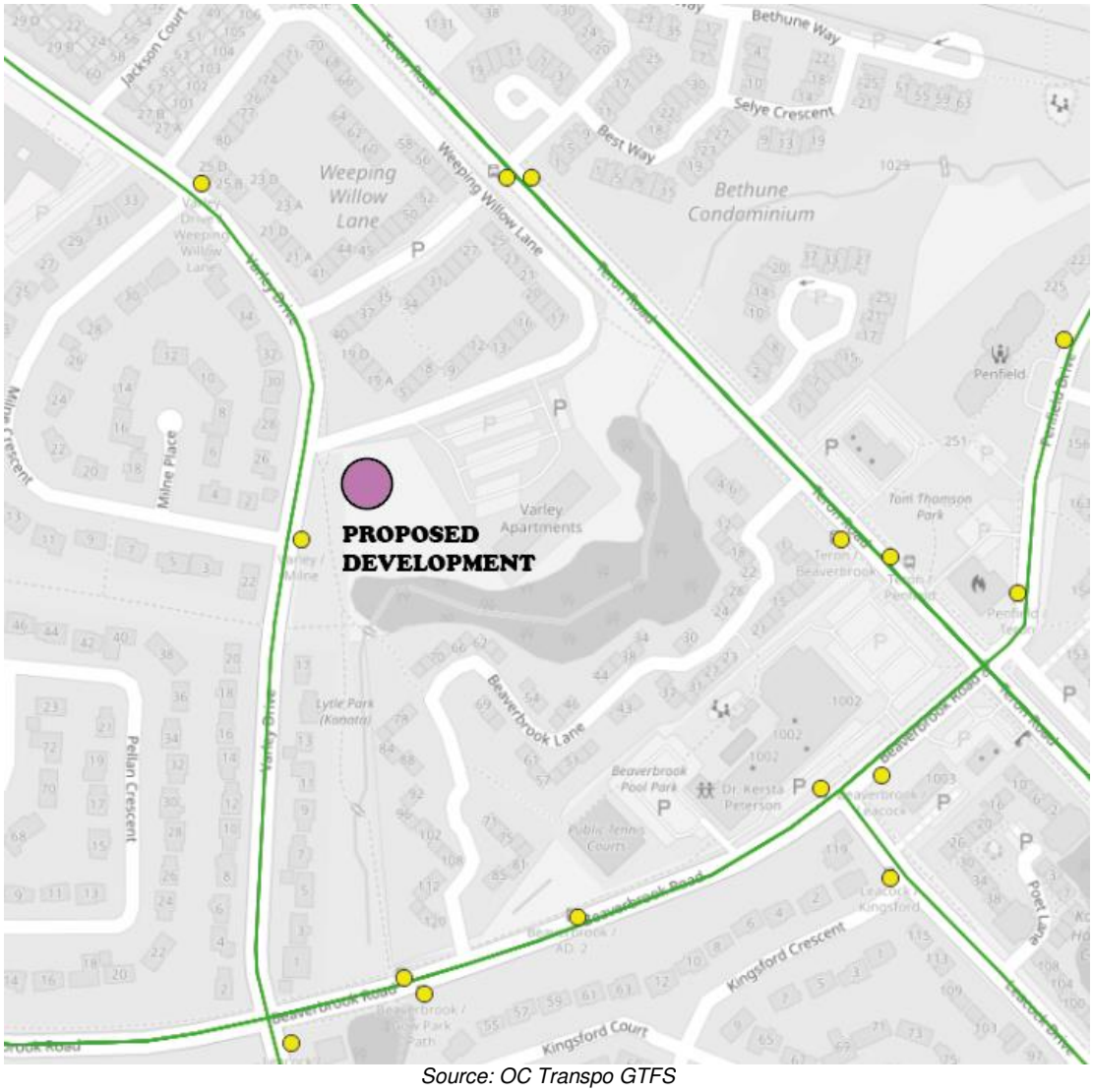
There is one bus route (#265) on Varley Drive. That route only travels northbound and the closest stop is located 60 meters south of Weeping Willow Lane.

There are also 3 more bus routes on Teron Road (#63, 64 and 166). The nearest bus stop on Teron Road is 350 meters walking distance away from the project.

On Beaverbrook Road, there is only one route (#168) that travels east-west.

The location of the bus stops in the study area are shown in yellow in Figure 6. The bus schedules are provided in Appendix B.

Figure 6 – Transit facilities and bus stops

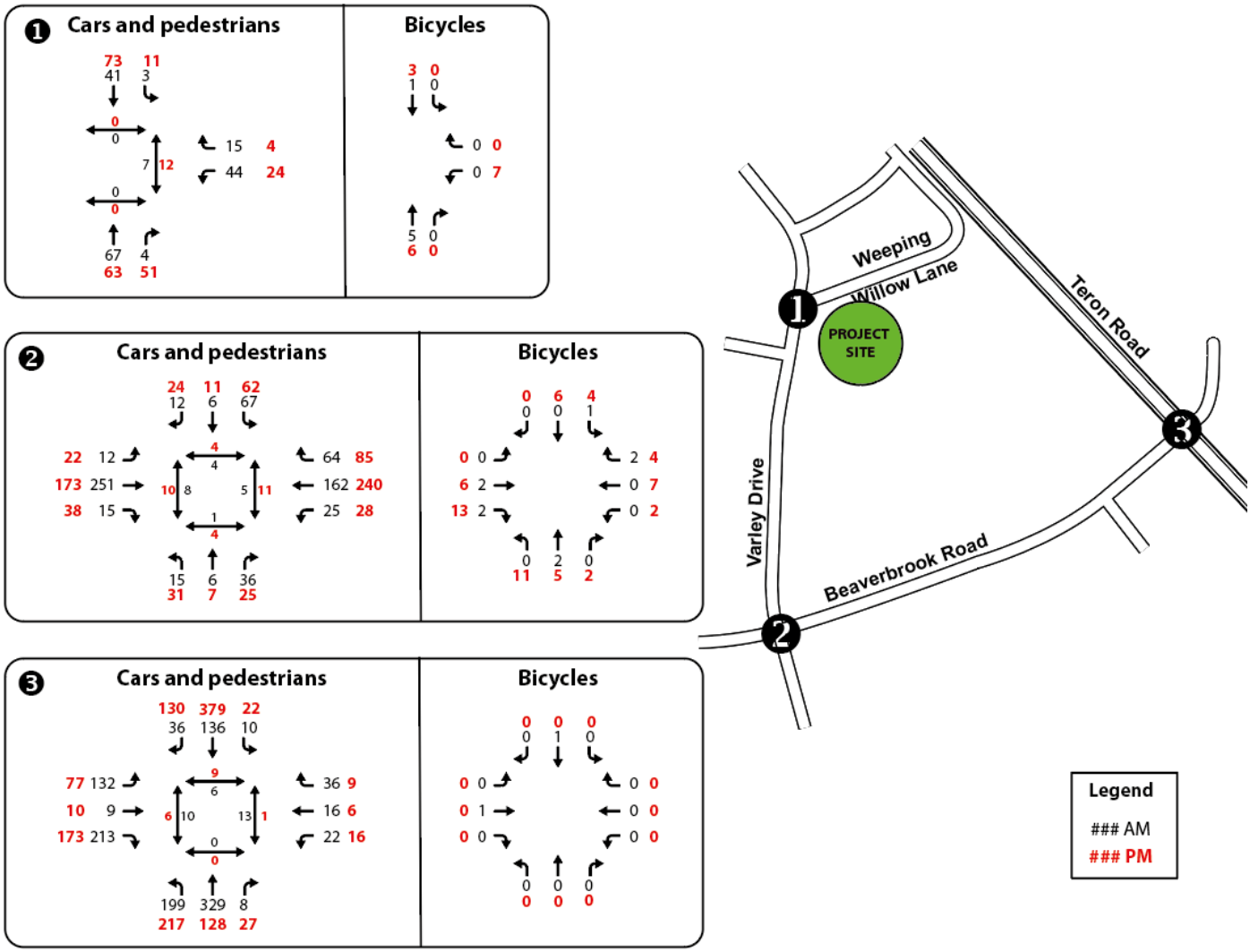


Source: OC Transpo GTFS

3.5 Peak Hour Travel Demand

Traffic counts were completed by GHD on June 15th 2021 at Weeping Willow Lane/Varley Drive and Beaverbrook Road/ Varley Drive. To take into account the impacts of the pandemic on the traffic volumes, calibration was completed using a count provided by the City for Teron Road & Beaverbrook Road intersection. The traffic volumes used in the TIA are shown in Figure 7. The traffic counts are presented in Appendix C.

Figure 7 – Vehicular volumes at the intersections



3.6 Collision Analysis

The collision data was taken from the City of Ottawa open data website. The data covers a period of 5 years from 2015 until 2019. In total, 14 collisions occurred within the study area.

WEEPING WILLOW LANE

There were no collisions listed on Weeping Willow Lane.

VARLEY DRIVE

Two collisions were listed on Varley Drive between Beaverbrook Road and Milne Crescent. Both were injury collisions and both involved only one vehicle travelling southbound. One collision was in early December and the other late January. The weather was clear at the time of the collisions.

BEAVERBROOK ROAD

A single collision was listed between Teron Road and Leacock Drive with a vehicle going westbound turning left and another one going eastbound. The collision was property damage only and happened during daylight with clear conditions.

TERON ROAD & BEAVERBROOK ROAD

There were 8 collisions at this intersection from 2015 to 2019 with the following impact types: 5 SMV, 2 angle and 1 turning movement. Two collisions happened with bicycles and three involved pedestrians. 75% of the collisions occurred during daylight with clear conditions and there were two collisions during rainy or snowy conditions. Five collisions caused non-fatal injuries. Out of the 5 collisions involving active transportation, four of them have “failed to yield right-of-way” as the driver 1 action and the other one is an “improper turn”.

VARLEY DRIVE & BEAVERBROOK ROAD

One collision occurred in 2019 where a vehicle failed to yield at the stop sign during rainy conditions, which resulted in an angle collision with non-fatal injury. The collision involved a vehicle travelling eastbound and another travelling southbound.

BEAVERBROOK ROAD & LEACOCK DRIVE

One collision happened in 2019 during snowy conditions where two vehicles travelling northbound collided (rear-end collision) resulting in personal damages only.

4. Planned Conditions

4.1 Changes to the Area Transportation Network

According to the Ottawa Transportation Master Plan Affordable Network, a BRT is planned along March Road to connect with Highway 417 with a station at the intersection of Teron Road. That station will be approximately 400 meters from the proposed development.

Many cycling links are planned in the area according to the Ottawa Cycling Plan. A spine route is to be added along March Road with local routes on Teron Road, Beaverbrook Road and Varley Drive.

A sidewalk is planned on Varley Drive, on the west side of the road, from Beaverbrook Road to the existing sidewalk at Milne Crescent.

4.2 Other Study Area Developments

The planned developments in the vicinity of the proposed development are as shown in Figure 8 and described in Table 3. However, given the locations and the sizes of these projects, they are unlikely to have a significant impact on the studied intersections.

Figure 8 – Other Study Area Developments

Source: Ottawa Development Applications Search

Table 3 – Other Study Area Developments

Location	Details
329 March Road	Three unit, single-storey commercial building of 380 m²
1131 Teron Road	3-storey apartment building
1151 Teron Road	9-storey apartment building
100 Steacie	Two 4-storey apartment buildings
231-251 Penfield Drive	8 townhouses

5. Study Area

The proposed development is located at the corner of Varley Drive and Weeping Willow Lane.

There is only one arterial intersection (March Road / Teron Road) that is within 1 km from the proposed development, as measured along roadways. However, few vehicles are expected to travel through that intersection since it is expected that most of the trips generated will be heading south towards Highway 417. Therefore, this intersection was not included in the study analyses.

The intersections that will be directly impacted by the development are identified in the table below. The primary access to the apartment building will be Weeping Willow Lane, which means most vehicles exiting and entering the building will travel through the intersection of Varley Drive / Weeping Willow Lane.

Table 4 – Impacted Intersections Within the Study Area

Intersection	Description
Varley Drive / Weeping Willow Lane	Adjacent to development
Varley Drive / Beaverbrook Road	Within 400m of the development access
Teron Road / Beaverbrook Road	Within 1 000m of the development access

6. Time Periods

The proposed development is a Medium-Rise residential building therefore the AM and PM peak hours will be examined since these times represent the peak travel time scenario.

7. Horizon Years

The planned year of development build-out is 2024 with full occupancy that same year. Therefore, the build-out plus five years horizon is 2029. The analysis will be completed for 2021 (existing), 2024 and 2029.

8. Exemptions Review

Based on the development proposed and following the Transportation Impact Assessment Guidelines (2017), this TIA is exempted from:

– Module 4.1.3: This development is not a subdivision
– Module 4.2.2: The parking supply meets the demand
– Module 4.6: The additional 36 vehicles generated in AM peak hour or 37 vehicles in the PM peak hour will not change the existing classification of the road
– Module 4.8: The development generates fewer than 200 person-trips in the peak hour

9. Development-generated Traffic

9.1 Trip Generation

9.1.1 Trip Generation Rates

The projected site trips were estimated based on TRANS Trip Generation Manual October 2020. The person-trip rates for a multi-unit mid-rise or high-rise dwelling unit (Land Use Code 221 and 222) is 0.80 for AM peak period and 0.90 for PM peak period. Thus, for the project, the total person-trips generated is 114 during AM peak period and 128 during PM peak period. No reduction was applied to the rates provided in TRANS Trip Generation Manual October 2020.

9.1.2 Mode Shares

The recommended mode shares by TRANS district for high-rise multi family dwelling are summarized in Table 5.

Table 5 – Residential Mode Share for High-Rise Housing in the Kanata / Stittsville District

Travel Mode	Mode Share AM	Mode Share PM
Auto-Driver	43 %	55 %
Auto Passenger	26 %	19 %
Transit	28 %	21 %
Cycling	0 %	0 %
Walking	4 %	5 %

Using the mode share, the number of generated trips per mode were calculated. The peak period to peak hour adjustment provided in the TRANS Trip Generation Manual October 2020 was used to calculate the number of trips that the proposed development will generate, per mode, per period. The recommended vehicle directional split for multi-unit high-rise is 31% inbound during AM Peak and 58% inbound during PM Peak. Table 6 summarizes trip generation by mode.

Table 6 – Trip Generation by Mode

Period	Travel Mode	Mode share	Trips Peak Period	Peak period to peak hour factor	Trips Peak Hour	In	Out
AM	Auto Driver	43 %	49	0.48	24	7	17
	Auto Passenger	26 %	30	0.48	14	4	10
	Transit	28 %	32	0.55	18	6	12
	Active	4 %	5	0.58	3	1	2
	Total		**116**		**59**	**18**	**41**

Period	Travel Mode	Mode share	Trips Peak Period	Peak period to peak hour factor	Trips Peak Hour	In	Out
PM	Auto Driver	55 %	70	0.44	31	18	13
	Auto Passenger	19 %	24	0.44	11	6	5
	Transit	21 %	27	0.47	13	8	5
	Active	5 %	6	0.50	3	2	1
	Total		**127**		**58**	**34**	**24**

The proposed development will generate 24 vehicle trips in the AM peak hour and 31 vehicle trips in the PM peak hour since we assume that the “auto passenger” mode are passengers to the “auto driver” mode.

9.2 Trip distribution

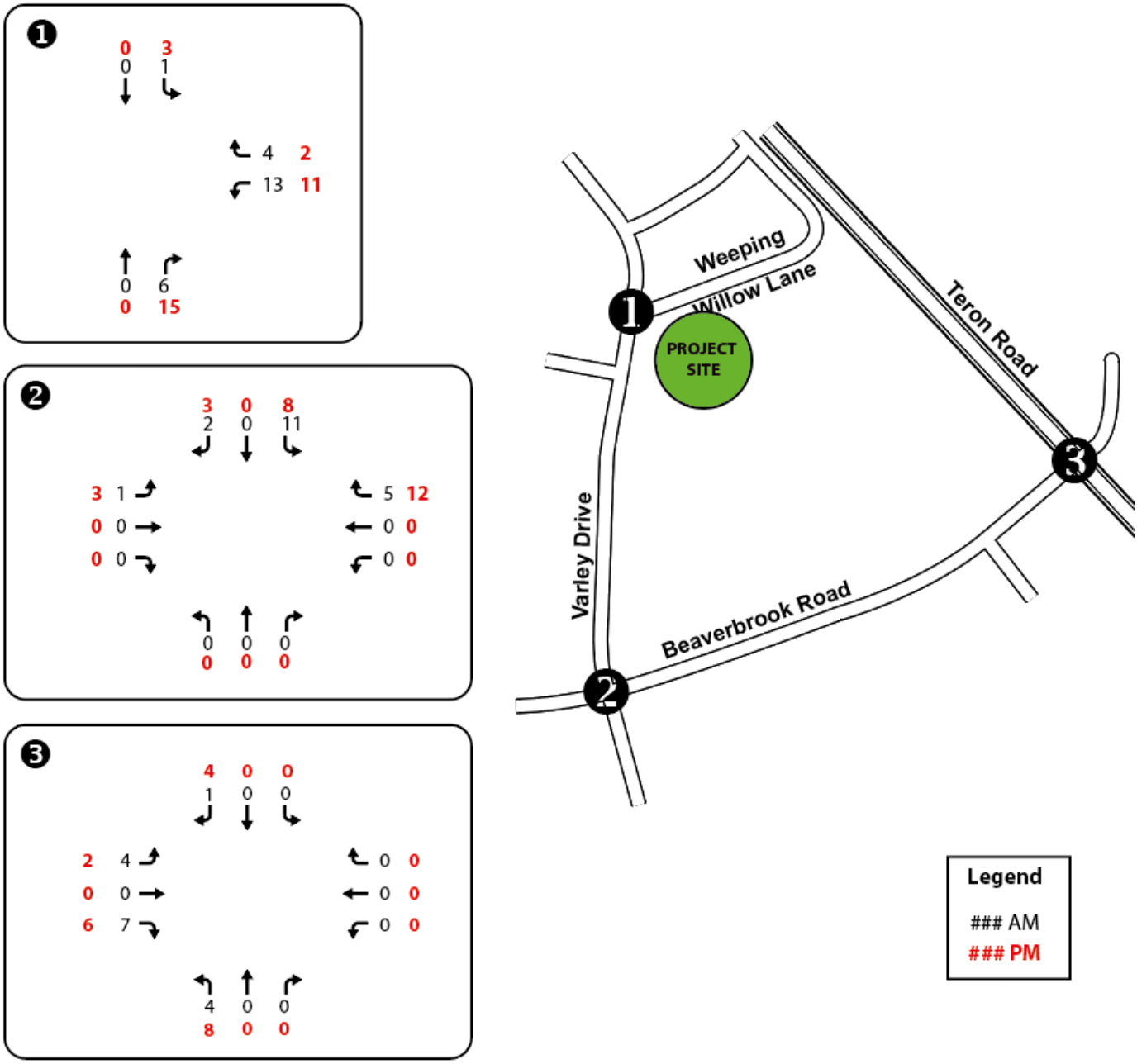
The trip distribution was completed using the existing travel patterns in the study area. Hence, the trip distribution is as follow for vehicles exiting the development in the AM peak hour. We assume the same proportions in the opposite direction for the PM peak hour.

– To the north using Varley Drive: 25%
– To the west using Varley Drive and Beaverbrook Road: 11%
– To the east using Varley Drive and Beaverbrook Road: 64%

9.3 Trip assignment

Using the distribution above and the existing turning movement splits, the trips generated were assigned to the road network. Figure 9 shows the new trips assigned on the road network.

Figure 9 – Development new trips assignment



10. Background Network Traffic

10.1 Changes to the Background Transportation Network

The transportation network plans were discussed in the Scoping Report. No changes are planned on the road network.

10.2 General Background Growth Rates

The background growth rates were calculated using data from the TRANS Regional Model. GHD was provided snapshots for horizons 2011 and 2031. From the volumes estimated for both horizons, the growth was calculated on each road within the study area on a yearly basis. These annual growth rates were then used to expand the traffic counts, from the year they were completed to the forecasted horizons of 2024 and 2029. The annual growth rates are the following:

- 0.8% on Beaverbrook Road
- 0.4% on Teron Road
- 0.7% on Varley Drive

10.3 Other Area Development

The volumes generated by the 1131-1151 Teron Road development were included in the background volumes (Figure 11 of the Parsons TIA Strategy Report). There other developments planned in the area, as listed in section 4.2, are unlikely to have a significant impact on the studied intersections given their sizes.

Figure 10 and Figure 11 show the projected background volumes without the development for 2024 and 2029.

Figure 10 – 2024 Background Volumes without development

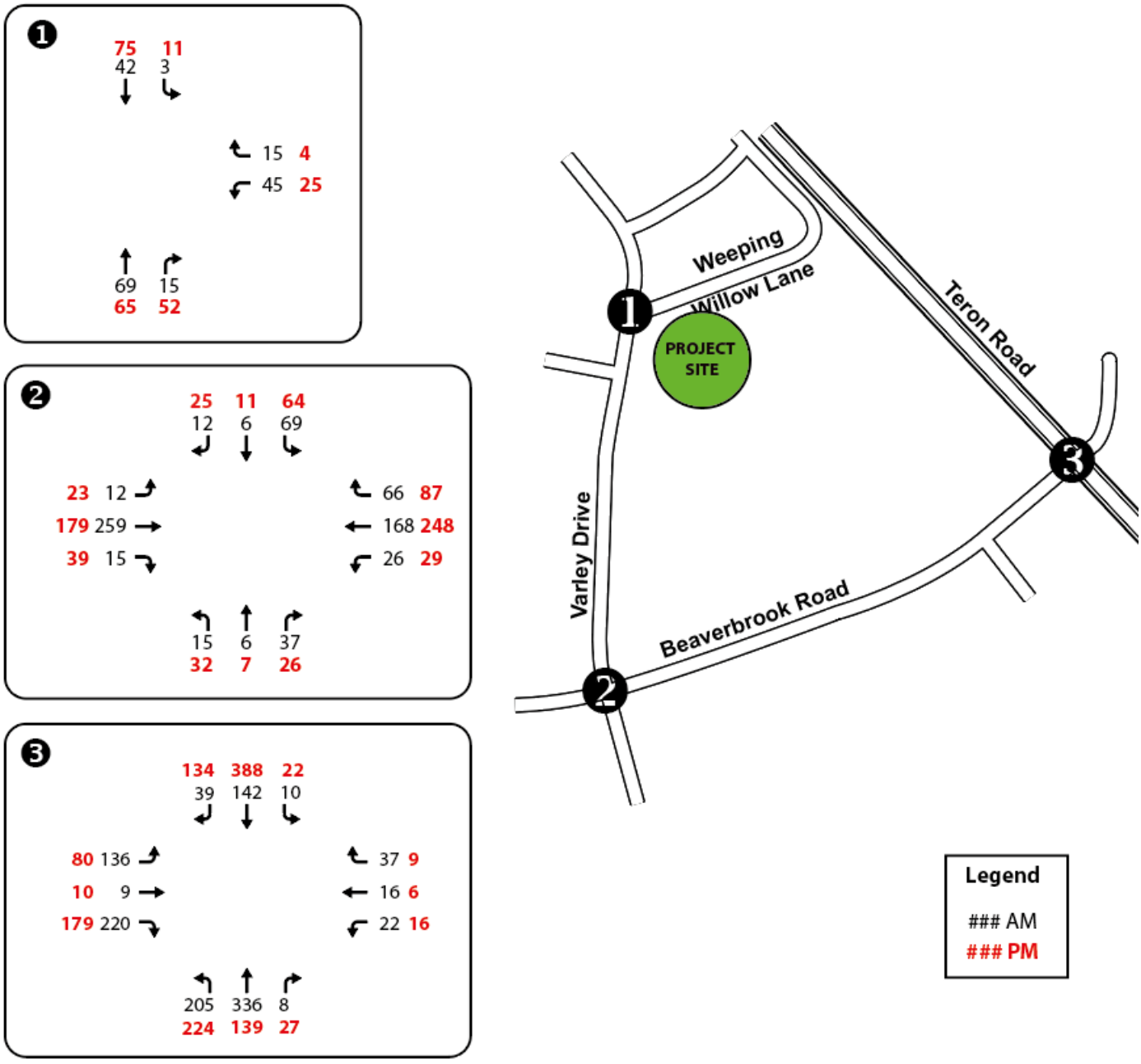
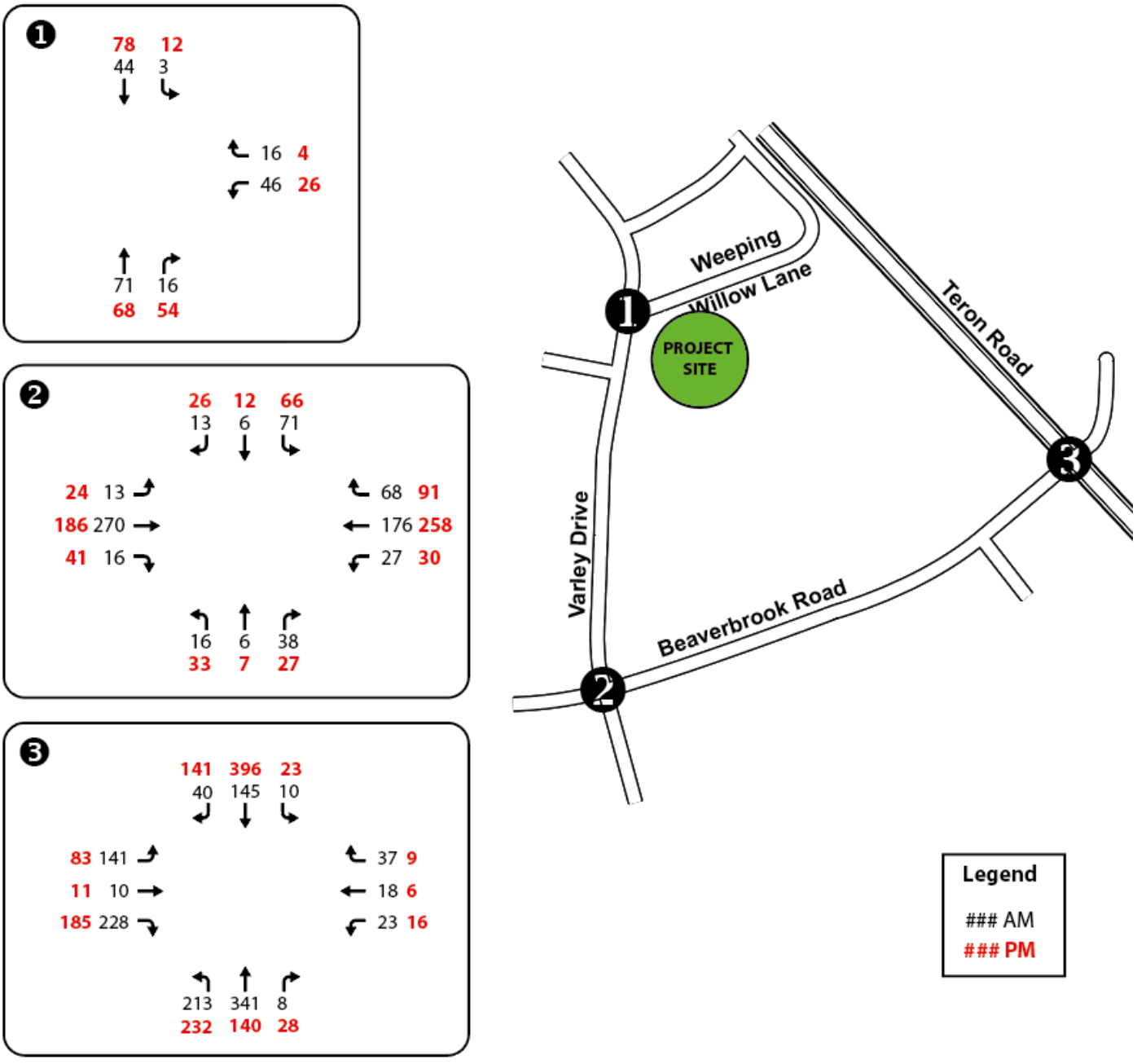


Figure 11 – 2029 Background Volumes without development



11. Demand Rationalization

The trip generation is consistent with the procedure set by the City of Ottawa and since the traffic generated by the project is low, no adjustments are required.

Figure 12 and Figure 13 show the projected volumes with the development project for 2024 and 2029.

Figure 12 – 2024 Background Volumes with development

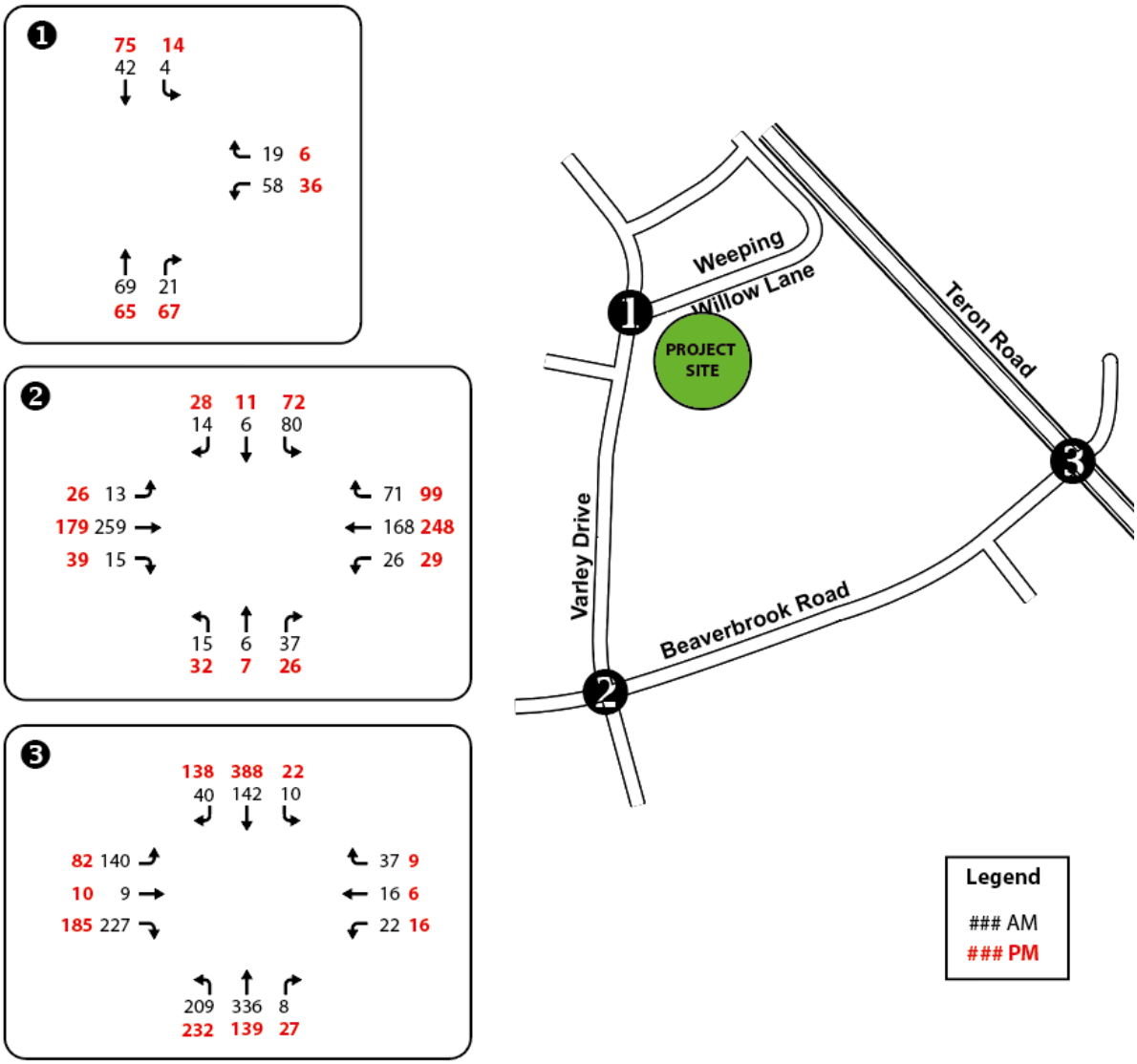
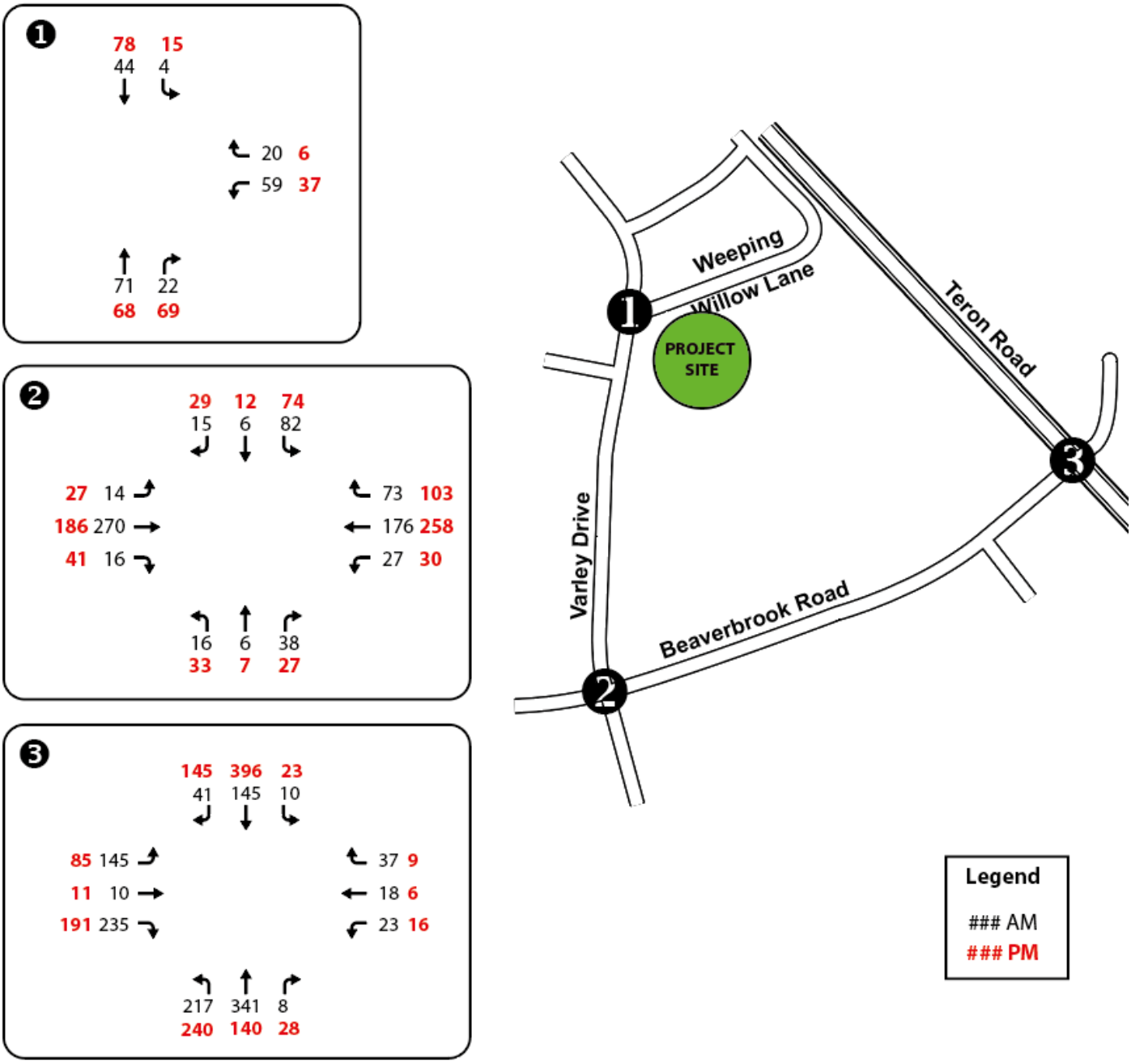


Figure 13 – 2029 Background Volumes with development



12. Development Design

Module 4.1.3 is exempt because this development is not a subdivision. The remainder of Module 4.1 is not required for a zoning application. These modules will be completed at the site plan application stage.

13. Parking

Module 4.2.2 is exempt because the parking supply meets the demand. The remainder of Module 4.2 is not required for a zoning application. These modules will be completed at the site plan application stage.

14. Boundary Streets

Module 4.3 is not required for a zoning application. This module will be completed at the site plan application stage.

15. Access Intersections

Module 4.4 is not required for a zoning application. This module will be completed at the site plan application stage.

16. Transportation Demand Management

16.1 Context for TDM

The mode share used within the TIA represent the travel trends for this area of the City with auto and transit being the most important modes. Parking is planned in the development for the residents.

The development is not located within a Design Priority Area or a Transit-oriented Development zone. Homestead Land Holdings will be the property owner and property manager of the apartment building.

The total number of bedrooms will be reviewed once the zoning amendment is approved and confirmed during site plan. A total of 142 units are projected and there are no age restrictions.

16.1.1 Need and Opportunity

The auto and transit modes will be the main modes of travel for the development but given the size of the project, the volumes generated are low. To encourage active travel, there are 103 parking spaces planned for bicycles, which is more than the number required by the zoning (71).

16.1.2 TDM Program

The TDM Measures Checklist was completed and can be found in Appendix E. The key TDM measure for this development is to unbundle parking cost from monthly rent. Another measure to be put in place is the connectivity for pedestrians to the adjacent network.

17. Neighbourhood Traffic Management

This section is intentionally left blank as this module is exempt from the present study.

18. Transit

The expected transit volumes from the development are low with 18 new trips during AM peak hour and 13 new trips during PM peak hour.

According to the Transportation Master Plan Affordable Network, a BRT with at-grade crossings is planned on March Road, between Highway 417 and Soland Road. A station is planned at the intersection of Teron Road, a 600 meters walking distance from the development.

Thus, given that the site is well served by public transportation and that new transit infrastructure will be put in place to improve transit in the area, the addition of less than 20 new trips in the transit system at peak hours should not be an issue.

19. Review of Network Concept

This section is intentionally left blank as this module is exempt from the present study.

20. Intersection Design

20.1 Existing Intersection Operations

The only signalized intersection in the study area is Teron Road / Beaverbrook Road. During both the AM and PM peak periods, the intersection operates on a free mode with a pedestrian recall on the through phases. The maximum cycle length is 95 seconds during AM peak and 107 seconds during PM peak.

The level of service (LOS) is based on the volume to capacity ratio (v/c) according to the guidelines from the City's Multimodal level of Service (MMLOS) Guide, as shown in Table 7. The results of the operational analysis at each intersection during AM and PM peak hours are shown in Table 8. The detailed performance results are provided in Appendix F.

Table 7 - Level of Service

Level of Service	Volume to Capacity Ratio
A	0 to 0.60
B	0.61 to 0.70
C	0.71 to 0.80
D	0.81 to 0.90
E	0.91 to 1.00
F	>1.00

Table 8 – Existing intersection operations

Intersection	Movement	AM		PM	
		V/C	LOS	V/C	LOS
Varley Drive & Weeping Willow Lane (unsignalized)	WBL/R	0.07	A	0.04	A
	NBT/R	0.00	A	0.00	A
	SBL/T	0.00	A	0.00	A
	Overall	**0.02**	**A**	**0.01**	**A**
Beaverbrook Road & Varley Drive (unsignalized)	EBL/T/R	0.40	A	0.35	A
	WBL/T/R	0.37	A	0.50	A
	NBL/T/R	0.09	A	0.11	A
	SBL/T/R	0.15	A	0.17	A
	Overall	**0.33**	**B**	**0.38**	**B**
Teron Road & Beaverbrook Road (signalized)	EBL	0.29	A	0.23	A
	EBT/R	0.6	A	0.70	B
	WBL	0.07	A	0.09	A
	WBT/R	0.15	A	0.06	A
	NBL	0.37	A	0.58	A
	NBT/R	0.51	A	0.17	A
	SBL	0.02	A	0.04	A
	SBT/R	0.28	A	0.81	D
	Overall	**0.47**	**A**	**0.68**	**B**

Note: saturation flow rate of 1800 veh/h/lane and PHF of 0.90

During the AM peak hour, all the intersections show good overall performance with LOS 'A' to LOS 'B'. The movement showing the highest v/c is the southbound through and right-turn movements during the PM peak hour with a v/c of 0.81 and a LOS 'D'. The minimum desirable LOS target is 'D' for a general urban area according to the MMLOS Guide of the City of Ottawa.

20.2 Network Intersection MMLOS

Table 9 summarizes the MMLOS analysis for the network intersections. The MMLOS detailed worksheet is presented in Appendix G. The target is based on the general urban area criteria in the MMLOS Guide of the City of Ottawa.

Table 9 – Network Intersection MMLOS Analysis

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Varley Drive & Weeping Willow Lane	A	C	B	D	N/A	D	N/A	N/A	A	D
	✓		✓		- (Unsignalized intersection)		-		✓	
Beaverbrook Road & Varley Drive	A	C	B	D	N/A	D	N/A	N/A	A	D
	✓		✓		- (Unsignalized intersection)		-		✓	

Intersection	Pedestrian LOS		Bicycle LOS		Transit LOS		Truck LOS		Auto LOS	
	PLOS	Target	BLOS	Target	TLOS	Target	TrLOS	Target	ALOS	Target
Teron Road & Beaverbrook Road	C	C	B	D	D	D	N/A	N/A	C	D
	✓		✓		✓		-		✓	

The targets are met for all criteria and at each intersection.

20.3 Future Intersection Operations - 2024

The results of the operational analysis at each intersection during AM and PM peak hours are shown in Table 10. The detailed results are provided in Appendix H.

Table 10 - 2024 Intersection Operations with development

Intersection	Movement	AM		PM	
		V/C	LOS	V/C	LOS
Varley Drive & Weeping Willow Lane (unsignalized)	WBL/R	0.09	A	0.05	A
	NBT/R	0.00	A	0.00	A
	SBL/T	0.00	A	0.01	A
	Overall	**0.03**	**A**	**0.01**	**A**
Beaverbrook Road & Varley Drive (unsignalized)	EBL/T/R	0.37	A	0.32	A
	WBL/T/R	0.35	A	0.47	A
	NBL/T/R	0.08	A	0.10	A
	SBL/T/R	0.15	A	0.17	A
	Overall	**0.31**	**A**	**0.35**	**A**
Teron Road & Beaverbrook Road (signalized)	EBL	0.26	A	0.22	A
	EBT/R	0.56	A	0.68	B
	WBL	0.06	A	0.08	A
	WBT/R	0.13	A	0.05	A
	NBL	0.35	A	0.54	A
	NBT/R	0.48	A	0.16	A
	SBL	0.02	A	0.04	A
	SBT/R	0.28	A	0.79	C
	Overall	**0.44**	**A**	**0.66**	**B**

Note: saturation flow rate of 1800 veh/h/lane and PHF of 1.00

The intersection operations for 2024 are within the range of LOS ‘A’ and LOS ‘C’. Thus, traffic will operate adequately even with the impacts of the development. Traffic operation results for the background and total traffic is similar due to the low number of development generated trips.

20.4 Future Intersection Operations- 2029

The results of the operational analysis at each intersection during AM and PM peak hours are shown in Table 11. The detailed results are provided in Appendix I.

Table 11 – 2029 Intersection Operations with development

Intersection	Movement	AM		PM	
		V/C	LOS	V/C	LOS
Varley Drive & Weeping Willow Lane (unsignalized)	WBL/R	0.09	A	0.05	A
	NBT/R	0.00	A	0.00	A
	SBL/T	0.00	A	0.01	A
	Overall	**0.03**	**A**	**0.01**	**A**
Beaverbrook Road & Varley Drive (unsignalized)	EBL/T/R	0.39	A	0.34	A
	WBL/T/R	0.37	A	0.50	A
	NBL/T/R	0.09	A	0.10	A
	SBL/T/R	0.16	A	0.18	A
	Overall	**0.32**	**A**	**0.37**	**A**
Teron Road & Beaverbrook Road (signalized)	EBL	0.27	A	0.22	A
	EBT/R	0.59	A	0.69	B
	WBL	0.07	A	0.08	A
	WBT/R	0.14	A	0.05	A
	NBL	0.36	A	0.57	A
	NBT/R	0.48	A	0.17	A
	SBL	0.02	A	0.04	A
	SBT/R	0.28	A	0.80	C
	Overall	**0.45**	**A**	**0.67**	**B**

Note: saturation flow rate of 1800 veh/h/lane and PHF of 1.00

The intersection operations for 2029 are similar to the 2024 conditions. Thus, traffic will operate adequately even with the impacts of the development. Traffic operation results for the background and total traffic is similar due to the low number of development generated trips.

21. Summary of Improvements Indicated and Modification Options

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

Proposed site and screening

- Located in the south-east corner of Varley Drive / Weeping Willow Lane intersection
- Residential development with 142 residential units, 142 underground parking spaces and 57 at-grade vehicular parking spaces and 103 bicycle parking spaces
- Construction is planned to start in 2022 and to be completed by the end of 2024 with occupancy starting in 2023
- A pedestrian connection is planned to the sidewalk on Varley Drive and a sidewalk is planned along Weeping Willow Lane, from Varley Drive to the development's entrance
- Site is served by transit and is 600 meters from the Kanata North Transitway BRT station at Teron Road

Forecasting

- Development will generate 116 and 127 new person trips respectively for the AM and PM peak hours with 24 new vehicle trips during AM peak hour and 31 during PM peak hour
- New vehicle trips will mostly be heading southbound to Teron Road
- Yearly background growth rates were calculated on each road in the study area using TRANS model outputs. Annual growth rates are below 1% for all collector roads

Strategy

- Managers of the development will unbundle parking costs from monthly rent
- Bicycle parking spaces are planned for the site and will be easily accessible
- The development generates less than 20 transit trips at peak hour which should not cause issues with the existing transit system
- The operations of the intersections within the study area remain similar between the existing and projected conditions (2025 and 2030). No mitigation is required.

All of Which is Respectfully Submitted,

GHD

Vanessa Skelton, P.Eng.

Appendices

Appendix A

Screening Form

Certification Form for TIA Study PM

TIA Plan Reports

On 14 June 2017, the Council of the City of Ottawa adopted new Transportation Impact Assessment (TIA) Guidelines. In adopting the guidelines, Council established a requirement for those preparing and delivering transportation impact assessments and reports to sign a letter of certification.

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

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

CERTIFICATION

☑ I have reviewed and have a sound understanding of the objectives, needs and requirements of the City of Ottawa's Official Plan, Transportation Master Plan and the Transportation Impact Assessment (2017) Guidelines;

☑ I have a sound knowledge of industry standard practice with respect to the preparation of transportation impact assessment reports, including multi modal level of service review;

☑ I have substantial experience (more than 5 years) in undertaking and delivering transportation impact studies (analysis, reporting and geometric design) with strong background knowledge in transportation planning, engineering or traffic operations; and

☑ I am either a licensed[1] or registered[2] professional in good standing, whose field of expertise

- ☑ is either transportation engineering
- ☐ or transportation planning .

[1,2] License of registration body that oversees the profession is required to have a code of conduct and ethics guidelines that will ensure appropriate conduct and representation for transportation planning and/or transportation engineering works.

City Of Ottawa
Infrastructure Services and Community Sustainability
Planning and Growth Management
110 Laurier Avenue West, 4th fl.
Ottawa, ON K1P 1J1
Tel. : 613-580-2424
Fax: 613-560-6006

Dated at Ottawa (City) this 13 day of September, 20 21.

Name : Vanessa Skelton

Professional title: Transportation Planning and Traffic Engineering Lead-Canada

Signature of individual certifier that s/he meets the above criteria

Office Contact Information (Please Print)	
Address:	179 Colonnade Road South Suite 400
City / Postal Code:	K2E 7J4
Telephone / Extension:	+1 613 288-1727
E-Mail Address:	Vanessa.Skelton@ghd.com

Stamp

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	100 Weeping Willow Lane
Description of Location	Apartment building (Varley Apartments)
Land Use Classification	R5A[1533] H(30) S331
Development Size (units)	142
Development Size (m^2)	~1600 m^2 per floor (9 storeys)
Number of Accesses and Locations	2
Phase of Development	1
Buildout Year	2024

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		X
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		X

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

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

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?	X	
Does the development satisfy the Location Trigger?		X
Does the development satisfy the Safety Trigger?		X

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

Appendix B

Bus schedules

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Wed, Jul 21

63 Briarbrook via Innovation

During morning and afternoon peak periods on weekdays, eastbound trips stop at Lincoln Fields, Dominion and Westboro Stations for drop-off only. No boarding.

[L] Continues to Innovation

SACRE COEUR / LAURIER	PROMENADE / TERRASSES DE LA CHAUDIÈRE	TUNNEY'S PASTURE B	BAYSHORE 1A	INNOVATION A	MAXWELL BRIDGE / WINDANCE	INNOVATION B
		05:24	05:37	05:55		
		05:40	05:53	06:11		
		05:54	06:07	06:26		
		06:08	06:21	06:40		
		06:22	06:35	06:55		
		06:28	06:41			
		06:35	06:48	07:10		
		06:43	06:56			
		06:49	07:02	07:25		
		06:58	07:11			
		07:04	07:17	07:40		
		07:14	07:27			
		07:19	07:32	07:55		
		07:34	07:47	08:11		
		07:52	08:05	08:31		
		08:22	08:35	09:02		
		08:53	09:06	09:32		
		09:27	09:40	10:02		
		09:59	10:12	10:32		
		10:29	10:42	11:02		
		10:59	11:12	11:32		
		11:29	11:42	12:02		
		12:00[L]	12:13[L]	12:32	12:38	12:49
		12:30[L]	12:43[L]	13:02	13:08	13:19
		13:00[L]	13:13[L]	13:32	13:38	13:49
		13:30[L]	13:43[L]	14:03	14:09	14:19
		14:00[L]	14:13[L]	14:33	14:39	14:49
		14:30[L]	14:43[L]	15:03	15:09	15:19
		15:00[L]	15:13[L]	15:33	15:39	15:49
14:59[L]	15:07[L]	15:18[L]	15:31[L]	15:51	15:57	16:07

SACRE COEUR / LAURIER	PROMENADE / TERRASSES DE LA CHAUDIÈRE	TUNNEY'S PASTURE B	BAYSHORE 1A	INNOVATION A	MAXWELL BRIDGE / WINDANCE	INNOVATION B
		15:35[L]	15:49[L]	16:10	16:15	16:27
15:27[L]	15:36[L]	15:48[L]	16:02[L]	16:23	16:28	16:40
		16:05[L]	16:19[L]	16:41	16:48	16:59
15:56[L]	16:05[L]	16:18[L]	16:32[L]	16:53	16:59	17:11
		16:33[L]	16:47[L]	17:09	17:16	17:27
16:25[L]	16:34[L]	16:48[L]	17:02[L]	17:24	17:31	17:42
		17:05[L]	17:19[L]	17:41	17:48	17:58
16:55[L]	17:04[L]	17:18[L]	17:32[L]	17:54	18:01	18:11
17:12[L]	17:21[L]	17:32[L]	17:46[L]	18:09	18:15	18:25
		17:48[L]	18:02[L]	18:20	18:27	18:37
17:45[L]	17:52[L]	18:03[L]	18:17[L]	18:35	18:42	18:52
		18:20[L]	18:35[L]	18:53	18:58	19:08
18:18[L]	18:25[L]	18:35[L]	18:50[L]	19:08	19:13	19:23
		19:07[L]	19:20[L]	19:39	19:44	19:54
		19:37[L]	19:50[L]	20:09	20:14	20:24
		20:07[L]	20:20[L]	20:39	20:44	20:54
		20:37[L]	20:50[L]	21:09	21:14	21:24
		21:07[L]	21:20[L]	21:39	21:44	21:54
		21:37[L]	21:50[L]	22:09	22:14	22:24
		22:07[L]	22:20[L]	22:39	22:44	22:54
		22:37[L]	22:50[L]	23:09	23:14	23:24
		23:18[L]	23:31[L]	23:50	23:55	00:05

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Wed, Jul 21

63 Tunney's Pasture via Briarbrook & Gatineau

During morning and afternoon peak periods on weekdays, eastbound trips stop at Lincoln Fields, Dominion and Westboro Stations for drop-off only. No boarding.

[V] to Sacré-Coeur

[x] via Legget / Solandt, to Sacré-Coeur

INNOVATION A	MAXWELL BRIDGE / WINDANCE	INNOVATION B	TERON 2A	TUNNEY'S PASTURE E	PIMISI A	PROMENADE / TERRASSES DE LA CHAUDIÈRE	SACRE COEUR / LAURIER
05:12[V]	05:17[V]	05:26[V]	05:34[V]	05:55[V]	06:01[V]	06:07	06:15
05:38[V]	05:43[V]	05:52[V]	06:00[V]	06:21[V]	06:27[V]	06:33	06:41
05:57[V]	06:02[V]	06:11[V]	06:19	06:40			
06:13[V]	06:18[V]	06:27[V]	06:37[V]	06:59[V]	07:05[V]	07:11	07:19
06:28[V]	06:33[V]	06:42[V]	06:53	07:17			
06:42[V]	06:47[V]	06:57[V]	07:08[V]	07:35[V]	07:44[V]	07:51	07:59
06:57[V]	07:02[V]	07:12[V]	07:23[V]	07:50[V]	08:00[V]	08:06	08:19
07:12[V]	07:17[V]	07:27[V]	07:39	08:06			
07:27[V]	07:32[V]	07:42[V]	07:54[V]	08:21[V]	08:30[V]	08:37	08:50
07:42[V]	07:47[V]	07:57[V]	08:09	08:35			
07:57[V]	08:02[V]	08:12[V]	08:24	08:50			
08:13[V]	08:18[V]	08:27[V]	08:40[V]	09:05[V]	09:11[V]	09:18	09:27
08:33[V]	08:38[V]	08:47[V]	09:01	09:26			
09:04[V]	09:09[V]	09:18[V]	09:29	09:51			
09:34[V]	09:39[V]	09:48[V]	09:59	10:21			
10:04[V]	10:09[V]	10:18[V]	10:29	10:51			
10:34[V]	10:39[V]	10:48[V]	10:58	11:19			
11:04[V]	11:09[V]	11:18[V]	11:28	11:51			
11:34[V]	11:39[V]	11:48[V]	11:58	12:21			
12:04[V]	12:09[V]	12:18[V]	12:28	12:50			
		12:51[V]	13:01	13:23			
		13:21[V]	13:31	13:53			
		13:51[V]	14:01	14:23			
		14:21[V]	14:34	14:59			
		14:51[V]	15:05	15:29			
		15:21[x]	15:36[V]	16:00			
		15:51[x]	16:07[V]	16:31			
		16:09[x]	16:26[V]	16:50			

INNOVATION A	MAXWELL BRIDGE / WINDANCE	INNOVATION B	TERON 2A	TUNNEY'S PASTURE E	PIMISI A	PROMENADE / TERRASSES DE LA CHAUDIÈRE	SACRE COEUR / LAURIER
		16:29[x]	16:48[V]	17:12			
		16:42[x]	17:01[V]	17:25			
		17:01[x]	17:21[V]	17:45			
		17:13[x]	17:30[V]	17:54			
		17:29[x]	17:45[V]	18:09			
		17:44[x]	18:00[V]	18:24			
		18:00[x]	18:16[V]	18:40			
		18:13[x]	18:29[V]	18:53			
		18:27[x]	18:42[V]	19:06			
		18:43[x]	18:58[V]	19:22			
		18:54[x]	19:09[V]	19:33			
		19:10[x]	19:23[V]	19:46			
		19:25[x]	19:38[V]	20:01			
		19:56[x]	20:09[V]	20:30			
		20:26[x]	20:39[V]	20:59			
		20:56[x]	21:09[V]	21:29			
		21:26[x]	21:38[V]	21:58			
		21:56[x]	22:08[V]	22:28			
		22:26[x]	22:38[V]	22:58			
		22:56[x]	23:08[V]	23:28			
		23:26[x]	23:38[V]	23:58			
		00:07[x]	00:19[V]	00:38			

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Wed, Jul 21

64 Morgan's Grant via Innovation

During morning and afternoon peak periods on weekdays, eastbound trips stop at Lincoln Fields, Dominion and Westboro Stations for drop-off only. No boarding.

[S] Ends at Innovation

[V] Via March

TUNNEY'S PASTURE B	LINCOLN FIELDS 1A	BAYSHORE 1A	TERON 1A	LEGGET / SOLANDT	INNOVATION A	OLD SECOND LINE / BRADY	INNOVATION B
05:46[S]	05:53[S]	05:59[S]	06:06[S]	06:10[S]	06:19[S]		
05:59[S]	06:06[S]	06:12[S]	06:19[S]	06:23[S]	06:32[S]		
06:14[S]	06:21[S]	06:27[S]	06:34[S]	06:38[S]	06:47[S]		
06:27[S]	06:34[S]	06:40[S]	06:47[S]	06:53[S]	07:02[S]		
06:42[S]	06:49[S]	06:55[S]	07:02[S]	07:08[S]	07:17[S]		
06:57[S]	07:04[S]	07:10[S]	07:17[S]	07:23[S]	07:32[S]		
07:12[S]	07:19[S]	07:25[S]	07:32[S]	07:38[S]	07:47[S]		
07:26[S]	07:33[S]	07:39[S]	07:46[S]	07:52[S]	08:02[S]		
07:44[S]	07:51[S]	07:57[S]	08:05[S]	08:12[S]	08:22[S]		
08:07[S]	08:14[S]	08:20[S]	08:28[S]	08:37[S]	08:47[S]		
08:43[S]	08:50[S]	08:56[S]	09:04[S]	09:11[S]	09:20[S]		
09:16[S]	09:23[S]	09:29[S]	09:37[S]	09:41[S]	09:50[S]		
09:47[S]	09:54[S]	10:00[S]	10:07[S]	10:11[S]	10:20[S]		
10:17[S]	10:24[S]	10:30[S]	10:37[S]	10:41[S]	10:50[S]		
10:47[S]	10:54[S]	11:00[S]	11:07[S]	11:11[S]	11:20[S]		
11:17[S]	11:24[S]	11:30[S]	11:37[S]	11:41[S]	11:50[S]		
11:46[S]	11:53[S]	11:59[S]	12:06[S]	12:10[S]	12:19[S]		
12:15	12:22	12:28	12:35	12:39	12:48	12:52	13:01
12:45	12:52	12:58	13:05	13:09	13:18	13:22	13:31
13:15	13:22	13:28	13:35	13:40	13:49	13:53	14:02
13:45	13:52	13:59	14:06	14:11	14:19	14:23	14:32
14:15	14:22	14:29	14:36	14:41	14:49	14:53	15:02
14:45	14:52	14:59	15:06	15:11	15:19	15:23	15:32
15:15[V]	15:23[V]	15:29[V]	15:38[V]		15:48	15:53	16:02
15:30[V]	15:38[V]	15:44[V]	15:53[V]		16:03	16:08	16:17
15:45[V]	15:53[V]	15:59[V]	16:08[V]		16:18	16:23	16:32
16:00[V]	16:08[V]	16:14[V]	16:23[V]		16:34	16:39	16:48
16:15[V]	16:23[V]	16:29[V]	16:38[V]		16:49	16:54	17:03
16:30[V]	16:38[V]	16:44[V]	16:53[V]		17:05	17:10	17:19

TUNNEY'S PASTURE B	LINCOLN FIELDS 1A	BAYSHORE 1A	TERON 1A	LEGGET / SOLANDT	INNOVATION A	OLD SECOND LINE / BRADY	INNOVATION B
16:45[V]	16:53[V]	16:59[V]	17:08[V]		17:20	17:25	17:34
17:00[V]	17:08[V]	17:14[V]	17:23[V]		17:35	17:40	17:49
17:15[V]	17:23[V]	17:29[V]	17:38[V]		17:50	17:56	18:05
17:30[V]	17:38[V]	17:44[V]	17:53[V]		18:02	18:06	18:15
17:43[V]	17:51[V]	17:57[V]	18:06[V]		18:15	18:19	18:28
17:58[V]	18:06[V]	18:12[V]	18:21[V]		18:30	18:34	18:43
18:29[V]	18:37[V]	18:43[V]	18:52[V]		19:01	19:05	19:14
18:52	18:59	19:06	19:13	19:17	19:25	19:29	19:38
19:22	19:29	19:35	19:42	19:46	19:54	19:58	20:07
19:52	19:59	20:05	20:12	20:16	20:24	20:28	20:37
20:22	20:29	20:35	20:42	20:46	20:54	20:58	21:07
20:52	20:59	21:05	21:12	21:16	21:24	21:28	21:37
21:22	21:29	21:35	21:42	21:46	21:54	21:58	22:07
21:52	21:59	22:05	22:12	22:16	22:24	22:28	22:37
22:22	22:29	22:35	22:42	22:46	22:54	22:58	23:07

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Wed, Jul 21

64 Tunney's Pasture via Morgan's Grant

During morning and afternoon peak periods on weekdays, eastbound trips stop at Lincoln Fields, Dominion and Westboro Stations for drop-off only. No boarding.

[V] Via Legget

INNOVATION A	OLD SECOND LINE / BRADY	INNOVATION B	LEGGET / SOLANDT	EAGLESON 2A	BAYSHORE 2A	LINCOLN FIELDS 2A	TUNNEY'S PASTURE C
05:32	05:35	05:43		05:55	06:01	06:09	06:14
05:57	06:00	06:08		06:20	06:26	06:34	06:39
06:07	06:10	06:18		06:30	06:36	06:44	06:49
06:21	06:24	06:33		06:44	06:51	07:00	07:05
06:34	06:38	06:48		07:00	07:08	07:18	07:25
06:49	06:53	07:03		07:15	07:23	07:34	07:41
07:04	07:08	07:18		07:30	07:38	07:49	07:56
07:19	07:23	07:33		07:45	07:53	08:04	08:11
07:34	07:38	07:48		08:00	08:08	08:19	08:26
07:49	07:53	08:03		08:15	08:21	08:31	08:38
08:04	08:08	08:18		08:30	08:36	08:45	08:52
08:24	08:28	08:38		08:50	08:56	09:05	09:12
08:49	08:53	09:03		09:15	09:21	09:28	09:35
09:22	09:25	09:33		09:45	09:51	09:58	10:05
09:52	09:55	10:03		10:15	10:21	10:28	10:35
10:22	10:25	10:33		10:45	10:51	10:58	11:05
10:52	10:55	11:03		11:15	11:21	11:28	11:34
11:22	11:25	11:33		11:45	11:51	11:59	12:05
11:52	11:55	12:03		12:15	12:21	12:29	12:35
12:21	12:25	12:33		12:45	12:52	12:59	13:05
		13:03		13:15	13:22	13:29	13:35
		13:33		13:44	13:51	13:58	14:04
		14:04		14:15	14:22	14:30	14:37
		14:34		14:46	14:53	15:01	15:08
		15:04		15:19	15:26	15:34	15:41
		15:34[V]	15:39[V]	15:50	15:58	16:06	16:13
		16:04[V]	16:09[V]	16:21	16:28	16:36	16:43
		16:19[V]	16:24[V]	16:36	16:43	16:51	16:58
		16:34[V]	16:39[V]	16:51	16:58	17:06	17:13
		16:50[V]	16:55[V]	17:10	17:17	17:25	17:32
		17:05[V]	17:10[V]	17:24	17:31	17:39	17:46

INNOVATION A	OLD SECOND LINE / BRADY	INNOVATION B	LEGGET / SOLANDT	EAGLESON 2A	BAYSHORE 2A	LINCOLN FIELDS 2A	TUNNEY'S PASTURE C
		17:21[V]	17:26[V]	17:39	17:46	17:54	18:01
		17:36[V]	17:41[V]	17:53	18:00	18:08	18:15
		17:51[V]	17:55[V]	18:06	18:13	18:21	18:28
		18:07[V]	18:12[V]	18:22	18:29	18:37	18:44
		18:17[V]	18:21[V]	18:31	18:37	18:45	18:52
		18:30[V]	18:34[V]	18:44	18:50	18:58	19:05
		18:45[V]	18:49[V]	18:59	19:05	19:13	19:20
		19:16[V]	19:20[V]	19:30	19:37	19:45	19:52
		19:40		19:51	19:58	20:06	20:12
		20:09		20:20	20:27	20:33	20:39
		20:39		20:50	20:57	21:03	21:09
		21:09		21:21	21:27	21:33	21:39
		21:39		21:51	21:57	22:03	22:09
		22:09		22:21	22:27	22:33	22:39
		22:39		22:51	22:57	23:03	23:09
		23:09		23:21	23:27	23:33	23:39

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Wed, Jul 21

166 Innovation

EAGLESON 4A	TERON 1A	HERZBERG / MARCH	INNOVATION B
07:35	07:37	07:41	07:54

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Wed, Jul 21

166 Eagleson

INNOVATION A	HERZBERG / MARCH	TERON 2A	EAGLESON 3A
17:04	17:17	17:21	17:24

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Wed, Jul 21

168 Bridlewood

TERRY FOX 4A	GOULBOURN FORCED / BADGELEY	BEAVERBROOK / LEACOCK	EAGLESON 3A	HAZELDEAN MALL / WEST STOP	GRASSY PLAINS/STONEHAVEN	FERNBANK / TERRY FOX
05:32	05:39	05:44	05:47	05:50	05:57	06:04
06:12	06:19	06:24	06:28	06:31	06:38	06:46
06:42	06:49	06:54	06:58	07:01	07:08	07:16
07:12	07:20	07:26	07:30	07:34	07:42	07:50
07:40	07:48	07:54	07:58	08:02	08:10	08:18
08:12	08:20	08:26	08:31	08:35	08:44	08:52
08:43	08:51	08:57	09:02	09:06	09:15	09:23
09:12	09:20	09:26	09:31	09:35	09:44	09:52
09:44	09:52	09:57	10:01	10:05	10:13	10:21
10:14	10:22	10:27	10:31	10:35	10:43	10:51
10:44	10:52	10:57	11:01	11:05	11:13	11:21
11:15	11:23	11:28	11:32	11:36	11:44	11:52
11:44	11:52	11:57	12:01	12:05	12:13	12:21
12:14	12:22	12:27	12:31	12:35	12:43	12:51
12:44	12:52	12:57	13:01	13:05	13:13	13:21
13:14	13:22	13:27	13:31	13:35	13:44	13:52
13:44	13:52	13:57	14:01	14:05	14:14	14:22
14:14	14:22	14:27	14:31	14:35	14:44	14:52
14:39	14:47	14:53	14:58	15:02	15:11	15:20
15:10	15:18	15:24	15:29	15:33	15:42	15:51
15:40	15:48	15:54	15:59	16:03	16:12	16:21
16:08	16:16	16:22	16:27	16:31	16:40	16:49
16:40	16:48	16:54	16:59	17:03	17:12	17:21
17:10	17:19	17:24	17:29	17:33	17:41	17:51
17:40	17:49	17:54	17:59	18:03	18:11	18:21
18:10	18:19	18:24	18:29	18:33	18:41	18:51
18:40	18:48	18:53	18:57	19:01	19:09	19:17
19:10	19:18	19:23	19:27	19:31	19:39	19:47
19:40	19:48	19:53	19:57	20:01	20:09	20:17
20:10	20:17	20:22	20:26	20:29	20:37	20:45
20:40	20:47	20:52	20:56	20:59	21:07	21:15
21:10	21:17	21:22	21:26	21:29	21:37	21:45
21:40	21:47	21:52	21:56	21:59	22:07	22:15
22:10	22:17	22:22	22:26	22:29	22:37	22:45
22:40	22:47	22:52	22:56	22:59	23:07	23:15
23:10	23:16	23:21	23:25	23:28	23:35	23:43

TERRY FOX 4A	GOULBOURN FORCED / BADGELEY	BEAVERBROOK / LEACOCK	EAGLESON 3A	HAZELDEAN MALL / WEST STOP	GRASSY PLAINS/STONEHAVEN	FERNBANK / TERRY FOX
23:40	23:46	23:51	23:55	23:58	00:05	00:13

Schedules & Maps

The next service change is on Saturday, September 04.

Schedule times are based on typical driving conditions and may vary. Please arrive at your stop a few minutes early to allow for any fluctuations in schedule.

Wed, Jul 21

168 Terry Fox

FERNBANK / TERRY FOX	GRASSY PLAINS / MEADOWBREEZE	HAZELDEAN MALL / EAST STOP	EAGLESON 4A	BEAVERBROOK / LEACOCK	TERRY FOX 3B
04:55	05:00	05:07	05:12	05:16	05:31
05:25	05:30	05:37	05:42	05:46	06:01
05:55	06:00	06:07	06:12	06:16	06:31
06:30	06:35	06:43	06:48	06:52	07:09
07:00	07:05	07:13	07:20	07:23	07:41
07:29	07:34	07:42	07:49	07:53	08:11
08:00	08:05	08:13	08:19	08:23	08:41
08:30	08:35	08:43	08:49	08:53	09:11
09:00	09:05	09:13	09:19	09:23	09:41
09:30	09:35	09:43	09:49	09:53	10:11
10:00	10:05	10:13	10:19	10:23	10:41
10:30	10:35	10:43	10:49	10:53	11:11
11:00	11:05	11:13	11:19	11:23	11:41
11:30	11:35	11:43	11:49	11:53	12:11
12:00	12:05	12:12	12:18	12:22	12:40
12:30	12:35	12:42	12:48	12:52	13:10
13:00	13:05	13:12	13:18	13:22	13:40
13:30	13:35	13:42	13:48	13:52	14:10
14:00	14:05	14:12	14:18	14:22	14:40
14:30	14:35	14:43	14:48	14:53	15:10
15:00	15:05	15:13	15:18	15:23	15:40
15:30	15:35	15:44	15:49	15:53	16:11
15:58	16:03	16:12	16:18	16:23	16:42
16:32	16:37	16:45	16:50	16:55	17:13
17:01	17:06	17:14	17:19	17:24	17:42
17:30	17:35	17:43	17:48	17:53	18:11
18:00	18:05	18:12	18:17	18:21	18:38
18:30	18:35	18:42	18:47	18:51	19:08
19:00	19:05	19:12	19:17	19:21	19:38
19:25	19:30	19:37	19:42	19:46	20:03
19:55	20:00	20:07	20:12	20:16	20:33
20:25	20:30	20:36	20:41	20:45	21:01
20:55	21:00	21:06	21:11	21:15	21:31
21:25	21:30	21:36	21:41	21:45	22:01
21:55	22:00	22:06	22:11	22:15	22:31
22:25	22:30	22:36	22:40	22:44	23:00

FERNBANK / TERRY FOX	GRASSY PLAINS / MEADOWBREEZE	HAZELDEAN MALL / EAST STOP	EAGLESON 4A	BEAVERBROOK / LEACOCK	TERRY FOX 3B
22:55	23:00	23:06	23:10	23:14	23:30
23:25	23:30	23:36	23:40	23:44	00:00

Appendix C

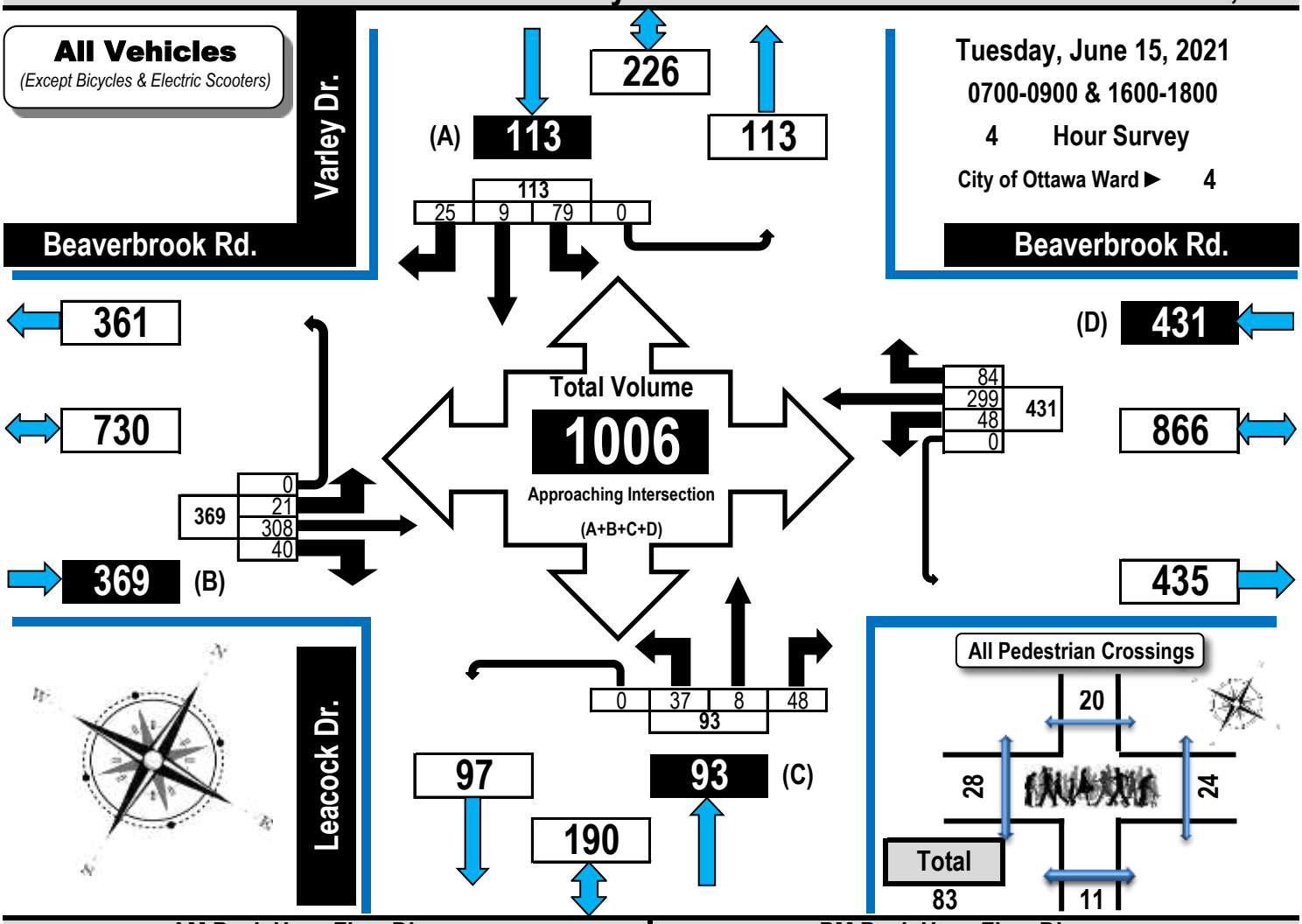
Traffic Counts

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

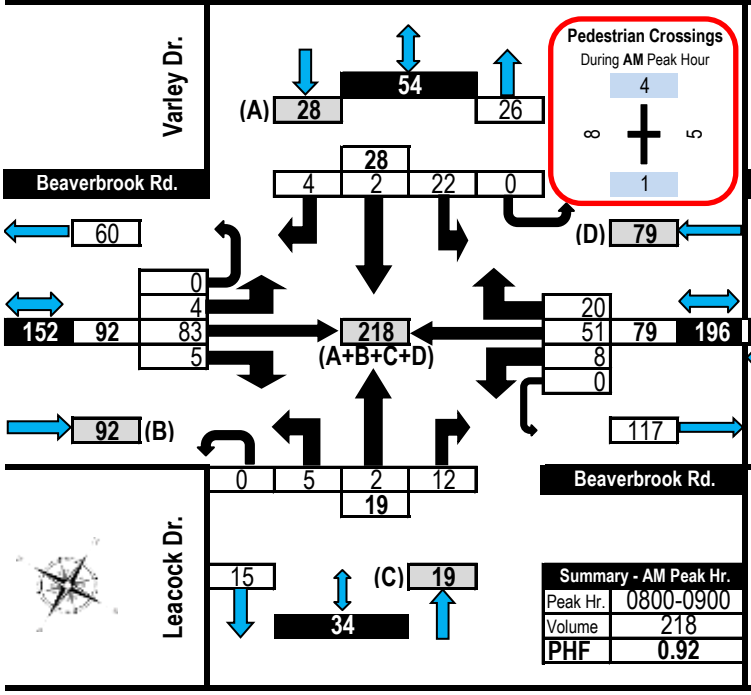
Beaverbrook Road & Leacock Drive/Varley Drive — Kanata, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Tuesday, June 15, 2021
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ▶ 4

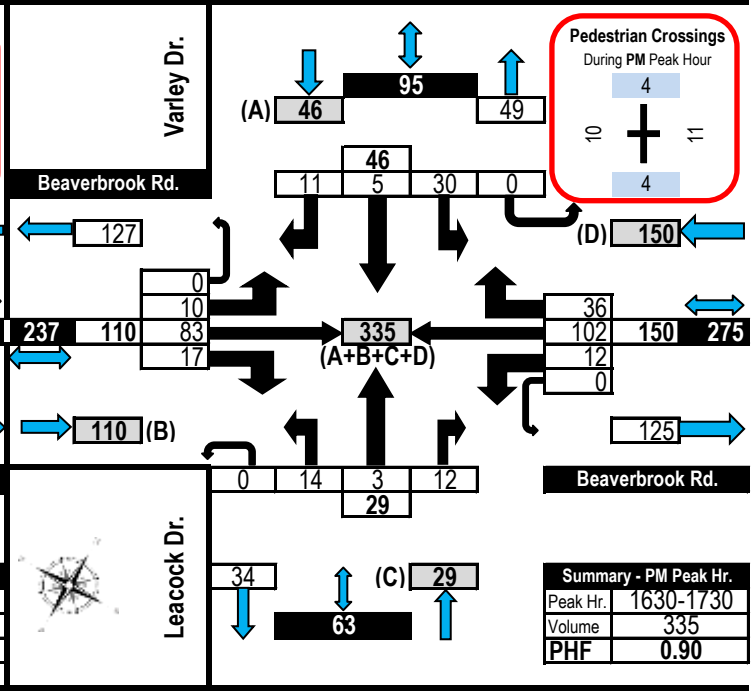


AM Peak Hour Flow Diagram



Summary - AM Peak Hr.	
Peak Hr.	0800-0900
Volume	218
PHF	0.92

PM Peak Hour Flow Diagram



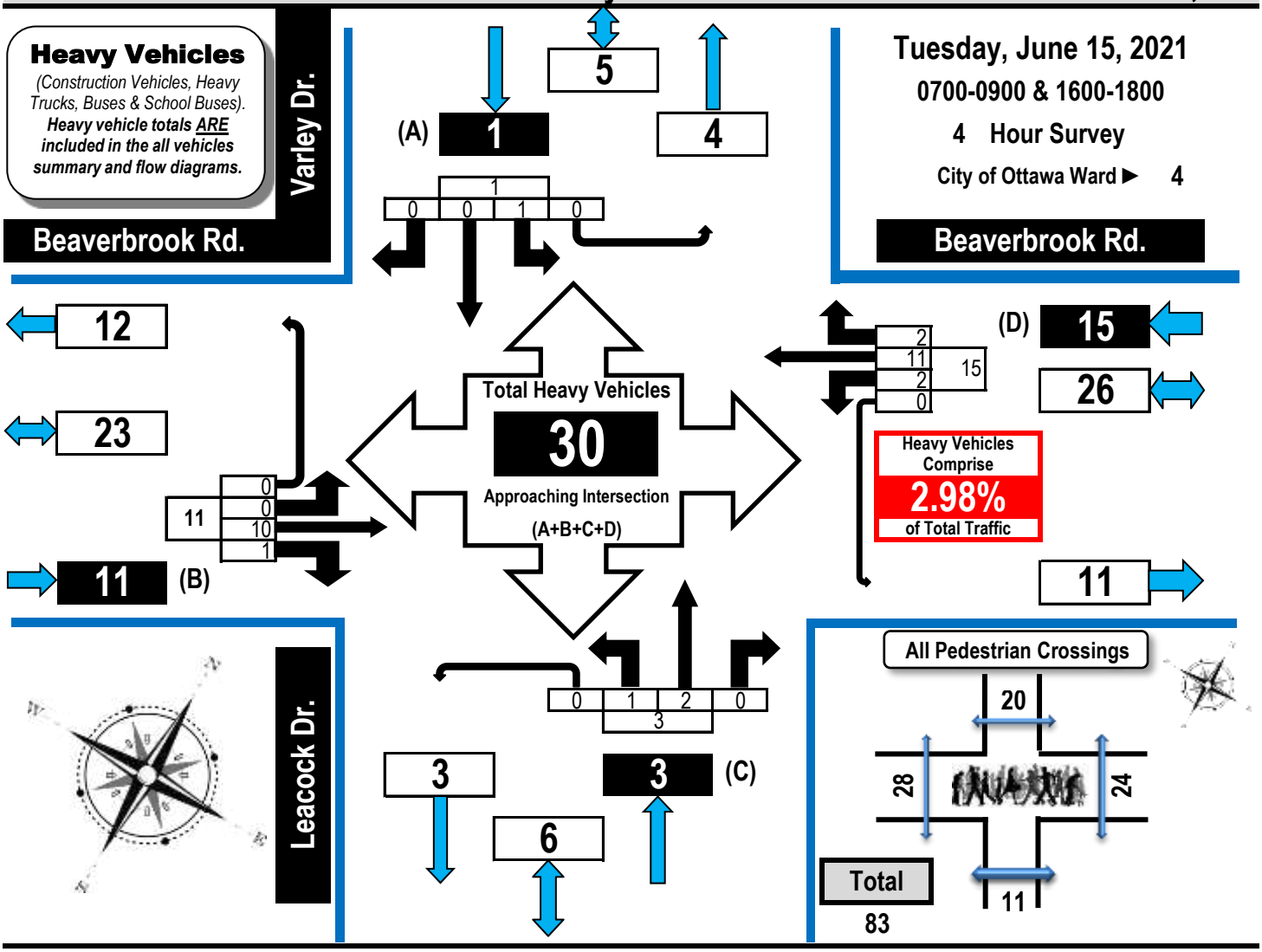
Summary - PM Peak Hr.	
Peak Hr.	1630-1730
Volume	335
PHF	0.90

Turning Movement Count
Heavy Vehicle Summary
Flow Diagram

Beaverbrook Road & Leacock Drive/Varley Drive — Kanata, ON

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

Tuesday, June 15, 2021
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 4



	Beaverbrook Rd. Eastbound					Beaverbrook Rd. Westbound					Leacock Dr. Northbound					Varley Dr. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	2	1	0	3	1	3	0	0	4	1	1	0	0	2	0	0	0	0	0	9
0800-0900	0	4	0	0	4	1	5	2	0	8	0	0	0	0	0	1	0	0	0	1	13
1600-1700	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
1700-1800	0	3	0	0	3	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	6
Totals	**0**	**10**	**1**	**0**	**11**	**2**	**11**	**2**	**0**	**15**	**1**	**2**	**0**	**0**	**3**	**1**	**0**	**0**	**0**	**1**	**30**

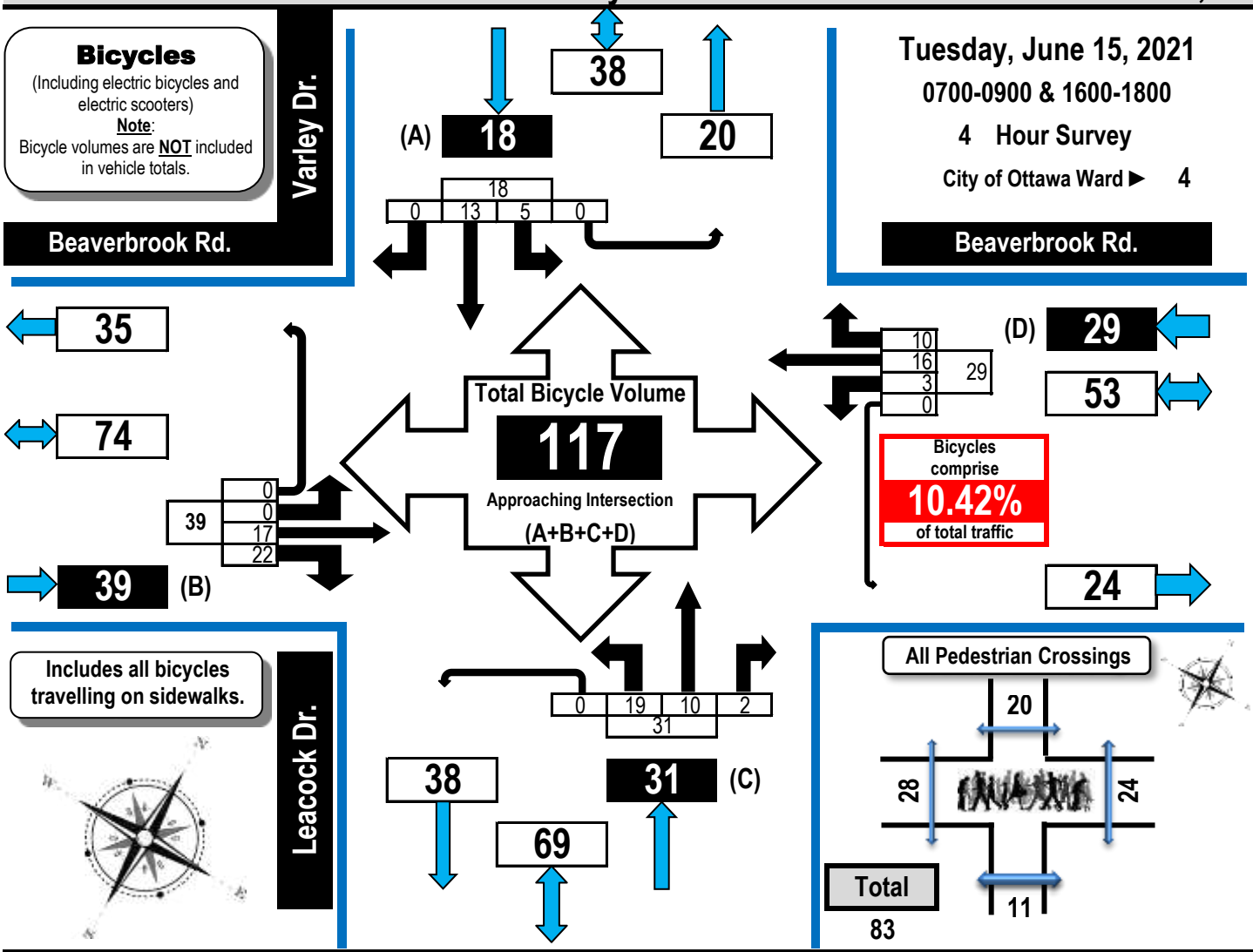
Comments:
Traffic count conducted during SARS-CoV-2 (Covid-19) pandemic. All schools closed to in-class learning; however, all businesses open as well as all restaurant patios. OCTranspo and ParaTranspo buses comprise 66.67 % of the heavy vehicle traffic. The majority of the heavy truck traffic was comprised of garbage trucks. Some drivers on Beaverbrook Road and the majority of the cyclists ignore the stop control.

Turning Movement Count
Bicycle Summary
Flow Diagram

Beaverbrook Road & Leacock Drive/Varley Drive — Kanata, ON

Bicycles
(Including electric bicycles and electric scooters)
Note:
Bicycle volumes are NOT included in vehicle totals.

Tuesday, June 15, 2021
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 4



	Beaverbrook Rd. Eastbound					Beaverbrook Rd. Westbound					Leacock Dr. Northbound					Varley Dr. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800	0	2	0	0	2	0	5	0	0	5	2	1	0	0	3	0	0	0	0	0	10
0800-0900	0	2	2	0	4	0	0	2	0	2	0	2	0	0	2	1	0	0	0	1	9
1600-1700	0	7	7	0	14	1	4	4	0	9	6	2	0	0	8	0	7	0	0	7	38
1700-1800	0	6	13	0	19	2	7	4	0	13	11	5	2	0	18	4	6	0	0	10	60
Totals	0	17	22	0	39	3	16	10	0	29	19	10	2	0	31	5	13	0	0	18	117

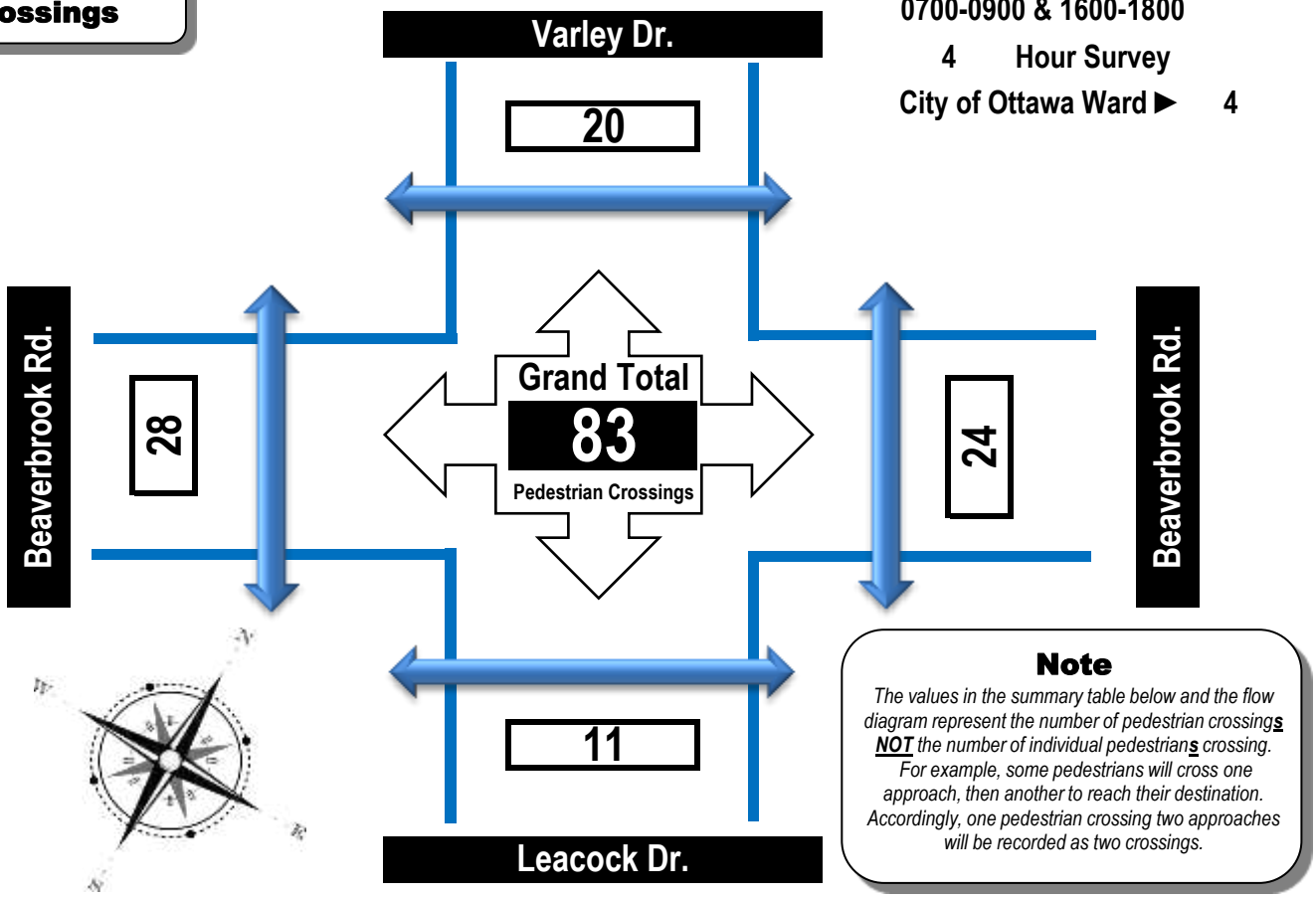
Comments:
Traffic count conducted during SARS-CoV-2 (Covid-19) pandemic. All schools closed to in-class learning; however, all businesses open as well as all restaurant patios. OCTranspo and ParaTranspo buses comprise 66.67 % of the heavy vehicle traffic. The majority of the heavy truck traffic was comprised of garbage trucks. Some drivers on Beaverbrook Road and the majority of the cyclists ignore the stop control.

Turning Movement Count
Pedestrian Crossings Summary and Flow Diagram

Beaverbrook Road & Leacock Drive/Varley Drive — Kanata, ON

Pedestrian Crossings

Tuesday, June 15, 2021
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 4



Note

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

Time Period	West Side Crossing Beaverbrook Rd.	East Side Crossing Beaverbrook Rd.	Street Total	South Side Crossing Leacock Dr.	North Side Crossing Varley Dr.	Street Total	Grand Total
0700-0800	7	4	11	6	2	8	19
0800-0900	8	5	13	1	4	5	18
1600-1700	6	8	14	1	6	7	21
1700-1800	7	7	14	3	8	11	25
Totals	**28**	**24**	**52**	**11**	**20**	**31**	**83**

Comments:

Traffic count conducted during SARS-CoV-2 (Covid-19) pandemic. All schools closed to in-class learning; however, all businesses open as well as all restaurant patios. OCTranspo and ParaTranspo buses comprise 66.67 % of the heavy vehicle traffic. The majority of the heavy truck traffic was comprised of garbage trucks. Some drivers on Beaverbrook Road and the majority of the cyclists ignore the stop control.

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count

Summary Report

Including AM and PM Peak Hours

All Vehicles Except Bicycles

Beaverbrook Road & Leacock Drive/Varley Drive — Kanata, ON

Survey Date: Tuesday, June 15, 2021 **Start Time:** 0700 **AADT Factor:** 0.9

Weather AM: Overcast +16° C **Survey Duration:** 4 Hrs. **Survey Hours:** 0700-0900 & 1600-1800

Weather PM: Partly Cloudy +23° C **Surveyor(s):** T. Carmody

	Beaverbrook Rd. Eastbound					Beaverbrook Rd. Westbound						Leacock Dr. Northbound					Varley Dr. Southbound						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	2	62	6	0	**70**	10	36	5	0	**51**	**121**	8	1	11	0	**20**	15	1	4	0	**20**	**40**	**161**
0800-0900	4	83	5	0	**92**	8	51	20	0	**79**	**171**	5	2	12	0	**19**	22	2	4	0	**28**	**47**	**218**
1600-1700	5	91	18	0	**114**	13	102	30	0	**145**	**259**	13	1	16	0	**30**	21	4	8	0	**33**	**63**	**322**
1700-1800	10	72	11	0	**93**	17	110	29	0	**156**	**249**	11	4	9	0	**24**	21	2	9	0	**32**	**56**	**305**
Totals	**21**	**308**	**40**	**0**	**369**	**48**	**299**	**84**	**0**	**431**	**800**	**37**	**8**	**48**	**0**	**93**	**79**	**9**	**25**	**0**	**113**	**206**	**1006**

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

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

Equ. 12 Hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

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

AADT 12-hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

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

AADT 24 Hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor ➡ 0.92												Highest Hourly Vehicle Volume Between 0700h & 0900h										
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0800-0900	4	83	5	0	**92**	8	51	20	0	**79**	**171**	5	2	12	0	**19**	22	2	4	0	**28**	**47**	**218**

PM Peak Hour Factor ➡ 0.90												Highest Hourly Vehicle Volume Between 1600h & 1800h										
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1630-1730	10	83	17	0	**110**	12	102	36	0	**150**	**260**	14	3	12	0	**29**	30	5	11	0	**46**	**75**	**335**

Comments:

Traffic count conducted during SARS-CoV-2 (Covid-19) pandemic. All schools closed to in-class learning; however, all businesses open as well as all restaurant patios. OCTranspo and ParaTranspo buses comprise 66.67 % of the heavy vehicle traffic. The majority of the heavy truck traffic was comprised of garbage trucks. Some drivers on Beaverbrook Road and the majority of the cyclists ignore the stop control.

Notes:

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

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

Varley Drive & Weeping Willow Lane (South) — Kanata, ON

All Vehicles
(Except Bicycles & Electric Scooters)

Tuesday, June 15, 2021
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 4

Total vehicle volume, all approaches. (A + C + D)

Varley Dr.

(A) 69 — 148 — 79

69
57 | 12 | 0

Weeping Willow Ln. (S)

(D) 51

17
34
0
51

213

94

43

0 | 62 | 31
93

91 — 93 (C) — 184

All Pedestrian Crossings

3
35
0

Total 38

AM Peak Hour Flow Diagram

Varley Dr.

(A) 12 — 34 — 22

12
11 | 1 | 0

Pedestrian Crossings During **AM** Peak Hr.
0
N/A + 7
0

(D) 17

Total vehicle volume, all approaches. (A + C + D)

50 (A+C+D)

5
12 | 17 | 22
0

5

0 | 17 | 4
21

Varley Dr.

23 — (C) 21 — 44

Weeping Willow Ln. (S)

Summary - AM Peak Hr.	
Peak Hr.	0730-0830
Volume	50
PHF	0.69

PM Peak Hour Flow Diagram

Varley Dr.

(A) 33 — 55 — 22

33
28 | 5 | 0

Pedestrian Crossings During **PM** Peak Hr.
0
N/A + 12
0

(D) 11

Total vehicle volume, all approaches. (A + C + D)

80 (A+C+D)

2
9 | 11 | 32
0

21

0 | 20 | 16
36

Varley Dr.

37 — (C) 36 — 73

Weeping Willow Ln. (S)

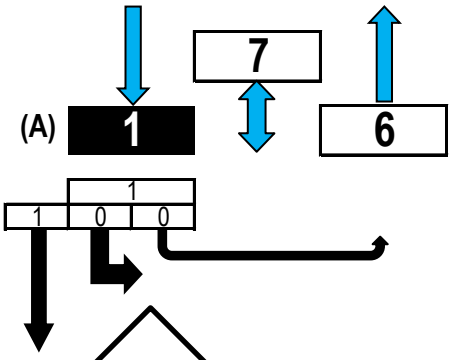
Summary - PM Peak Hr.	
Peak Hr.	1630-1730
Volume	80
PHF	0.95

Turning Movement Count
Heavy Vehicle Summary
Flow Diagram

Varley Drive & Weeping Willow Lane (South) — Kanata, ON

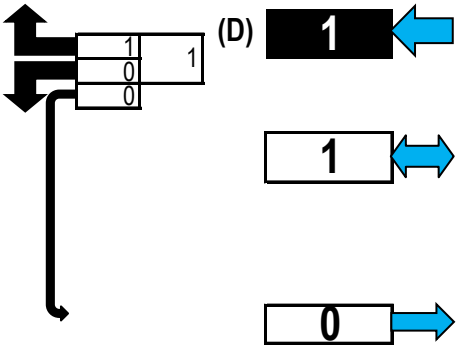
Heavy Vehicles
(Construction Vehicles, Heavy Trucks, Buses & School Buses).
Heavy vehicle totals ARE included in the all vehicles summary and flow diagrams.

Varley Dr.



Tuesday, June 15, 2021
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 4

Weeping Willow Ln. (S)

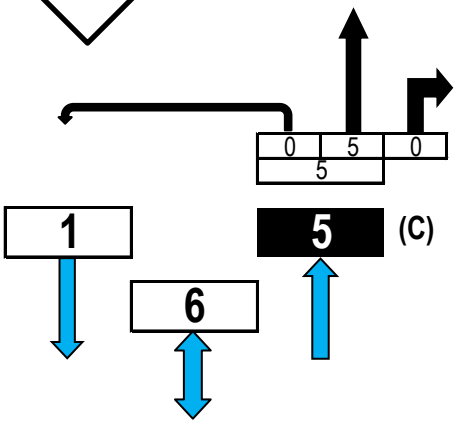


Total heavy vehicle volume, all approaches. (A + C + D)

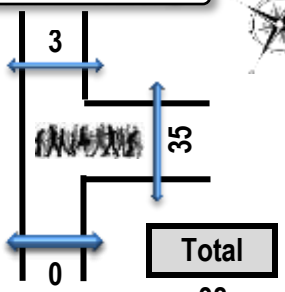
7

Heavy Vehicles Comprise
3.29%
of Total Traffic

Varley Dr.



All Pedestrian Crossings



	N/A Eastbound					Weeping Willow Ln. (S) Westbound					Varley Dr. Northbound					Varley Dr. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800						0		0	0	0		1	0	0	1	0	0		0	0	1
0800-0900						0		1	0	1		3	0	0	3	0	1		0	1	5
1600-1700						0		0	0	0		0	0	0	0	0	0		0	0	0
1700-1800						0		0	0	0		1	0	0	1	0	0		0	0	1
Totals						0		1	0	1		5	0	0	5	0	1		0	1	7

Turning Movement Count
Bicycle Summary
Flow Diagram

Varley Drive & Weeping Willow Lane (South) — Kanata, ON

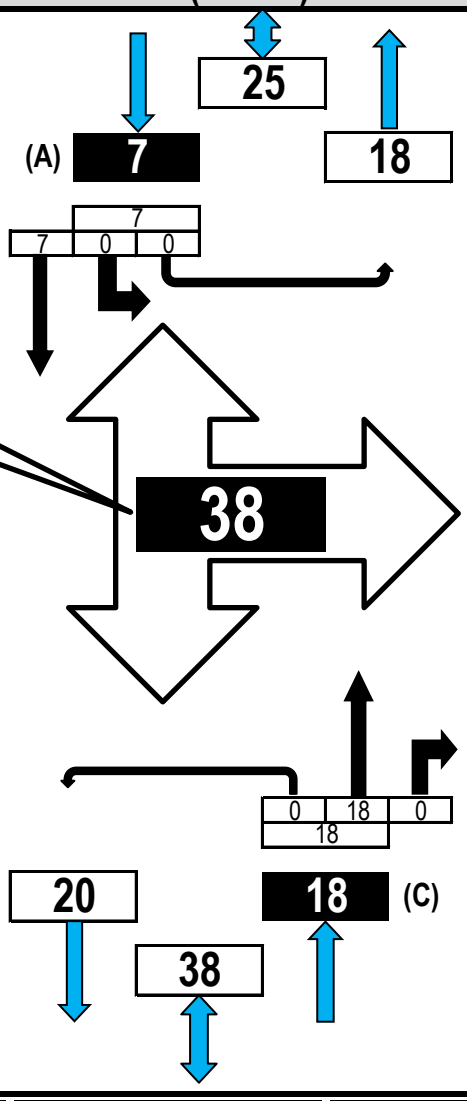
Bicycles
(Including electric bicycles and electric scooters)
Note:
Bicycle volumes are NOT included in vehicle totals.

Total bicycle volume, all approaches. (A + C + D)

Bicycles comprise **15.14%** of total traffic

Includes all bicycles travelling on sidewalks.

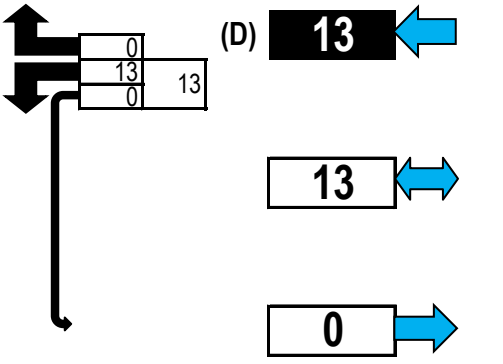
Varley Dr.



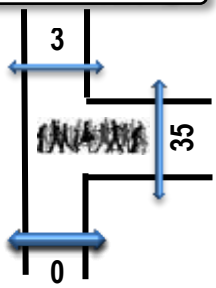
Varley Dr.

Tuesday, June 15, 2021
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 4

Weeping Willow Ln. (S)



All Pedestrian Crossings



Total
38

	N/A Eastbound					Weeping Willow Ln. (S) Westbound					Varley Dr. Northbound					Varley Dr. Southbound					
Time Period	LT	ST	RT	UT	EB Tot	LT	ST	RT	UT	WB Tot	LT	ST	RT	UT	NB Tot	LT	ST	RT	UT	SB Tot	GR Tot
0700-0800						0		0	0	0		2	0	0	2	0	0		0	0	2
0800-0900						0		0	0	0		5	0	0	5	0	1		0	1	6
1600-1700						6		0	0	6		5	0	0	5	0	3		0	3	14
1700-1800						7		0	0	7		6	0	0	6	0	3		0	3	16
Totals						13		0	0	13		18	0	0	18	0	7		0	7	38

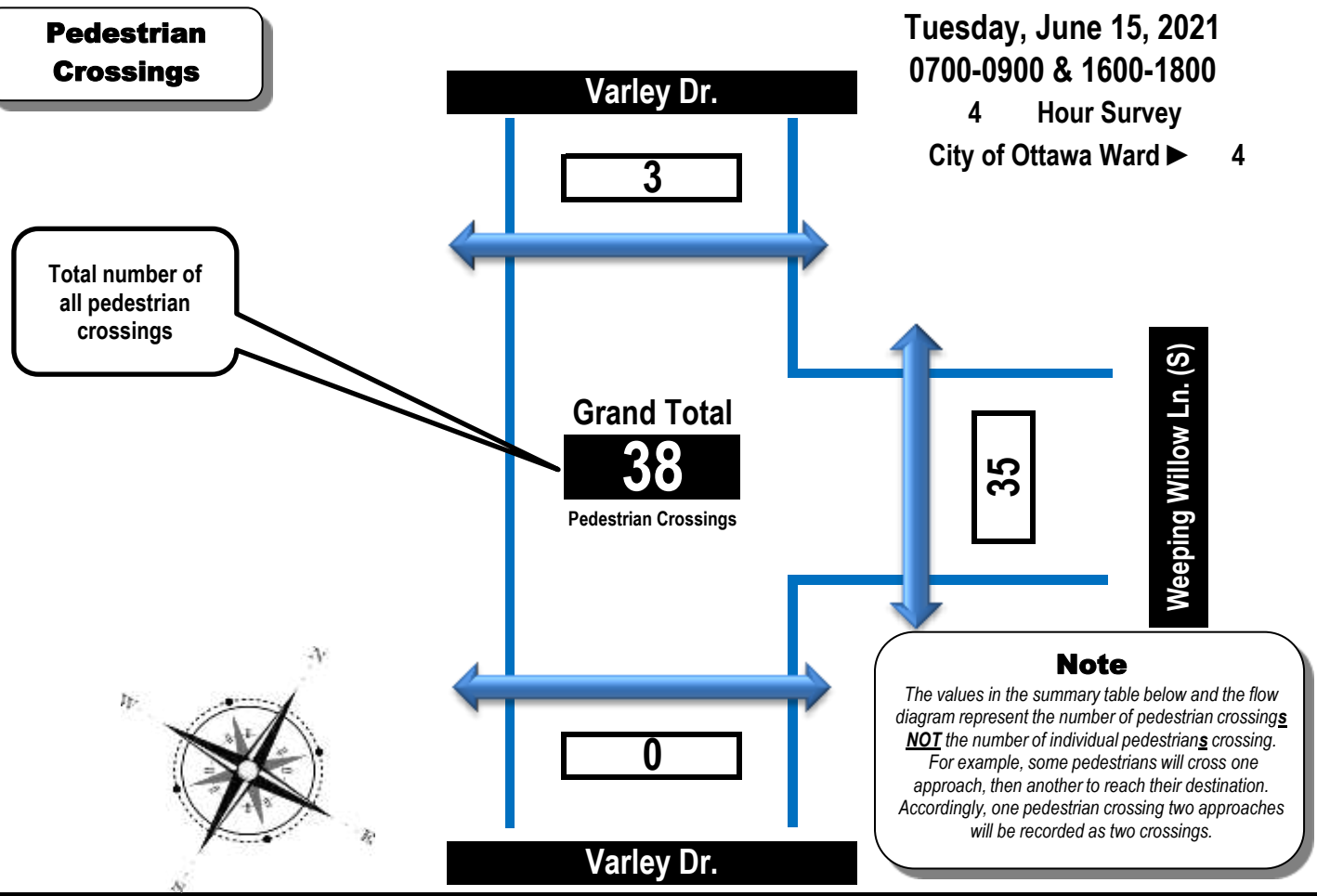
Turning Movement Count

Pedestrian Crossings Summary and Flow Diagram

Varley Drive & Weeping Willow Lane (South) — Kanata, ON

Pedestrian Crossings

Tuesday, June 15, 2021
0700-0900 & 1600-1800
4 Hour Survey
City of Ottawa Ward ► 4



Note

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

Time Period	West Side Crossing N/A	East Side Crossing Weeping Willow Ln. (S)	Street Total	South Side Crossing Varley Dr.	North Side Crossing Varley Dr.	Street Total	Grand Total
0700-0800		5	5	0	0	0	5
0800-0900		9	9	0	0	0	9
1600-1700		11	11	0	1	1	12
1700-1800		10	10	0	2	2	12
Totals	**0**	**35**	**35**	**0**	**3**	**3**	**38**

Comments:
Traffic count conducted during SARS-CoV-2 (Covid-19) pandemic. All schools closed to in-class learning; however, all businesses open as well as all restaurant patios. OCTranspo and ParaTranspo buses comprise 28.57% of the heavy vehicle traffic. The majority of the heavy vehicle traffic was comprised of garbage trucks.

ACCURATE TRUSTED TRAFFIC DATA

Turning Movement Count

Summary Report

Including AM and PM Peak Hours

All Vehicles Except Bicycles

Varley Drive & Weeping Willow Lane (South) — Kanata, ON

Survey Date: Tuesday, June 15, 2021 **Start Time:** 0700 **AADT Factor:** 0.9

Weather AM: Overcast +16° C **Survey Duration:** 4 Hrs. **Survey Hours:** 0700-0900 & 1600-1800

Weather PM: Partly Cloudy +23° C **Surveyor(s):** T. Carmody

	N/A				Weeping Willow Ln. (S)						Varley Dr.					Varley Dr.						
	Eastbound					Westbound						Northbound					Southbound						
Time Period	LT	ST	RT	UT	E/B Tot	LT	ST	RT	UT	W/B Tot	Street Total	LT	ST	RT	UT	N/B Tot	LT	ST	RT	UT	S/B Tot	Street Total	Grand Total
0700-0800	0	0	0	0	**0**	7	0	5	0	**12**	**12**	0	7	0	0	**7**	1	7	0	0	**8**	**15**	**27**
0800-0900	0	0	0	0	**0**	11	0	2	0	**13**	**13**	0	18	5	0	**23**	2	11	0	0	**13**	**36**	**49**
1600-1700	0	0	0	0	**0**	9	0	6	0	**15**	**15**	0	15	12	0	**27**	5	21	0	0	**26**	**53**	**68**
1700-1800	0	0	0	0	**0**	7	0	4	0	**11**	**11**	0	22	14	0	**36**	4	18	0	0	**22**	**58**	**69**
Totals	**0**	**0**	**0**	**0**	**0**	**34**	**0**	**17**	**0**	**51**	**51**	**0**	**62**	**31**	**0**	**93**	**12**	**57**	**0**	**0**	**69**	**162**	**213**

Equivalent 12 & 24-hour Vehicle Volumes Including the Annual Average Daily Traffic (AADT) Factor Applicable to the Day and Month of the Turning Movement Count

Expansion factors are applied exclusively to standard weekday 8-hour turning movement counts conducted during the hours of 0700h - 1000h, 1130h - 1330h and 1500h - 1800h

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

Equ. 12 Hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

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

AADT 12-hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

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

AADT 24 Hr	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	n/a	n/a	n/a	n/a	**n/a**	n/a	n/a	n/a	n/a	**n/a**	**n/a**	**n/a**

AADT and expansion factors provided by the City of Ottawa

AM Peak Hour Factor ➡					0.69							Highest Hourly Vehicle Volume Between 0700h & 0900h											
AM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
0730-0830	0	0	0	0	**0**	12	0	5	0	**17**	**17**	0	17	4	0	**21**	1	11	0	0	**12**	**33**	**50**

PM Peak Hour Factor ➡					0.95							Highest Hourly Vehicle Volume Between 1600h & 1800h											
PM Peak Hr	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	LT	ST	RT	UT	Total	LT	ST	RT	UT	Total	Str. Tot.	Gr. Tot.
1630-1730	0	0	0	0	**0**	9	0	2	0	**11**	**11**	0	20	16	0	**36**	5	28	0	0	**33**	**69**	**80**

Comments:

Traffic count conducted during SARS-CoV-2 (Covid-19) pandemic. All schools closed to in-class learning; however, all businesses open as well as all restaurant patios. OCTranspo and ParaTranspo buses comprise 28.57% of the heavy vehicle traffic. The majority of the heavy vehicle traffic was comprised of garbage trucks.

Notes:

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

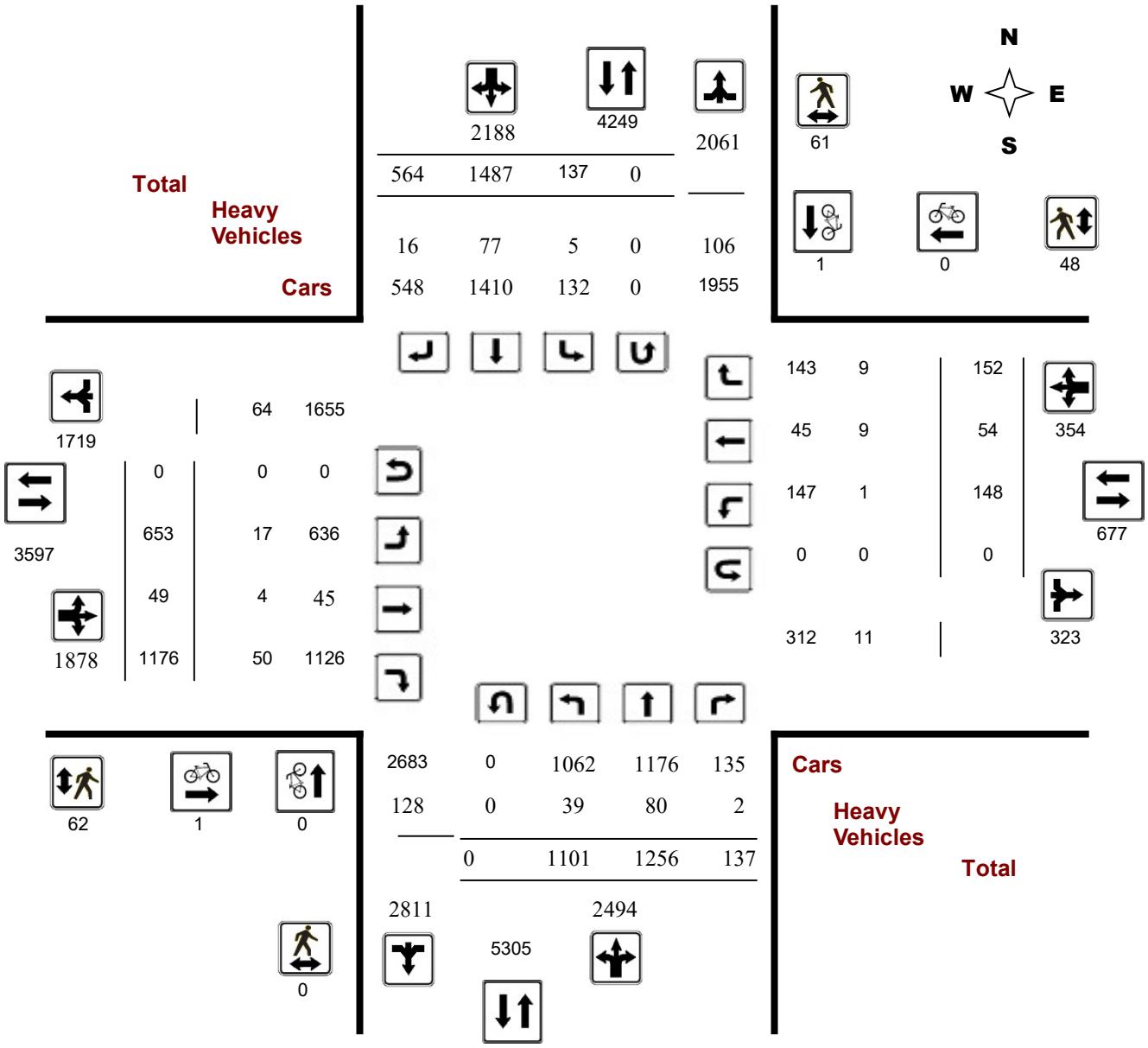
Transportation Services - Traffic Services

Turning Movement Count - Study Results

TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Survey Date: Tuesday, March 10, 2020
Start Time: 07:00
WO No: 39593
Device: Miovision

Full Study Diagram



5479343 - MAR 10 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

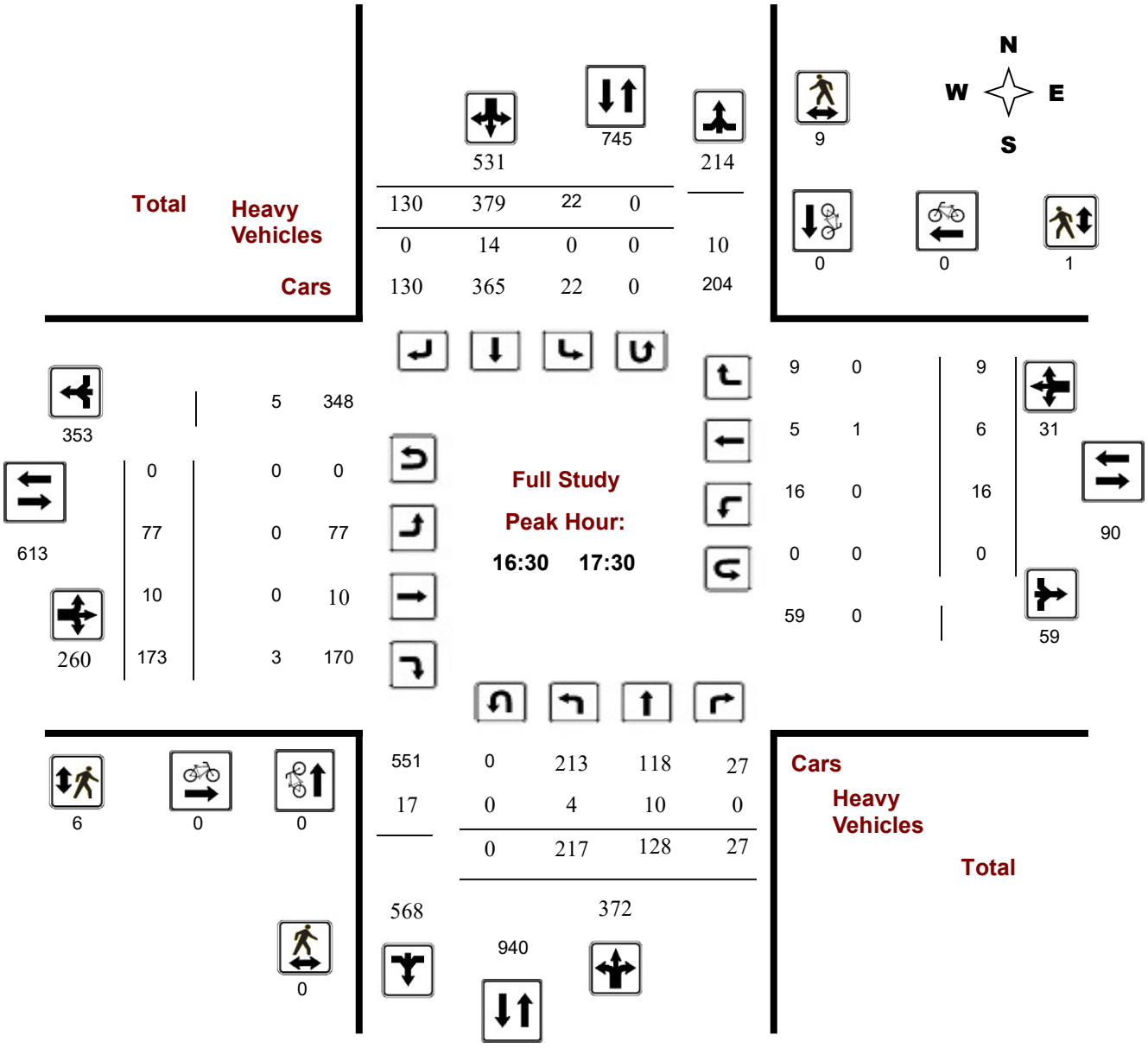
Turning Movement Count - Study Results

TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Survey Date: Tuesday, March 10, 2020 **WO No:** 39593

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

Full Study Peak Hour Diagram



5479343 - MAR 10 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Survey Date: Tuesday, March 10, 2020 **WO No:** 39593

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

Full Study Summary (8 HR Standard)

Survey Date: Tuesday, March 10, 2020

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

1.00

	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	71	148	7	**226**	8	75	36	**119**	**345**	113	4	152	**269**	21	9	28	**58**	**327**	**672**
08:00 09:00	197	320	9	**526**	16	144	39	**199**	**725**	142	11	189	**342**	23	13	30	**66**	**408**	**1133**
09:00 10:00	98	168	7	**273**	10	84	41	**135**	**408**	79	4	167	**250**	12	4	25	**41**	**291**	**699**
11:30 12:30	85	99	18	**202**	24	185	49	**258**	**460**	56	2	103	**161**	18	6	18	**42**	**203**	**663**
12:30 13:30	90	122	18	**230**	11	129	56	**196**	**426**	50	3	99	**152**	15	0	9	**24**	**176**	**602**
15:00 16:00	164	147	22	**333**	24	177	83	**284**	**617**	66	8	147	**221**	22	9	20	**51**	**272**	**889**
16:00 17:00	205	121	26	**352**	22	333	133	**488**	**840**	75	5	186	**266**	18	6	14	**38**	**304**	**1144**
17:00 18:00	191	131	30	**352**	22	360	127	**509**	**861**	72	12	133	**217**	19	7	8	**34**	**251**	**1112**
Sub Total	1101	1256	137	**2494**	137	1487	564	**2188**	**4682**	653	49	1176	**1878**	148	54	152	**354**	**2232**	**6914**
U Turns	0			**0**	0			**0**	**0**	**0**			**0**	0			**0**	**0**	**0**
Total	1101	1256	137	**2494**	137	1487	564	**2188**	**4682**	653	49	1176	**1878**	148	54	152	**354**	**2232**	**6914**
EQ 12Hr	1530	1746	190	**3466**	190	2067	784	**3041**	**6507**	908	68	1635	**2611**	206	75	211	**492**	**3103**	**9610**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.														**1.39**					
AVG 12Hr	1530	1746	190	**3466**	190	2067	784	**3041**	**6507**	908	68	1635	**2611**	206	75	211	**492**	**3103**	**9610**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.														**1.00**					
AVG 24Hr	2004	2287	249	**4540**	249	2708	1027	**3984**	**8524**	1189	89	2142	**3420**	270	98	276	**644**	**4064**	**12588**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.														**1.31**					

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

Transportation Services - Traffic Services

Turning Movement Count - Study Results

TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Survey Date: Tuesday, March 10, 2020 **WO No:** 39593

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

Full Study 15 Minute Increments

Time Period		Northbound				Southbound					Eastbound				Westbound					
		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	14	30	1	45	0	19	4	23	**68**	14	1	39	54	3	0	6	9	**63**	**131**
07:15	07:30	26	28	3	57	1	18	5	24	**81**	27	2	40	69	4	2	8	14	**83**	**164**
07:30	07:45	16	34	0	50	2	15	10	27	**77**	25	1	30	56	8	3	5	16	**72**	**149**
07:45	08:00	15	56	3	74	5	23	17	45	**119**	47	0	43	90	6	4	9	19	**109**	**228**
08:00	08:15	28	57	3	88	8	28	12	48	**136**	42	4	42	88	4	1	3	8	**96**	**232**
08:15	08:30	42	80	1	123	4	47	9	60	**183**	26	4	50	80	4	3	9	16	**96**	**279**
08:30	08:45	69	101	2	172	2	37	7	46	**218**	33	2	56	91	11	2	7	20	**111**	**329**
08:45	09:00	58	82	3	143	2	32	11	45	**188**	41	1	41	83	4	7	11	22	**105**	**293**
09:00	09:15	30	66	2	98	2	20	9	31	**129**	32	2	66	100	3	4	9	16	**116**	**245**
09:15	09:30	25	51	1	77	3	24	8	35	**112**	20	0	40	60	4	0	3	7	**67**	**179**
09:30	09:45	22	21	1	44	2	19	11	32	**76**	15	0	32	47	1	0	4	5	**52**	**128**
09:45	10:00	21	30	3	54	3	21	13	37	**91**	12	2	29	43	4	0	9	13	**56**	**147**
11:30	11:45	21	28	3	52	2	47	8	57	**109**	21	1	25	47	7	1	5	13	**60**	**169**
11:45	12:00	30	29	2	61	13	48	13	74	**135**	12	1	36	49	2	3	7	12	**61**	**196**
12:00	12:15	20	19	6	45	7	45	13	65	**110**	13	0	19	32	7	1	3	11	**43**	**153**
12:15	12:30	14	23	7	44	2	45	15	62	**106**	10	0	23	33	2	1	3	6	**39**	**145**
12:30	12:45	15	31	6	52	3	38	17	58	**110**	14	0	27	41	6	0	2	8	**49**	**159**
12:45	13:00	24	35	3	62	3	32	13	48	**110**	16	1	18	35	3	0	2	5	**40**	**150**
13:00	13:15	30	33	6	69	3	28	14	45	**114**	9	0	30	39	2	0	1	3	**42**	**156**
13:15	13:30	21	23	3	47	2	31	12	45	**92**	11	2	24	37	4	0	4	8	**45**	**137**
15:00	15:15	47	45	7	99	7	37	19	63	**162**	13	2	37	52	5	1	11	17	**69**	**231**
15:15	15:30	36	37	3	76	7	35	14	56	**132**	16	2	21	39	3	5	5	13	**52**	**184**
15:30	15:45	42	34	3	79	5	42	23	70	**149**	14	1	49	64	7	2	2	11	**75**	**224**
15:45	16:00	39	31	9	79	5	63	27	95	**174**	23	3	40	66	7	1	2	10	**76**	**250**
16:00	16:15	44	37	6	87	6	71	35	112	**199**	20	2	48	70	7	1	5	13	**83**	**282**
16:15	16:30	55	30	9	94	5	79	33	117	**211**	20	1	39	60	5	3	3	11	**71**	**282**
16:30	16:45	52	27	5	84	7	89	27	123	**207**	17	2	54	73	2	1	3	6	**79**	**286**
16:45	17:00	54	27	6	87	4	94	38	136	**223**	18	0	45	63	4	1	3	8	**71**	**294**
17:00	17:15	58	31	9	98	4	97	31	132	**230**	21	2	49	72	5	3	2	10	**82**	**312**
17:15	17:30	53	43	7	103	7	99	34	140	**243**	21	6	25	52	5	1	1	7	**59**	**302**
17:30	17:45	37	34	6	77	8	101	41	150	**227**	14	3	31	48	5	1	2	8	**56**	**283**
17:45	18:00	43	23	8	74	3	63	21	87	**161**	16	1	28	45	4	2	3	9	**54**	**215**
Total:		1101	1256	137	2494	137	1487	564	2188	**4682**	653	49	1176	1878	148	54	152	354	**4682**	**6,914**

Note: U-Turns are included in Totals.

Transportation Services - Traffic Services

Turning Movement Count - Study Results

TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Survey Date: Tuesday, March 10, 2020 **WO No:** 39593

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

Full Study Cyclist Volume

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

Transportation Services - Traffic Services

Turning Movement Count - Study Results

TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Survey Date: Tuesday, March 10, 2020 **WO No:** 39593

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

Full Study Pedestrian Volume

Time Period	NB Approach (E or W Crossing)	SB Approach (E or W Crossing)	Total	EB Approach (N or S Crossing)	WB Approach (N or S Crossing)	Total	Grand Total
07:00 07:15	0	0	**0**	0	0	**0**	**0**
07:15 07:30	0	3	**3**	3	1	**4**	**7**
07:30 07:45	0	4	**4**	1	0	**1**	**5**
07:45 08:00	0	2	**2**	2	1	**3**	**5**
08:00 08:15	0	4	**4**	3	3	**6**	**10**
08:15 08:30	0	0	**0**	5	6	**11**	**11**
08:30 08:45	0	2	**2**	0	6	**6**	**8**
08:45 09:00	0	3	**3**	2	0	**2**	**5**
09:00 09:15	0	1	**1**	3	1	**4**	**5**
09:15 09:30	0	2	**2**	1	1	**2**	**4**
09:30 09:45	0	2	**2**	4	1	**5**	**7**
09:45 10:00	0	2	**2**	2	0	**2**	**4**
11:30 11:45	0	0	**0**	0	4	**4**	**4**
11:45 12:00	0	0	**0**	1	2	**3**	**3**
12:00 12:15	0	0	**0**	2	2	**4**	**4**
12:15 12:30	0	0	**0**	0	0	**0**	**0**
12:30 12:45	0	1	**1**	2	0	**2**	**3**
12:45 13:00	0	1	**1**	2	0	**2**	**3**
13:00 13:15	0	0	**0**	1	0	**1**	**1**
13:15 13:30	0	1	**1**	0	0	**0**	**1**
15:00 15:15	0	3	**3**	5	5	**10**	**13**
15:15 15:30	0	6	**6**	6	4	**10**	**16**
15:30 15:45	0	1	**1**	0	7	**7**	**8**
15:45 16:00	0	8	**8**	5	1	**6**	**14**
16:00 16:15	0	2	**2**	2	2	**4**	**6**
16:15 16:30	0	3	**3**	3	0	**3**	**6**
16:30 16:45	0	2	**2**	1	0	**1**	**3**
16:45 17:00	0	0	**0**	1	0	**1**	**1**
17:00 17:15	0	3	**3**	3	1	**4**	**7**
17:15 17:30	0	4	**4**	1	0	**1**	**5**
17:30 17:45	0	0	**0**	1	0	**1**	**1**
17:45 18:00	0	1	**1**	0	0	**0**	**1**
Total	0	61	**61**	62	48	**110**	**171**

5479343 - MAR 10 2020 - 8HRS - LORETTA

Transportation Services - Traffic Services

Turning Movement Count - Study Results

TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Survey Date: Tuesday, March 10, 2020 **WO No:** 39593

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

Full Study Heavy Vehicles

		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	07:15	0	6	0	**6**	0	2	0	**2**	**8**	0	0	0	**0**	0	0	0	**0**	**0**	**8**
07:15	07:30	1	5	0	**6**	0	1	0	**1**	**7**	0	1	1	**2**	0	0	0	**0**	**2**	**9**
07:30	07:45	0	3	0	**3**	0	3	2	**5**	**8**	0	0	0	**0**	0	0	1	**1**	**1**	**9**
07:45	08:00	1	5	0	**6**	0	2	4	**6**	**12**	1	0	2	**3**	0	1	0	**1**	**4**	**16**
08:00	08:15	1	3	1	**5**	1	4	0	**5**	**10**	1	0	2	**3**	0	0	0	**0**	**3**	**13**
08:15	08:30	2	0	0	**2**	1	4	0	**5**	**7**	0	0	9	**9**	0	2	0	**2**	**11**	**18**
08:30	08:45	2	5	0	**7**	0	5	1	**6**	**13**	1	0	4	**5**	0	1	2	**3**	**8**	**21**
08:45	09:00	3	4	0	**7**	1	3	0	**4**	**11**	2	0	1	**3**	0	2	0	**2**	**5**	**16**
09:00	09:15	0	2	0	**2**	0	0	1	**1**	**3**	0	0	5	**5**	0	0	0	**0**	**5**	**8**
09:15	09:30	1	1	0	**2**	0	3	1	**4**	**6**	0	0	2	**2**	0	0	0	**0**	**2**	**8**
09:30	09:45	2	1	0	**3**	0	0	1	**1**	**4**	2	0	2	**4**	0	0	1	**1**	**5**	**9**
09:45	10:00	1	4	1	**6**	0	4	0	**4**	**10**	0	1	0	**1**	0	0	1	**1**	**2**	**12**
11:30	11:45	0	1	0	**1**	0	2	0	**2**	**3**	0	0	1	**1**	0	0	0	**0**	**1**	**4**
11:45	12:00	0	1	0	**1**	0	1	0	**1**	**2**	0	0	0	**0**	0	1	0	**1**	**1**	**3**
12:00	12:15	0	2	0	**2**	0	2	0	**2**	**4**	0	0	1	**1**	0	0	1	**1**	**2**	**6**
12:15	12:30	1	1	0	**2**	0	1	0	**1**	**3**	0	0	1	**1**	0	0	0	**0**	**1**	**4**
12:30	12:45	1	1	0	**2**	0	1	0	**1**	**3**	1	0	0	**1**	1	0	0	**1**	**2**	**5**
12:45	13:00	3	2	0	**5**	0	1	1	**2**	**7**	1	0	1	**2**	0	0	0	**0**	**2**	**9**
13:00	13:15	0	2	0	**2**	0	2	1	**3**	**5**	1	0	0	**1**	0	0	0	**0**	**1**	**6**
13:15	13:30	3	1	0	**4**	0	2	2	**4**	**8**	1	0	0	**1**	0	0	0	**0**	**1**	**9**
15:00	15:15	1	3	0	**4**	1	3	0	**4**	**8**	0	0	2	**2**	0	0	3	**3**	**5**	**13**
15:15	15:30	5	4	0	**9**	0	2	0	**2**	**11**	0	0	1	**1**	0	0	0	**0**	**1**	**12**
15:30	15:45	0	2	0	**2**	0	1	0	**1**	**3**	1	0	1	**2**	0	0	0	**0**	**2**	**5**
15:45	16:00	4	2	0	**6**	0	2	2	**4**	**10**	3	2	2	**7**	0	0	0	**0**	**7**	**17**
16:00	16:15	1	3	0	**4**	0	0	0	**0**	**4**	0	0	4	**4**	0	0	0	**0**	**4**	**8**
16:15	16:30	1	3	0	**4**	1	7	0	**8**	**12**	2	0	2	**4**	0	1	0	**1**	**5**	**17**
16:30	16:45	1	1	0	**2**	0	3	0	**3**	**5**	0	0	1	**1**	0	0	0	**0**	**1**	**6**
16:45	17:00	1	2	0	**3**	0	3	0	**3**	**6**	0	0	0	**0**	0	0	0	**0**	**0**	**6**
17:00	17:15	1	4	0	**5**	0	5	0	**5**	**10**	0	0	2	**2**	0	0	0	**0**	**2**	**12**
17:15	17:30	1	3	0	**4**	0	3	0	**3**	**7**	0	0	0	**0**	0	1	0	**1**	**1**	**8**
17:30	17:45	0	1	0	**1**	0	1	0	**1**	**2**	0	0	1	**1**	0	0	0	**0**	**1**	**3**
17:45	18:00	1	2	0	**3**	0	4	0	**4**	**7**	0	0	2	**2**	0	0	0	**0**	**2**	**9**
Total:	None	39	80	2	**121**	5	77	16	**98**	**219**	17	4	50	**71**	1	9	9	**19**	**90**	**309**

Transportation Services - Traffic Services

Turning Movement Count - Study Results

TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Survey Date: Tuesday, March 10, 2020 **WO No:** 39593

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

Full Study 15 Minute U-Turn Total

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

Appendix D

Collision Data

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: BEAVERBROOK RD @ LEACOCK DR E

Traffic Control: Stop sign **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Feb-04, Wed,17:30	Snow	Rear end	P.D. only	Loose snow	North	Slowing or stopping	Automobile, station wagon	Other motor vehicle	0
					North	Stopped	Automobile, station wagon	Other motor vehicle	

Location: BEAVERBROOK RD @ LEACOCK DR W/VARLEY DR E

Traffic Control: Stop sign **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2019-Apr-26, Fri,08:25	Rain	Angle	Non-fatal injury	Wet	East	Going ahead	Automobile, station wagon	Other motor vehicle	0
					South	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: BEAVERBROOK RD btwn LEACOCK DR & TERON RD

Traffic Control: No control **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2018-Apr-18, Wed,09:15	Clear	Turning movement	P.D. only	Dry	West	Turning left	Automobile, station wagon	Other motor vehicle	0
					East	Going ahead	Automobile, station wagon	Other motor vehicle	

Location: TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Traffic Control: Traffic signal **Total Collisions:** 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Sep-02, Wed,16:36	Clear	Angle	P.D. only	Dry	North	Going ahead	Automobile, station wagon	Other motor vehicle	0
					West	Turning left	Passenger van	Other motor vehicle	
2015-Sep-22, Tue,17:31	Clear	Turning movement	Non-fatal injury	Dry	North	Turning left	Bicycle	Other motor vehicle	0
					South	Going ahead	Pick-up truck	Cyclist	
2015-Oct-29, Thu,12:42	Clear	SMV other	Non-fatal injury	Dry	East	Turning left	Pick-up truck	Pedestrian	1
2016-Nov-04, Fri,12:04	Clear	SMV other	P.D. only	Dry	North	Turning left	Automobile, station wagon	Ran off road	0
2017-Mar-28, Tue,08:36	Rain	SMV other	Non-fatal injury	Wet	East	Turning left	Automobile, station wagon	Pedestrian	1

Transportation Services - Traffic Services

Collision Details Report - Public Version

From: January 1, 2015 **To:** December 31, 2019

Location: TERON RD @ BEAVERBROOK RD/PENFIELD DR N

Traffic Control: Traffic signal **Total Collisions:** 8

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2018-Jun-28, Thu,19:57	Clear	Angle	Non-fatal injury	Dry	East	Turning left	Bicycle	Other motor vehicle	0
					North	Going ahead	Automobile, station wagon	Cyclist	
2018-Dec-10, Mon,10:40	Clear	SMV other	P.D. only	Dry	West	Going ahead	Automobile, station wagon	Skidding/sliding	0
2018-Dec-11, Tue,18:21	Snow	SMV other	Non-fatal injury	Wet	East	Turning left	Automobile, station wagon	Pedestrian	1

Location: VARLEY DR @ VARLEY LANE N

Traffic Control: No control **Total Collisions:** 1

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2018-Nov-03, Sat,16:30	Clear	SMV other	P.D. only	Dry	West	Turning right	Automobile, station wagon	Ran off road	0

Location: VARLEY DR btwn BEAVERBROOK RD & MILNE CRES

Traffic Control: No control **Total Collisions:** 2

Date/Day/Time	Environment	Impact Type	Classification	Surface Cond'n	Veh. Dir	Vehicle Manoeuver	Vehicle type	First Event	No. Ped
2015-Dec-03, Thu,09:23	Clear	SMV other	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Ran off road	0
2017-Jan-31, Tue,20:50	Clear	SMV unattended vehicle	Non-fatal injury	Dry	South	Going ahead	Automobile, station wagon	Unattended vehicle	0

Appendix E

TDM Measures Checklist

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

Legend

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

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

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

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

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

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

Appendix F

Existing Intersection Operations

Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	44	15	67	15	3	41
Future Vol, veh/h	44	15	67	15	3	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	17	0	0	0
Mvmt Flow	49	17	74	17	3	46

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	135	83	0	0	91	0
Stage 1	83	-	-	-	-	-
Stage 2	52	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	863	982	-	-	1517	-
Stage 1	945	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	861	982	-	-	1517	-
Mov Cap-2 Maneuver	861	-	-	-	-	-
Stage 1	945	-	-	-	-	-
Stage 2	974	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.5
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	889	1517	-
HCM Lane V/C Ratio	-	-	0.074	0.002	-
HCM Control Delay (s)	-	-	9.4	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	12	251	15	25	162	64	15	6	36	67	6	12
Future Vol, veh/h	12	251	15	25	162	64	15	6	36	67	6	12
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	5	0	13	10	10	0	0	0	5	0	0
Mvmt Flow	13	279	17	28	180	71	17	7	40	74	7	13
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.7	10.6	8.7	9.5
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	26%	4%	10%	79%
Vol Thru, %	11%	90%	65%	7%
Vol Right, %	63%	5%	25%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	57	278	251	85
LT Vol	15	12	25	67
Through Vol	6	251	162	6
RT Vol	36	15	64	12
Lane Flow Rate	63	309	279	94
Geometry Grp	1	1	1	1
Degree of Util (X)	0.089	0.396	0.368	0.144
Departure Headway (Hd)	5.069	4.619	4.756	5.493
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	699	775	753	647
Service Time	3.154	2.672	2.811	3.573
HCM Lane V/C Ratio	0.09	0.399	0.371	0.145
HCM Control Delay	8.7	10.7	10.6	9.5
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.3	1.9	1.7	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	132	9	213	22	16	36	199	329	8	10	136	36
Future Volume (veh/h)	132	9	213	22	16	36	199	329	8	10	136	36
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1800	1674	1800	1660	1716	1744	1758	1800	1702	1674	1716
Adj Flow Rate, veh/h	147	10	237	24	18	40	221	366	9	11	151	40
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	2	0	9	0	10	6	4	3	0	7	9	6
Cap, veh/h	516	17	395	342	123	273	600	723	18	452	540	143
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.42	0.42	0.42	0.42	0.42	0.42
Sat Flow, veh/h	1345	62	1473	1151	458	1018	1173	1708	42	968	1275	338
Grp Volume(v), veh/h	147	0	247	24	0	58	221	0	375	11	0	191
Grp Sat Flow(s),veh/h/ln	1345	0	1535	1151	0	1476	1173	0	1750	968	0	1613
Q Serve(g_s), s	3.5	0.0	5.2	0.7	0.0	1.1	5.6	0.0	5.8	0.3	0.0	2.9
Cycle Q Clear(g_c), s	4.6	0.0	5.2	5.9	0.0	1.1	8.5	0.0	5.8	6.1	0.0	2.9
Prop In Lane	1.00		0.96	1.00		0.69	1.00		0.02	1.00		0.21
Lane Grp Cap(c), veh/h	516	0	412	342	0	396	600	0	741	452	0	683
V/C Ratio(X)	0.29	0.00	0.60	0.07	0.00	0.15	0.37	0.00	0.51	0.02	0.00	0.28
Avail Cap(c_a), veh/h	1028	0	996	780	0	958	2008	0	2841	1613	0	2618
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.0	0.0	11.8	14.3	0.0	10.3	9.8	0.0	7.8	10.1	0.0	7.0
Incr Delay (d2), s/veh	0.3	0.0	1.5	0.1	0.0	0.2	0.4	0.0	0.6	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	1.8	0.2	0.0	0.4	0.9	0.0	1.1	0.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.4	0.0	13.3	14.4	0.0	10.5	10.2	0.0	8.4	10.1	0.0	7.2
LnGrp LOS	B	A	B	B	A	B	B	A	A	B	A	A
Approach Vol, veh/h		394			82			596			202	
Approach Delay, s/veh		13.0			11.6			9.1			7.4	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	21.2	15.7	21.2	15.7
Change Period (Y+Rc), s	5.6	* 5.8	5.6	* 5.8
Max Green Setting (Gmax), s	60.0	* 24	60.0	* 24
Max Q Clear Time (g_c+I1), s	10.5	7.2	8.1	7.9
Green Ext Time (p_c), s	5.2	2.7	1.8	0.4

Intersection Summary	
HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	24	4	63	51	11	73
Future Vol, veh/h	24	4	63	51	11	73
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	Free
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	27	4	70	57	12	81

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	175	70	0	-	70	0
Stage 1	70	-	-	-	-	-
Stage 2	105	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	819	998	-	0	1544	-
Stage 1	958	-	-	0	-	-
Stage 2	924	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	812	998	-	-	1544	-
Mov Cap-2 Maneuver	812	-	-	-	-	-
Stage 1	958	-	-	-	-	-
Stage 2	917	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	834	1544	-
HCM Lane V/C Ratio	-	0.037	0.008	-
HCM Control Delay (s)	-	9.5	7.3	0
HCM Lane LOS	-	A	A	A
HCM 95th %tile Q(veh)	-	0.1	0	-

Intersection	
Intersection Delay, s/veh	11
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	173	38	28	240	85	31	7	25	62	11	24
Future Vol, veh/h	22	173	38	28	240	85	31	7	25	62	11	24
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	24	192	42	31	267	94	34	8	28	69	12	27
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	12.1	9.2	9.6
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	49%	9%	8%	64%
Vol Thru, %	11%	74%	68%	11%
Vol Right, %	40%	16%	24%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	63	233	353	97
LT Vol	31	22	28	62
Through Vol	7	173	240	11
RT Vol	25	38	85	24
Lane Flow Rate	70	259	392	108
Geometry Grp	1	1	1	1
Degree of Util (X)	0.107	0.341	0.496	0.166
Departure Headway (Hd)	5.504	4.74	4.55	5.546
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	655	751	784	651
Service Time	3.508	2.824	2.623	3.548
HCM Lane V/C Ratio	0.107	0.345	0.5	0.166
HCM Control Delay	9.2	10.3	12.1	9.6
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.4	1.5	2.8	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	10	173	16	6	9	217	128	27	22	379	130
Future Volume (veh/h)	77	10	173	16	6	9	217	128	27	22	379	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1772	1800	1800	1800	1772	1688	1800	1800	1744	1800
Adj Flow Rate, veh/h	86	11	192	18	7	10	241	142	30	24	421	144
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	2	0	0	0	2	8	0	0	4	0
Cap, veh/h	373	16	275	196	127	181	414	845	178	634	521	178
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.11	0.63	0.63	0.42	0.42	0.42
Sat Flow, veh/h	1418	83	1455	1198	670	957	1688	1351	285	1232	1242	425
Grp Volume(v), veh/h	86	0	203	18	0	17	241	0	172	24	0	565
Grp Sat Flow(s),veh/h/ln	1418	0	1538	1198	0	1628	1688	0	1636	1232	0	1667
Q Serve(g_s), s	3.3	0.0	7.6	0.9	0.0	0.5	4.4	0.0	2.7	0.7	0.0	18.3
Cycle Q Clear(g_c), s	3.8	0.0	7.6	8.4	0.0	0.5	4.4	0.0	2.7	0.7	0.0	18.3
Prop In Lane	1.00		0.95	1.00		0.59	1.00		0.17	1.00		0.25
Lane Grp Cap(c), veh/h	373	0	291	196	0	308	414	0	1023	634	0	700
V/C Ratio(X)	0.23	0.00	0.70	0.09	0.00	0.06	0.58	0.00	0.17	0.04	0.00	0.81
Avail Cap(c_a), veh/h	797	0	751	554	0	795	633	0	1747	1020	0	1221
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	22.0	0.0	23.3	27.2	0.0	20.4	11.4	0.0	4.8	10.5	0.0	15.6
Incr Delay (d2), s/veh	0.3	0.0	3.3	0.2	0.0	0.1	1.4	0.0	0.1	0.0	0.0	2.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	3.0	0.3	0.0	0.2	1.2	0.0	0.5	0.2	0.0	5.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.3	0.0	26.5	27.4	0.0	20.5	12.8	0.0	4.9	10.6	0.0	18.1
LnGrp LOS	C	A	C	C	A	C	B	A	A	B	A	B
Approach Vol, veh/h		289			35			413			589	
Approach Delay, s/veh		25.3			24.1			9.5			17.8	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	2		4	5	6		8					
Phs Duration (G+Y+Rc), s	44.0		17.4	12.6	31.4		17.4					
Change Period (Y+Rc), s	5.6		* 5.8	5.6	5.6		* 5.8					
Max Green Setting (Gmax), s	65.6		* 30	15.0	45.0		* 30					
Max Q Clear Time (g_c+I1), s	4.7		9.6	6.4	20.3		10.4					
Green Ext Time (p_c), s	1.5		2.1	0.7	5.5		0.1					

Intersection Summary		
HCM 6th Ctrl Delay	17.0	
HCM 6th LOS	B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Appendix G

MMLOS Analysis

	INTERSECTIONS		Varley Drive / Weeping Willow Lane		
			NORTHBOUND	WESTBOUND	SOUTHBOUND
PEDESTRIAN	Lanes		2	2	2
	Median		No median	No median	No median
	Island Refuge		No	No	No
	Crosswalk Type		Standard transverse markings	Standard transverse markings	Standard transverse markings
	Level of service		**A (101)**	**A (104)**	**A (109)**
			A		
CYCLIST	Type of Bikeway		Mixed Traffic	Mixed Traffic	Mixed Traffic
	Turning Speed (25km/h to 80 km/h)		25	25	25
	Right Turn Storage Length		0 to 25 m	0 to 25 m	0 to 25 m
	Dual Right Turn ?		No	No	No
	Shared Through-Right ?		No	No	No
	Bike Box ?		No	No	No
	Number of Lanes Crossed for Left Turns		1	1	1
	Operating Speed on Approach		40-49 km/h	< 40 km/h	40-49 km/h
	Dual Left Turn Lanes ?		No	No	No
	Level of service		**A**	**A**	**B**
			B		
AUTO	**Level of service**	**AM**	**A**	**A**	**A**
		PM	**A**	**A**	**A**

	INTERSECTIONS		Beaverbrook Road / Varley Drive			
			NORTHBOUND	WESTBOUND	SOUTHBOUND	EASTBOUND
PEDESTRIAN	Lanes		2	2	2	2
	Median		No median	No median	No median	No median
	Island Refuge		No	No	No	No
	Corner Radius (largest)		0	2	0	0
	Crosswalk Type		Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	Level of service		**A (103)**	**A (103)**	**A (103)**	**A (101)**
			A			
CYCLIST	Type of Bikeway		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Turning Speed (25km/h to 80 km/h)		25	25	25	25
	Right Turn Storage Length		0 to 25 m	0 to 25 m	0 to 25 m	0 to 25 m
	Dual Right Turn ?		No	No	No	No
	Shared Through-Right ?		No	No	No	No
	Bike Box ?		No	No	No	No
	Number of Lanes Crossed for Left Turns		1	1	1	1
	Operating Speed on Approach		40-49 km/h	40-49 km/h	40-49 km/h	40-49 km/h
	Dual Left Turn Lanes ?		No	No	No	No
	Level of service		**B**	**B**	**B**	**B**
			B			
AUTO	**Level of service**	**AM**	**A**	**A**	**A**	**A**
		PM	**A**	**A**	**A**	**A**

	INTERSECTIONS		Teron Road / Beaverbrook Road			
			NORTHBOUND	WESTBOUND	SOUTHBOUND	EASTBOUND
PEDESTRIAN	Lanes		3	3	3	3
	Median		No median	No median	No median	No median
	Island Refuge		No	No	No	No
	Conflicting Left Turns		Permissive	Permissive	Permissive	Protected/permissive
	Conflicting Right Turns		Permissive	Permissive	Permissive	Permissive
	RTOR?		RTOR allowed	RTOR allowed	RTOR allowed	RTOR allowed
	Ped Leading Interval ?		No	No	No	No
	Corner Radius (largest)		0	1	0	0
	Crosswalk Type		Standard transverse markings	Standard transverse markings	Standard transverse markings	Standard transverse markings
	Level of service		**C (71)**	**C (71)**	**C (71)**	**C (68)**
			C			
CYCLIST	Type of Bikeway		Mixed Traffic	Mixed Traffic	Mixed Traffic	Mixed Traffic
	Turning Speed (25km/h to 80 km/h)		25	25	25	25
	Right Turn Storage Length		0 to 25 m	0 to 25 m	0 to 25 m	0 to 25 m
	Dual Right Turn ?		No	No	No	No
	Shared Through-Right ?		No	No	No	No
	Bike Box ?		No	No	No	No
	Number of Lanes Crossed for Left Turns		1	1	1	1
	Operating Speed on Approach		50-59 km/h	40-49 km/h	50-59 km/h	40-49 km/h
	Dual Left Turn Lanes ?		No	No	No	No
	Level of service		**B**	**B**	**B**	**B**
			B			
TRANSIT	Average Signal Delay		9,5	24,1	17,8	25,3
	Level of service		**B**	**D**	**C**	**D**
			D			
TRUCK	Turning Radius (smallest)		10-15 m	10-15 m	10-15 m	15+ m
	Number of Receiving Lanes		1	1	1	1
	Level of service		**E**	**E**	**E**	**C**
			E			
AUTO	**Level of service**	**AM**	**A**	**A**	**A**	**A**
		PM	**A**	**A**	**D**	**B**

Appendix H

2024 Intersection Operations with Development

Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	58	19	69	21	4	42
Future Vol, veh/h	58	19	69	21	4	42
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	17	0	0	0
Mvmt Flow	58	19	69	21	4	42

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	130	80	0	0	90	0
Stage 1	80	-	-	-	-	-
Stage 2	50	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	869	986	-	-	1518	-
Stage 1	948	-	-	-	-	-
Stage 2	978	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	866	986	-	-	1518	-
Mov Cap-2 Maneuver	866	-	-	-	-	-
Stage 1	948	-	-	-	-	-
Stage 2	975	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	893	1518	-
HCM Lane V/C Ratio	-	-	0.086	0.003	-
HCM Control Delay (s)	-	-	9.4	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Intersection Delay, s/veh	10
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	13	259	15	26	168	71	15	6	37	80	6	14
Future Vol, veh/h	13	259	15	26	168	71	15	6	37	80	6	14
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	5	0	13	10	10	0	0	0	5	0	0
Mvmt Flow	13	259	15	26	168	71	15	6	37	80	6	14
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	10.3	8.5	9.4
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	26%	5%	10%	80%
Vol Thru, %	10%	90%	63%	6%
Vol Right, %	64%	5%	27%	14%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	58	287	265	100
LT Vol	15	13	26	80
Through Vol	6	259	168	6
RT Vol	37	15	71	14
Lane Flow Rate	58	287	265	100
Geometry Grp	1	1	1	1
Degree of Util (X)	0.08	0.367	0.347	0.15
Departure Headway (Hd)	4.988	4.599	4.718	5.404
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	712	778	758	659
Service Time	3.066	2.648	2.77	3.476
HCM Lane V/C Ratio	0.081	0.369	0.35	0.152
HCM Control Delay	8.5	10.3	10.3	9.4
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.3	1.7	1.6	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	140	9	227	22	16	37	209	336	8	10	142	40
Future Volume (veh/h)	140	9	227	22	16	37	209	336	8	10	142	40
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1800	1674	1800	1660	1716	1744	1758	1800	1702	1674	1716
Adj Flow Rate, veh/h	140	9	227	22	16	37	209	336	8	10	142	40
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	0	9	0	10	6	4	3	0	7	9	6
Cap, veh/h	537	16	407	369	123	284	591	694	17	460	510	144
Arrive On Green	0.28	0.28	0.28	0.28	0.28	0.28	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1351	59	1476	1162	445	1029	1183	1710	41	996	1256	354
Grp Volume(v), veh/h	140	0	236	22	0	53	209	0	344	10	0	182
Grp Sat Flow(s),veh/h/ln	1351	0	1534	1162	0	1474	1183	0	1751	996	0	1610
Q Serve(g_s), s	3.1	0.0	4.7	0.6	0.0	1.0	5.2	0.0	5.2	0.3	0.0	2.7
Cycle Q Clear(g_c), s	4.1	0.0	4.7	5.3	0.0	1.0	7.9	0.0	5.2	5.5	0.0	2.7
Prop In Lane	1.00		0.96	1.00		0.70	1.00		0.02	1.00		0.22
Lane Grp Cap(c), veh/h	537	0	423	369	0	407	591	0	710	460	0	653
V/C Ratio(X)	0.26	0.00	0.56	0.06	0.00	0.13	0.35	0.00	0.48	0.02	0.00	0.28
Avail Cap(c_a), veh/h	1070	0	1028	827	0	988	2092	0	2932	1724	0	2696
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.3	0.0	11.1	13.4	0.0	9.7	9.8	0.0	7.9	9.9	0.0	7.1
Incr Delay (d2), s/veh	0.3	0.0	1.2	0.1	0.0	0.2	0.4	0.0	0.6	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	1.6	0.2	0.0	0.3	0.8	0.0	1.0	0.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.5	0.0	12.3	13.4	0.0	9.9	10.2	0.0	8.4	9.9	0.0	7.4
LnGrp LOS	B	A	B	B	A	A	B	A	A	A	A	A
Approach Vol, veh/h		376			75			553			192	
Approach Delay, s/veh		12.0			10.9			9.1			7.5	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	20.1	15.7	20.1	15.7
Change Period (Y+Rc), s	5.6	* 5.8	5.6	* 5.8
Max Green Setting (Gmax), s	60.0	* 24	60.0	* 24
Max Q Clear Time (g_c+I1), s	9.9	6.7	7.5	7.3
Green Ext Time (p_c), s	4.7	2.6	1.7	0.4

Intersection Summary	
HCM 6th Ctrl Delay	9.9
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	36	6	65	67	14	75
Future Vol, veh/h	36	6	65	67	14	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	Free
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	36	6	65	67	14	75

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	168	65	0	-	65	0
Stage 1	65	-	-	-	-	-
Stage 2	103	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	827	1005	-	0	1550	-
Stage 1	963	-	-	0	-	-
Stage 2	926	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	820	1005	-	-	1550	-
Mov Cap-2 Maneuver	820	-	-	-	-	-
Stage 1	963	-	-	-	-	-
Stage 2	918	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.5	0	1.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	842	1550	-
HCM Lane V/C Ratio	-	0.05	0.009	-
HCM Control Delay (s)	-	9.5	7.3	0
HCM Lane LOS	-	A	A	A
HCM 95th %tile Q(veh)	-	0.2	0	-

Intersection	
Intersection Delay, s/veh	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	179	39	29	248	99	32	7	26	72	11	28
Future Vol, veh/h	26	179	39	29	248	99	32	7	26	72	11	28
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	26	179	39	29	248	99	32	7	26	72	11	28
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10	11.6	9	9.5
HCM LOS	A	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	49%	11%	8%	65%
Vol Thru, %	11%	73%	66%	10%
Vol Right, %	40%	16%	26%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	65	244	376	111
LT Vol	32	26	29	72
Through Vol	7	179	248	11
RT Vol	26	39	99	28
Lane Flow Rate	65	244	376	111
Geometry Grp	1	1	1	1
Degree of Util (X)	0.096	0.319	0.471	0.165
Departure Headway (Hd)	5.321	4.711	4.505	5.359
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	666	756	793	663
Service Time	3.419	2.778	2.564	3.45
HCM Lane V/C Ratio	0.098	0.323	0.474	0.167
HCM Control Delay	9	10	11.6	9.5
HCM Lane LOS	A	A	B	A
HCM 95th-tile Q	0.3	1.4	2.5	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	10	185	16	6	9	232	139	27	22	388	138
Future Volume (veh/h)	82	10	185	16	6	9	232	139	27	22	388	138
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1772	1800	1800	1800	1772	1688	1800	1800	1744	1800
Adj Flow Rate, veh/h	82	10	185	16	6	9	232	139	27	22	388	138
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	2	0	0	0	2	8	0	0	4	0
Cap, veh/h	380	15	273	208	121	182	430	844	164	623	493	175
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.12	0.61	0.61	0.40	0.40	0.40
Sat Flow, veh/h	1421	79	1459	1207	650	975	1688	1373	267	1239	1228	437
Grp Volume(v), veh/h	82	0	195	16	0	15	232	0	166	22	0	526
Grp Sat Flow(s),veh/h/ln	1421	0	1537	1207	0	1625	1688	0	1640	1239	0	1665
Q Serve(g_s), s	2.9	0.0	6.8	0.7	0.0	0.4	4.1	0.0	2.5	0.6	0.0	15.9
Cycle Q Clear(g_c), s	3.3	0.0	6.8	7.5	0.0	0.4	4.1	0.0	2.5	0.6	0.0	15.9
Prop In Lane	1.00		0.95	1.00		0.60	1.00		0.16	1.00		0.26
Lane Grp Cap(c), veh/h	380	0	287	208	0	304	430	0	1008	623	0	668
V/C Ratio(X)	0.22	0.00	0.68	0.08	0.00	0.05	0.54	0.00	0.16	0.04	0.00	0.79
Avail Cap(c_a), veh/h	858	0	804	614	0	849	676	0	1875	1097	0	1306
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	20.5	0.0	21.7	25.2	0.0	19.1	10.5	0.0	4.7	10.5	0.0	15.0
Incr Delay (d2), s/veh	0.3	0.0	3.0	0.2	0.0	0.1	1.1	0.0	0.1	0.0	0.0	2.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	2.7	0.2	0.0	0.2	1.0	0.0	0.5	0.1	0.0	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	0.0	24.8	25.4	0.0	19.2	11.6	0.0	4.8	10.5	0.0	17.3
LnGrp LOS	C	A	C	C	A	B	B	A	A	B	A	B
Approach Vol, veh/h		277			31			398			548	
Approach Delay, s/veh		23.6			22.4			8.8			17.0	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	2		4	5	6		8					
Phs Duration (G+Y+Rc), s	40.9		16.5	12.2	28.6		16.5					
Change Period (Y+Rc), s	5.6		* 5.8	5.6	5.6		* 5.8					
Max Green Setting (Gmax), s	65.6		* 30	15.0	45.0		* 30					
Max Q Clear Time (g_c+I1), s	4.5		8.8	6.1	17.9		9.5					
Green Ext Time (p_c), s	1.5		2.0	0.7	5.2		0.1					

Intersection Summary		
HCM 6th Ctrl Delay	16.0	
HCM 6th LOS	B	

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Appendix I

2029 Intersection Operations with Development

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Intersection	
Int Delay, s/veh	3.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	59	20	71	22	4	44
Future Vol, veh/h	59	20	71	22	4	44
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	17	0	0	0
Mvmt Flow	59	20	71	22	4	44

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	134	82	0	0	93	0
Stage 1	82	-	-	-	-	-
Stage 2	52	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	864	983	-	-	1514	-
Stage 1	946	-	-	-	-	-
Stage 2	976	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	861	983	-	-	1514	-
Mov Cap-2 Maneuver	861	-	-	-	-	-
Stage 1	946	-	-	-	-	-
Stage 2	973	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.4	0	0.6
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	889	1514	-
HCM Lane V/C Ratio	-	-	0.089	0.003	-
HCM Control Delay (s)	-	-	9.4	7.4	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-

Intersection	
Intersection Delay, s/veh	10.3
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	14	270	16	27	176	73	16	6	38	82	6	15
Future Vol, veh/h	14	270	16	27	176	73	16	6	38	82	6	15
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	5	0	13	10	10	0	0	0	5	0	0
Mvmt Flow	14	270	16	27	176	73	16	6	38	82	6	15
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.6	10.5	8.6	9.6
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	27%	5%	10%	80%
Vol Thru, %	10%	90%	64%	6%
Vol Right, %	63%	5%	26%	15%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	60	300	276	103
LT Vol	16	14	27	82
Through Vol	6	270	176	6
RT Vol	38	16	73	15
Lane Flow Rate	60	300	276	103
Geometry Grp	1	1	1	1
Degree of Util (X)	0.084	0.386	0.364	0.156
Departure Headway (Hd)	5.057	4.629	4.753	5.461
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	701	774	753	651
Service Time	3.144	2.684	2.811	3.541
HCM Lane V/C Ratio	0.086	0.388	0.367	0.158
HCM Control Delay	8.6	10.6	10.5	9.6
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.3	1.8	1.7	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	145	10	235	23	18	37	217	341	8	10	145	41
Future Volume (veh/h)	145	10	235	23	18	37	217	341	8	10	145	41
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1800	1674	1800	1660	1716	1744	1758	1800	1702	1674	1716
Adj Flow Rate, veh/h	145	10	235	23	18	37	217	341	8	10	145	41
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	2	0	9	0	10	6	4	3	0	7	9	6
Cap, veh/h	528	17	402	353	132	272	595	707	17	463	519	147
Arrive On Green	0.27	0.27	0.27	0.27	0.27	0.27	0.41	0.41	0.41	0.41	0.41	0.41
Sat Flow, veh/h	1349	63	1472	1153	484	996	1179	1711	40	991	1255	355
Grp Volume(v), veh/h	145	0	245	23	0	55	217	0	349	10	0	186
Grp Sat Flow(s),veh/h/ln	1349	0	1535	1153	0	1480	1179	0	1751	991	0	1610
Q Serve(g_s), s	3.3	0.0	5.0	0.6	0.0	1.0	5.4	0.0	5.3	0.3	0.0	2.8
Cycle Q Clear(g_c), s	4.3	0.0	5.0	5.7	0.0	1.0	8.2	0.0	5.3	5.6	0.0	2.8
Prop In Lane	1.00		0.96	1.00		0.67	1.00		0.02	1.00		0.22
Lane Grp Cap(c), veh/h	528	0	419	353	0	404	595	0	724	463	0	666
V/C Ratio(X)	0.27	0.00	0.59	0.07	0.00	0.14	0.36	0.00	0.48	0.02	0.00	0.28
Avail Cap(c_a), veh/h	1051	0	1014	800	0	978	2054	0	2890	1690	0	2658
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	11.6	0.0	11.4	13.9	0.0	10.0	9.8	0.0	7.8	9.8	0.0	7.1
Incr Delay (d2), s/veh	0.3	0.0	1.4	0.1	0.0	0.2	0.4	0.0	0.5	0.0	0.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	1.7	0.2	0.0	0.3	0.8	0.0	1.0	0.0	0.0	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.9	0.0	12.8	14.0	0.0	10.1	10.2	0.0	8.3	9.9	0.0	7.3
LnGrp LOS	B	A	B	B	A	B	B	A	A	A	A	A
Approach Vol, veh/h		390			78			566			196	
Approach Delay, s/veh		12.5			11.3			9.1			7.4	
Approach LOS		B			B			A			A	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	20.6	15.7	20.6	15.7
Change Period (Y+Rc), s	5.6	* 5.8	5.6	* 5.8
Max Green Setting (Gmax), s	60.0	* 24	60.0	* 24
Max Q Clear Time (g_c+I1), s	10.2	7.0	7.6	7.7
Green Ext Time (p_c), s	4.8	2.7	1.7	0.4

Intersection Summary	
HCM 6th Ctrl Delay	10.0
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	37	6	68	69	15	78
Future Vol, veh/h	37	6	68	69	15	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	Free	-	Free
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	100	100	100	100	100	100
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	37	6	68	69	15	78

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	176	68	0	-	68	0
Stage 1	68	-	-	-	-	-
Stage 2	108	-	-	-	-	-
Critical Hdwy	6.4	6.2	-	-	4.1	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	818	1001	-	0	1546	-
Stage 1	960	-	-	0	-	-
Stage 2	921	-	-	0	-	-
Platoon blocked, %			-			-
Mov Cap-1 Maneuver	810	1001	-	-	1546	-
Mov Cap-2 Maneuver	810	-	-	-	-	-
Stage 1	960	-	-	-	-	-
Stage 2	912	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.6	0	1.2
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	WBLn1	SBL	SBT
Capacity (veh/h)	-	832	1546	-
HCM Lane V/C Ratio	-	0.052	0.01	-
HCM Control Delay (s)	-	9.6	7.4	0
HCM Lane LOS	-	A	A	A
HCM 95th %tile Q(veh)	-	0.2	0	-

Intersection	
Intersection Delay, s/veh	10.9
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	186	41	30	258	103	33	7	27	74	12	29
Future Vol, veh/h	27	186	41	30	258	103	33	7	27	74	12	29
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles, %	0	1	0	0	1	0	0	0	0	0	0	0
Mvmt Flow	27	186	41	30	258	103	33	7	27	74	12	29
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	1	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	1
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	1	1
HCM Control Delay	10.3	12	9.1	9.7
HCM LOS	B	B	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	49%	11%	8%	64%
Vol Thru, %	10%	73%	66%	10%
Vol Right, %	40%	16%	26%	25%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	67	254	391	115
LT Vol	33	27	30	74
Through Vol	7	186	258	12
RT Vol	27	41	103	29
Lane Flow Rate	67	254	391	115
Geometry Grp	1	1	1	1
Degree of Util (X)	0.102	0.335	0.493	0.176
Departure Headway (Hd)	5.497	4.751	4.54	5.524
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	655	749	786	653
Service Time	3.501	2.835	2.614	3.524
HCM Lane V/C Ratio	0.102	0.339	0.497	0.176
HCM Control Delay	9.1	10.3	12	9.7
HCM Lane LOS	A	B	B	A
HCM 95th-tile Q	0.3	1.5	2.8	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	85	11	191	16	6	9	240	140	28	23	396	145
Future Volume (veh/h)	85	11	191	16	6	9	240	140	28	23	396	145
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1800	1800	1772	1800	1800	1800	1772	1688	1800	1800	1744	1800
Adj Flow Rate, veh/h	85	11	191	16	6	9	240	140	28	23	396	145
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Percent Heavy Veh, %	0	0	2	0	0	0	2	8	0	0	4	0
Cap, veh/h	380	16	276	202	124	185	424	845	169	625	497	182
Arrive On Green	0.19	0.19	0.19	0.19	0.19	0.19	0.12	0.62	0.62	0.41	0.41	0.41
Sat Flow, veh/h	1421	84	1454	1199	650	975	1688	1365	273	1237	1218	446
Grp Volume(v), veh/h	85	0	202	16	0	15	240	0	168	23	0	541
Grp Sat Flow(s),veh/h/ln	1421	0	1538	1199	0	1625	1688	0	1639	1237	0	1664
Q Serve(g_s), s	3.1	0.0	7.3	0.8	0.0	0.4	4.4	0.0	2.6	0.7	0.0	17.0
Cycle Q Clear(g_c), s	3.5	0.0	7.3	8.0	0.0	0.4	4.4	0.0	2.6	0.7	0.0	17.0
Prop In Lane	1.00		0.95	1.00		0.60	1.00		0.17	1.00		0.27
Lane Grp Cap(c), veh/h	380	0	292	202	0	309	424	0	1013	625	0	679
V/C Ratio(X)	0.22	0.00	0.69	0.08	0.00	0.05	0.57	0.00	0.17	0.04	0.00	0.80
Avail Cap(c_a), veh/h	826	0	775	578	0	818	652	0	1805	1055	0	1257
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.2	0.0	22.5	26.2	0.0	19.7	11.0	0.0	4.8	10.6	0.0	15.5
Incr Delay (d2), s/veh	0.3	0.0	3.2	0.2	0.0	0.1	1.3	0.0	0.1	0.0	0.0	2.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	2.9	0.2	0.0	0.2	1.1	0.0	0.5	0.1	0.0	5.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.5	0.0	25.6	26.4	0.0	19.8	12.3	0.0	4.9	10.7	0.0	17.9
LnGrp LOS	C	A	C	C	A	B	B	A	A	B	A	B
Approach Vol, veh/h		287			31			408			564	
Approach Delay, s/veh		24.4			23.2			9.2			17.6	
Approach LOS		C			C			A			B	

Timer - Assigned Phs	2		4	5	6		8					
Phs Duration (G+Y+Rc), s	42.4		17.1	12.5	29.9		17.1					
Change Period (Y+Rc), s	5.6		* 5.8	5.6	5.6		* 5.8					
Max Green Setting (Gmax), s	65.6		* 30	15.0	45.0		* 30					
Max Q Clear Time (g_c+I1), s	4.6		9.3	6.4	19.0		10.0					
Green Ext Time (p_c), s	1.5		2.1	0.7	5.3		0.1					

Intersection Summary		
HCM 6th Ctrl Delay	16.6	
HCM 6th LOS	B	

Notes

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