

951 Gladstone Avenue and 145 Loretta Avenue North Transportation Impact Assessment

Step 1 & 2 Screening and Scoping Report

Step 3: Forecasting Report

Step 4: Strategy Report

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1 Screening

This study has been prepared according to the City of Ottawa's 2017 Transportation Impact Assessment (TIA) Guidelines. Accordingly, a Step 1 Screening Form has been prepared and is included as Appendix A, along with the Certification Form for TIA Study PM. As shown in the Screening Form, a TIA is required including the Design Review component and the Network Impact Component.

2 Existing and Planned Conditions

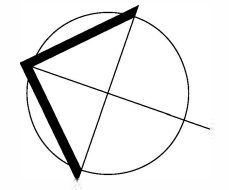
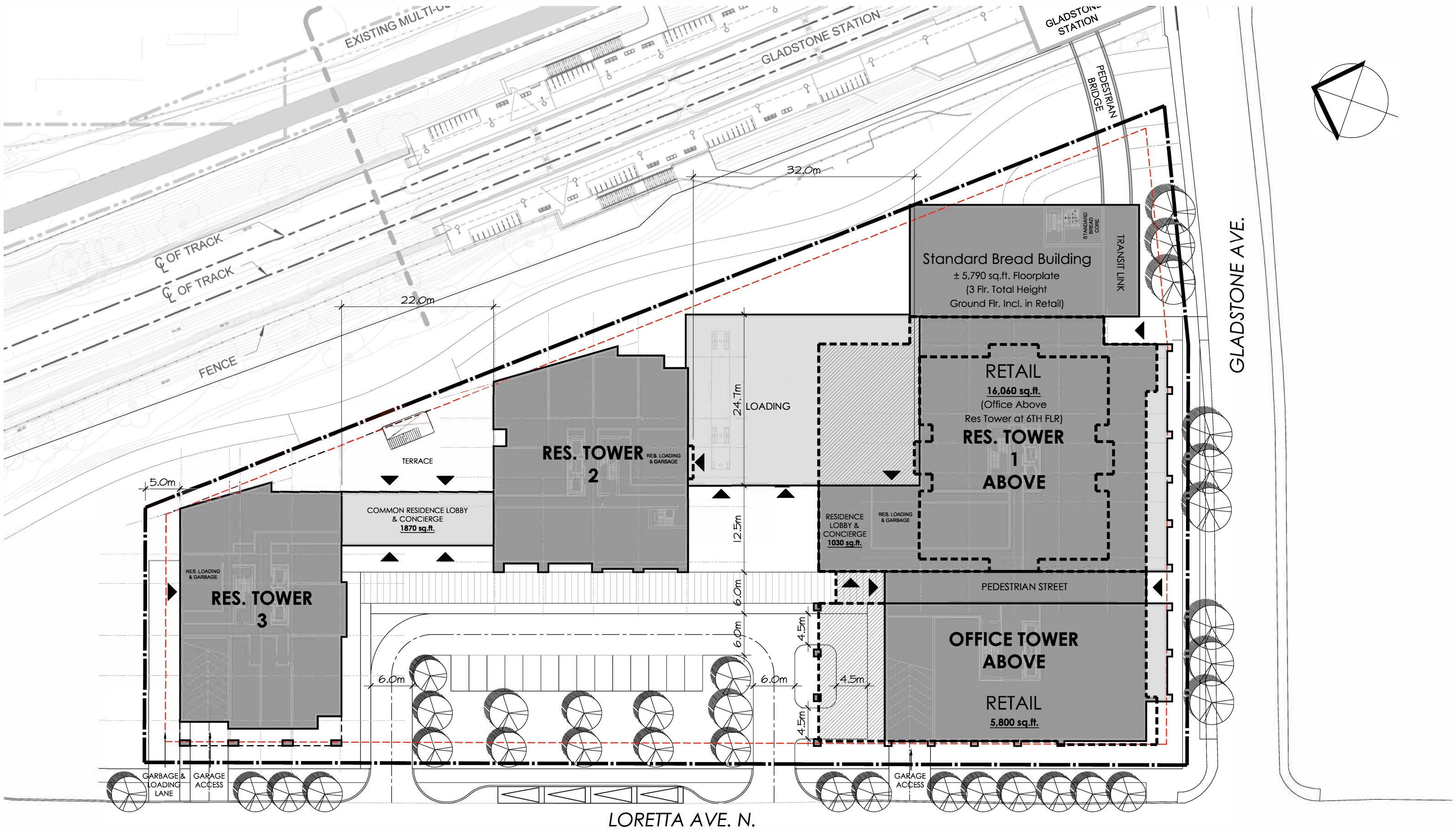
2.1 Proposed Development

The proposed development, located at 951 Gladstone Avenue and 145 Loretta Avenue North, is currently zoned general industrial. The existing land uses include brewery, jujitsu club, cross-fit gym, glass blowing, art studio, beer and wine supply, bread bakery, and other assorted industrial uses. The proposed Official Plan and Zoning By-Law Amendments would all for high-rise residential and commercial/retail uses. The proposed development would include apartments totalling 931 units, 141,750 sq. ft of office space, and 21,686 sq. ft. of retail space. The existing access on Gladstone Avenue will remain, and a one-way access loop along Loretta Avenue North. The frontage along Loretta Avenue North would formalize the curb edge and remove the paved shoulder and open access along the building frontage. A pedestrian bridge is proposed on the east side of the development, adjacent to Gladstone Avenue, to connect directly with the future Gladstone Trillium Line Station. The anticipated full build-out and occupancy horizon is 2023. Figure 1 illustrates the Study Area Context. Figure 2 illustrates the proposed concept plan.

Figure 1: Area Context Plan



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: October 5, 2018



GLADSTONE + LORETTA

Site Plan



TRINITY

scale 1:500

2.2 Existing Conditions

2.2.1 Area Road Network

Gladstone Avenue: Gladstone Avenue is a City of Ottawa major collector road with a two-lane urban cross-section including sidewalks and a posted speed limit of 40 km/h. The current right-of-way is 20.0 metres, with additional width provided in proximity to the rail corridor.

Loretta Avenue North/Laurel Street: Loretta Avenue N is a City of Ottawa local road with a two-lane urban cross-section including paved shoulders on the east side and a sidewalk on the west side. The posted speed is 40 km/h and the right-of-way is 20.0 metres.

Breezehill Avenue: Breezehill Avenue is a City of Ottawa local road with a two-lane urban cross-section, including sidewalks, and parking on the east side of the road. The posted speed limit is 40 km/h and the right-of-way is 20.0 metres.

Bayswater Avenue: Bayswater Avenue is a City of Ottawa collector road with a two-lane urban cross-section, including sidewalks and on-street parking. The unposted speed limit is 50 km/h and the right-of-way is 25.0 metres.

Preston Street: Preston Street is a City of Ottawa arterial road with a two-lane urban cross-section, including parking lanes and auxiliary lanes at major intersections. The unposted speed limit is 50 km/h and the Ottawa Official Plan reserves a 23.0 metre right-of-way.

Somerset Street West: Somerset Street West is a City of Ottawa arterial road with a two-lane cross-section, including sidewalks and on street parking. The unposted speed limit is 50 km/h and the right-of-way is 20.0 metres. East of Breezehill Avenue, bike lanes are provided.

2.2.2 Existing Intersections

Gladstone Avenue / Bayswater Avenue

The intersection of Gladstone Avenue and Bayswater Avenue is a signalized intersection with shared all movement lanes on each approach. No turn restrictions were noted.

Gladstone Avenue / Preston Street

The intersection of Gladstone Avenue and Preston Street is a signalized intersection with auxiliary left-turn lanes on the northbound, westbound, and southbound approaches. No turn restrictions were noted.

Somerset Street West / Breezehill Avenue

The intersection of Somerset Street West and Breezehill Avenue is a minor stop-controlled intersection with shared movement lanes on all approaches. Bike lanes along Somerset Street West start/end on the east side of the intersection. No turn restrictions were noted.

2.2.3 Existing Driveways

Along Gladstone Avenue, a driveway to the City of Ottawa yard (175 Loretta Avenue North) is located opposite the existing site access adjacent to the Trillium Rail Corridor, and an access to 950 Gladstone Avenue within 5.0 metres of the Loretta Avenue North intersection. Between Loretta Avenue North and Breezehill Avenue, an access

loop is located on the north side of Gladstone Avenue to the Canadian Bank Note Limited, and five driveways are located on the south side.

Along Loretta Avenue North, two accesses are provided on the west side of the road for the Canadian Bank Note Limited site, and a single access is located north of the proposed site for 131 Loretta Avenue North. The paved shoulder is used for perpendicular parking along Loretta Avenue North as well.

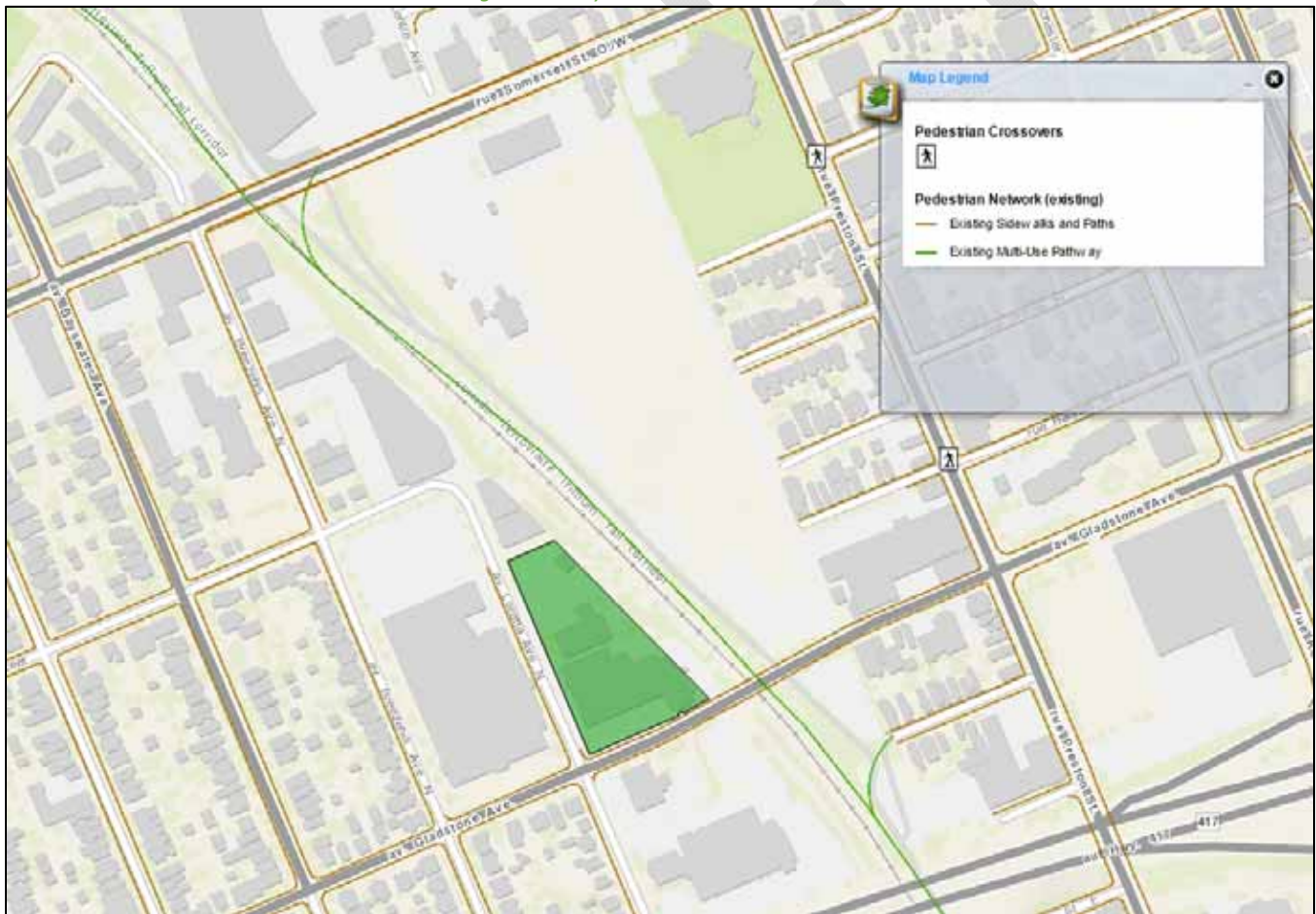
2.2.4 Existing Cycling and Pedestrian Facilities

Figure 3 illustrates the pedestrian facilities in the study area and Figure 4 illustrates the cycling facilities.

Sidewalks are provided along both sides of the roadways in the study area with the exception of the east side of Breezehill Avenue between Gladstone Avenue and Laurel Street, on both sides of Laurel Street, and the east side of Loretta Avenue North. The Trillium Pathway is a multi-use pathway along the east side of the Trillium Rail Corridor.

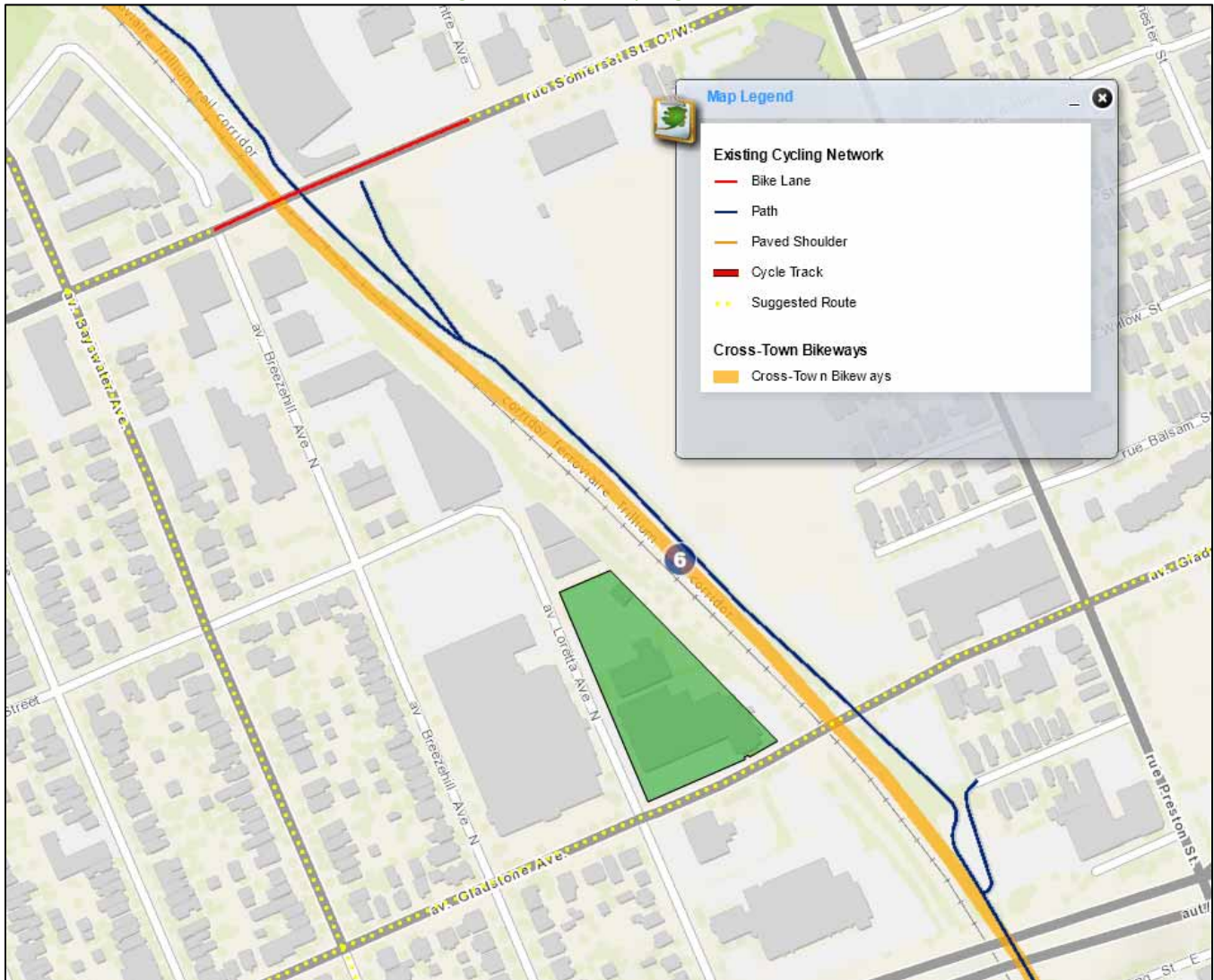
The cycling network consists of the Trillium Pathway as a cross-town bikeway, suggested biking routes along Gladstone Avenue, Bayswater Avenue and Somerset Street W, including bike lanes on the bridge over the Trillium Rail Corridor.

Figure 3: Study Area Pedestrian Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: October 5, 2018

Figure 4: Study Area Cycling Facilities



Source: <http://maps.ottawa.ca/geoOttawa/> Accessed: October 5, 2018

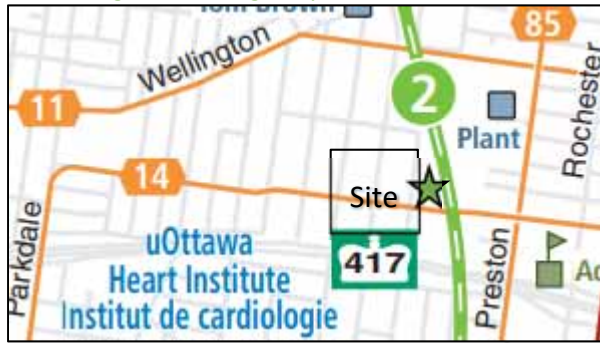
2.2.5 Existing Transit

Within the study area, Route #14 operates along Gladstone Avenue, Route #11 along Somerset Street W, and Route #85 along Preston Street. Figure 5 illustrates the transit routes in the study area. The frequency of these routes within proximity to the proposed site is currently:

- Route #11 - every 15-30 minutes, with higher frequency during the commuter peaks and day time
- Route #14 – every 30 minutes, with higher frequency during the commuter peaks and day time
- Route #85 - every 15-30 minutes, with higher frequency during the commuter peaks and day time

The Trillium Station at Carling Avenue is located approximately 1.0 km walking distance to the south and the Bayview Station is approximately 1.1 km walking distance to the north.

Figure 5: Existing Study Area Transit Service



Source: <http://www.octranspo.com/> Accessed: October 5, 2018

2.2.6 Existing Area Traffic Management Measures

Within the study area, vertical centreline stake bollards are located along Gladstone Avenue, Breezehill Avenue, and Bayswater Avenue.

2.2.7 Existing Peak Hour Travel Demand

Existing turning movement counts were acquired from the City of Ottawa for the existing Study Area intersection. Table 1 summarizes the intersection count dates.

Table 1: Intersection Count Date

Intersection	Count Date
Gladstone Avenue and Bayswater Avenue	Wednesday July 27, 2016
Gladstone Avenue and Preston Street	Tuesday June 20, 2017
Somerset Street West and Breezehill Avenue	Thursday August 12, 2015

The intersections were not assigned any growth to estimate the 2018 adjusted traffic counts and [Table 2](#) summarizes the existing study area intersection operations. Figure 6 illustrates the existing traffic volumes.

Detailed turning movement count data is included in Appendix B, and the synchro worksheets are provided in Appendix C.

Figure 6: Existing Traffic Volumes

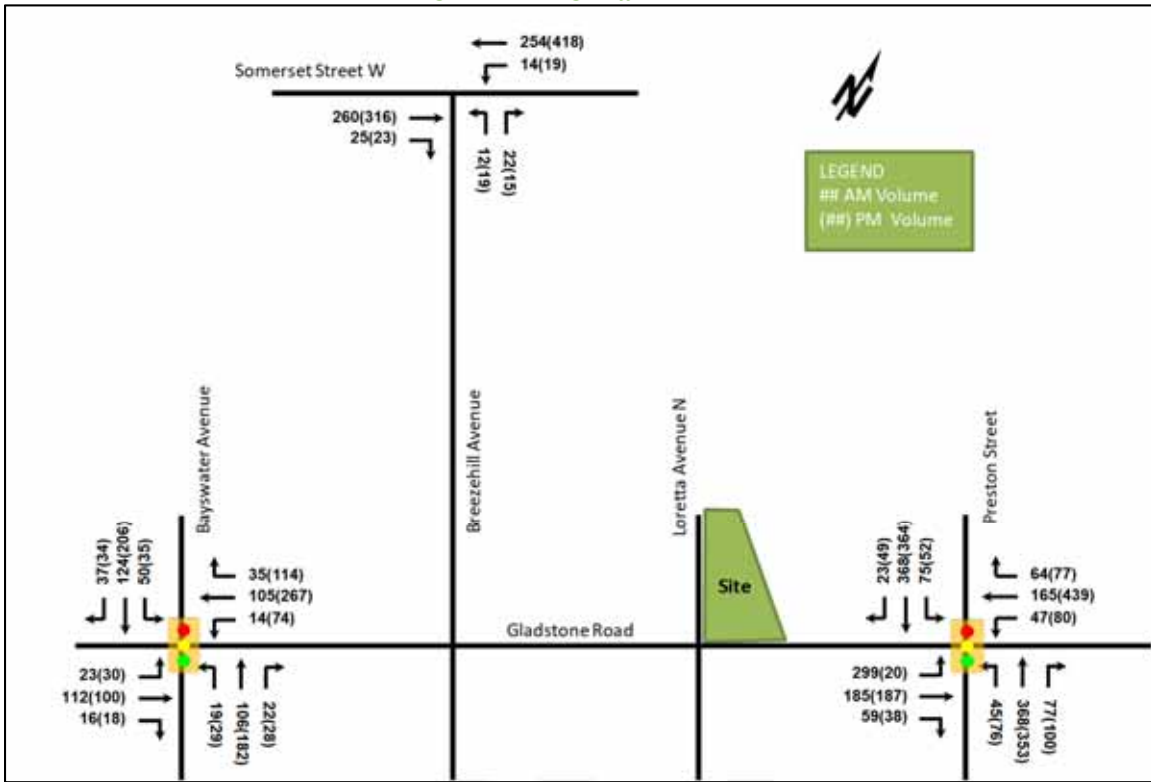


Table 29: Existing Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95 th)	LOS	Delay	V/C	Q (95 th)
Gladstone Avenue & Preston Street <i>Signalized</i>	EB	F	491.6	2.02	#171.3	B	19.7	0.52	41.4
	WBL	C	22.9	0.21	12.5	B	17.4	0.26	16.2
	WBT/R	C	25.5	0.56	43.0	D	44.9	0.93	#115.5
	NBL	A	8.1	0.11	6.8	B	15.4	0.28	14.9
	NBT/R	B	11.5	0.52	53.0	B	19.0	0.65	72.3
	SBL	A	9.4	0.21	10.9	B	14.6	0.21	10.9
	SBT/R	B	10.8	0.46	45.5	B	17.9	0.59	64.3
Overall	F	160.3	-	-	-	C	25.8	-	-
Gladstone Avenue & Bayswater Avenue <i>Signalized</i>	EB	C	25.0	0.52	25.9	B	10.5	0.27	15.6
	WB	C	21.7	0.49	24.3	C	24.3	0.80	57.4
	NB	A	5.4	0.15	13.8	B	15.9	0.40	38.7
	SB	A	5.8	0.23	20.0	B	16.9	0.46	45.6
	Overall	B	13.8	-	-	-	B	18.8	-
Somerset Street W & Breezehill Avenue <i>Unsignalized</i>	EB	A	0.0	0.00	0.0	A	0.0	0.00	0.0
	WB	A	0.4	0.01	0.0	A	0.4	0.02	0.1
	NB	B	11.4	0.06	0.2	B	14.6	0.10	0.3
	Overall	A	0.8	-	-	-	A	0.8	-

The existing intersection operations predominantly operate with high levels of service except for the eastbound approach at the Gladstone Avenue and Preston Street during the AM peak hour. The modelled intersection delay is approximately 7 cycle lengths. The left-turn movement currently is approximately 300 vehicles, more than both the through and right turn volumes combined and requires an auxiliary turn lane. The constrained nature of Gladstone Avenue (right-of-way of approximately 15.0m) at Preston Road does not allow the widening of the eastbound approach.

The queue in the westbound through/right-turn lane at the Gladstone Avenue and Preston Street intersection may extend beyond the adjacent private approach accesses.

2.2.8 Collision Analysis

Collision data has been acquired from the City of Ottawa open data website (data.ottawa.ca) for four years prior to the commencement of this TIA for the surrounding study area road network. [Table 3](#)[Table 2](#) summarizes the collisions documented in the study area and Figure 7 illustrates the intersections and segments analyzed.

Table 3-2: Study Area Collision Summary

		Number	%
Total Collisions		53	100%
Classification	Fatality	0	0%
	Non-Fatal Injury	19	36%
	Property Damage Only	34	64%
Initial Impact Type	Angle	14	26%
	Rear end	10	19%
	Sideswipe	4	8%
	Turning Movement	13	25%
	SMV Other	4	8%
	SMV Unattended	6	11%
	Other	2	4%
Road Surface Condition	Dry	36	68%
	Wet	13	25%
	Loose Snow	2	4%
	Slush	1	2%
	Packed Snow	0	0%
	Ice	1	2%
Pedestrian Involved		0	0%
Cyclists Involved		7	13%

Figure 7: Study Area Collision Records



Of the collisions noted above, 18 collisions occurred at the Gladstone Avenue and Preston Street intersection, and 11 collisions occurred on Somerset Street West between Breezehill Avenue and Preston Street. Along the frontage of the proposed site, a single collision was noted at the Gladstone Avenue and Loretta Avenue North intersection and 2 collisions on Gladstone Avenue between Loretta Avenue North and Preston Street. The other location of note is the Gladstone Avenue and Bayswater Avenue that had a total of 8 collisions.

With respect to the cyclist and pedestrian collisions, the cyclist collisions were all noted at the Gladstone Avenue/Preston Street intersection (4) and the Somerset Street West segment between Breezehill Avenue and Preston Street (3).

Collision data is included in Appendix D.

2.3 Planned Conditions

2.3.1 Changes to the Area Transportation Network

The subject development is within the Gladstone Station District CDP (2014) and as such, is subject to the development and planning vision outlined with the CDP. The CDP visioning option for the transit-oriented development node, illustrated in Figure 8, has the following new transportation infrastructure elements:

- Trillium LRT station plaza identified as a node/landmark/gateway for the community
- a multi-use crossing is proposed over the rail line between Gladstone Avenue and Laurel Street W
- a new road connection across the rail line between Laurel Street W and Oak Street

Beyond the station plaza, these improvements are not identified in the City's affordable network and not time frame is available for their construction.

Figure 8: Gladstone Station District CDP Vision & Concept Options Report – Preferred Option: Perspective Looking North-East



2.3.2 Other Study Area Developments

1040 and 1050 Somerset Street

The combined site would include a 32-storey residential building between the Trillium Rail corridor and Breezhill Avenue, and a 23-storey residential building on the west side of Breezhill Avenue. Both sites would include ground floor commercial/retail and provide underground parking. Access to the 1040 site was proposed along Breezhill Avenue and a laneway access on Somerset Street West was proposed for the 1050 site. These files have not advanced since 2013.

989 Somerset Street

The proposed development consists of a mixed-use building with ground floor retail and 127 residential units above. The transportation impact of this site will be primarily on Somerset Street West and Preston Street. In addition, this file has not advanced since 2014.

3 Study Area and Time Periods

3.1 Study Area

The study area will include the intersections of Gladstone Avenue and Bayswater Avenue, Gladstone Avenue and Preston Street, and Somerset Street West and Breezhill Avenue. Gladstone Avenue and Loretta Avenue North are noted as the boundary roads for the site.

The TRANS screenline SL-29 will need to be reviewed along the Trillium rail corridor, for the Gladstone Avenue and Somerset Street W bridge crossings.

3.2 Time Periods

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

3.3 Horizon Years

The anticipated build-out year is 2023. As a result, the full build-out plus five years horizon year is 2028.

4 Exemption Review

[Table 4](#)~~Table 3~~ summarizes the exemptions for this TIA.

Table 43: Exemption Review

Module	Element	Explanation	Exempt/Required
Design Review Component			
4.1 Development Design	4.1.2 Circulation and Access	Only required for site plans	Required
	4.2.3 New Street Networks	Only required for plans of subdivision	Exempt
4.2 Parking	4.2.1 Parking Supply	Only required for site plans	Required
	4.2.2 Spillover Parking	Only required for site plans where parking supply is 15% below unconstrained demand	Exempt
Network Impact Component			
4.5 Transportation Demand Management	All Elements	Not required for site plans expected to have fewer than 60 employees and/or students on location at any given time	Required
4.6 Neighbourhood Traffic Management	4.6.1 Adjacent Neighbourhoods	Only required when the development relies on local or collector streets for access and total volumes exceed ATM capacity thresholds	Required
4.8 Network Concept		Only required when proposed development generates more than 200 person-trips during the peak hour in excess of equivalent volume permitted by established zoning	Required

5 Development-Generated Travel Demand

5.1 Trip Generation and Mode Shares

This TIA has been prepared using the vehicle and person trip rates for the residential components using the TRANS Trip Generation Study Report (2009) and person trip rates for general office and the vehicle trip rates for the retail components using the ITE Trip Generation Manual (10th Edition). To estimate person trip generation for the retail component, a factor of 1.28 has been applied to the ITE rates. [Table 5](#)~~Table 4~~ summarizes the person trip rates for the proposed land uses.

Table 54: Trip Generation Person Trip Rates

Dwelling Type	Land Use Code	Peak Hour	Vehicle Trip Rate	Person Trip Rates
High-rise condominiums (3+ floors)	232 (TRANS)	AM	-	1.03
		PM	-	0.85
General Office (Dense Multi-Use)	710	AM	-	1.51
		PM	-	1.57
Shopping Centre (Dense Multi-Use)	820	AM	2.41	3.08
		PM	4.92	6.3

Using the above Person Trip rates, the total person trip generation has been estimates. [Table 6](#)~~Table-5~~ below illustrates the total person trip generation by dwelling type.

Table 65: Total Person Trip Generation

Land Use	Units / GFA	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
High-rise condominiums	931	268	688	956	459	332	791
General Office	141.75	53	161	214	140	83	223
Shopping Centre	21.69	15	52	67	86	51	137
Total Person Trips		336	901	1,237	685	466	1,151

As the proposed development is within a transit-oriented development zone, TOD mode shares will be applied for the development and are summarized in [Table 7](#)~~Table-6~~.

Table 76: TOD Mode Share

Travel Mode	Mode Share
Auto Driver	15%
Auto Passenger	5%
Transit	65%
Non-Auto	15%
Total	100%

Internal capture rates from the ITE Trip Generation Handbook 3rd Edition assigned to the development for the office and retail components for mixed-use developments. The rates summarized in [Table 8](#)~~Table-7~~ represent the percentage of trips to/from the retail or office uses based on the residential component.

Table 87: Internal Capture Rates

Land Use	AM		PM	
	In	Out	Total	In
General Office	3%	1%	57%	2%
Shopping Centre	17%	14%	10%	26%

Using the above mode shares, person trip rates, and the internal capture rates the person trips by mode have been projected. [Table 9](#)~~Table-8~~ summarizes the trip generation by mode.

Table 98: Trip Generation by Mode

Travel Mode	Mode Share	In	Out	Total	In	Out	Total
Auto Driver	15%	50	134	184	90	68	157
Auto Passenger	5%	17	44	62	30	23	53
Transit	65%	215	579	795	387	294	681
Non-Auto Modes	15%	50	134	184	90	68	157
Internal Capture		5	9	14	89	15	104
Total	100%	336	901	1,237	685	466	1,151

As shown above, 184 AM and 157 PM peak hour two-way vehicle trips are projected as a result of the proposed development.

5.2 Trip Distribution

To understand the travel patterns of the subject development the OD Survey has been reviewed to determine the existing travel patterns. Table 10 below summarizes the distribution.

Table 109: OD Survey Existing Mode Share – Ottawa Inner

To/From	Percent of Trips
North	20%
South	35%
East	25%
West	20%
Total	100%

5.3 Trip Assignment

Using the distribution outlined above, turning movement splits, and access to major transportation infrastructure, the trips generated by the site have been assigned to the Study Area road network.

Figure 9: Traffic Assignment (%)

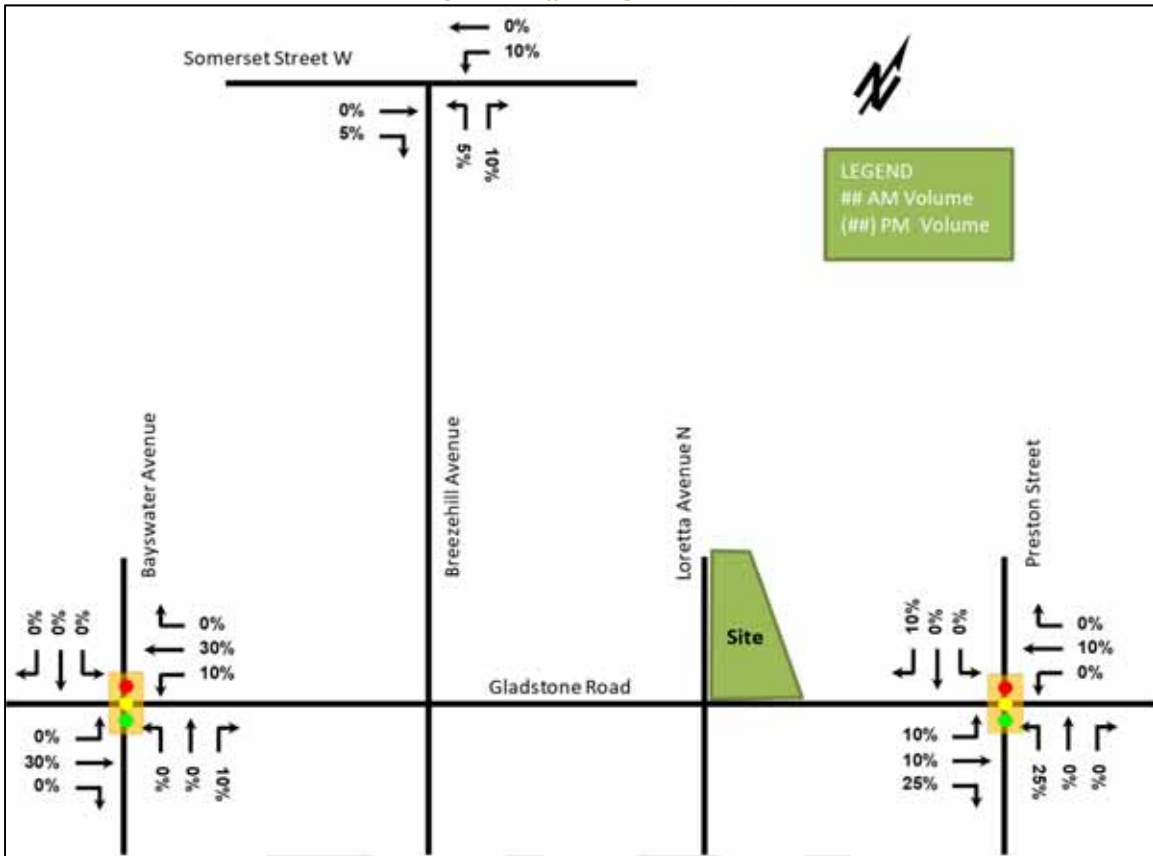
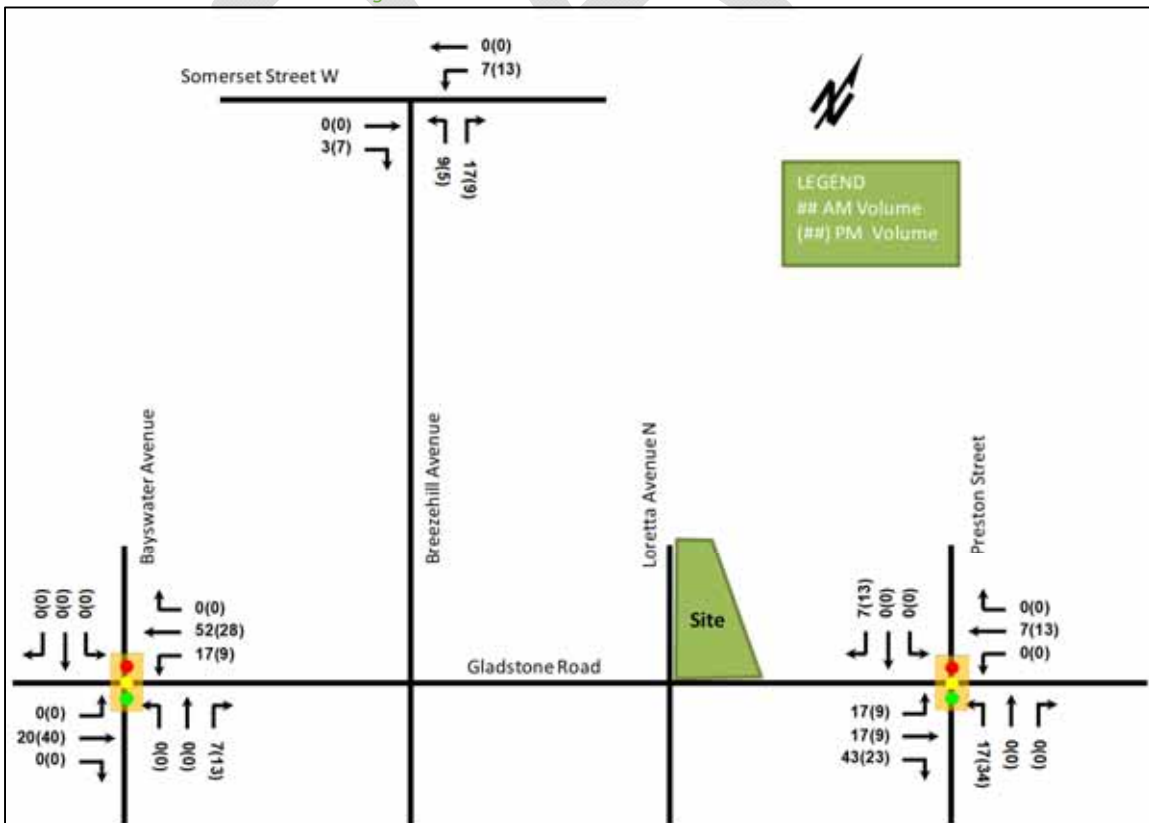


Figure 10: New Site Generation Auto Volumes



6 Background Network Travel Demands

6.1 Transportation Network Plans

The transportation network plans were discussed in Section 2.3.1. Beyond the opening of the Trillium LRT Gladstone Station, no addition network changes have been included the preparation of this TIA.

6.2 Background Growth

The auto demand within the inner area of Ottawa has been documented as decreasing over the past 10 years, resulting in reduced demand on many roadways. As such, no growth has been applied to the study area intersections.

6.3 Other Developments






No background developments were explicitly considered as part of this TIA.

The future background traffic volumes are anticipated to remain the same as the existing conditions and no improvements are recommended.

7 Demand Rationalization

The existing SL-29 screenline two-way volumes, by mode, along the Trillium rail corridor for the Gladstone Avenue and Somerset Street W crossings has been summarized in [Table 11](#)~~Table-9~~. The auto volumes are approximately 60% to the east during the AM peak and 70% to the west during the PM peak. The theoretical capacity of these roadways could range between 700-900 vehicles per lane, which would provide approximately 30% or more residual capacity in the peak direction for each of these roadways, or be the equivalent to a level of service B.

Table 119: SL-29 Screenline Summary

Vehicle/Mode	Gladstone Bridge		Somerset Bridge	
	AM	PM	AM	PM
	404	676	494	850
	72	61	120	135
	57	65	168	264
	91	86	88	41
	9	10	10	9

Based on the capacity analysis and screenline data, no capacity constraints are currently noted for the area and rationalization for adjusted demand is not required for this TIA.

8 Transportation Demand Management

8.1 Context for TDM

The mode shares used within the TIA represent the planning level targets for a transit-oriented design (TOD). Should these mode shares not be reached, the subject site accesses Loretta Avenue, connecting to Gladstone Avenue and Breezehill Avenue, will see an impact on the adjacent residential land-uses. If the travel modes match the existing Ottawa West area mode shares, this would increase the vehicular traffic by over 3 times the TOD mode shares.

The subject site is within a TOD area. Tenants have not been finalized at this time, therefore any relocations from within Ottawa-Gatineau or the specific business operations cannot be confirmed until the tenants are known.

For the residential land use, total bedrooms within the development is subject to final owner purchasing preferences and no age restrictions are noted. The retail and office land uses will be determined by lease options and are entirely dependant on tenants to determine the number and occupation of employees, and clients/customers travelling from the Ottawa-Gatineau area and within 2.0km of the site.

8.2 Need and Opportunity

The subject site has been assumed to rely predominantly on transit due to the proximity to the future Gladstone LRT Station. As mentioned above, a decrease in the assumed 65% transit mode share to the existing 50% auto mode share for the area, would see an increase of over 3 times the auto trips from the proposed development.

The development is planned to coincide with the Gladstone Station construction. The convenience of the transit station should provide the opportunity to reach the forecast transit mode share, although incentives for new residential tenants exists within the TDM framework. Hard measures, such as reduced parking provisions, would limit the risk of higher auto mode shares being produced from the site.

8.3 TDM Program

The “suite of post occupancy TDM measures” has been summarized in the TDM checklists for both the residential and non-residential land uses. The checklist is provided in Appendix E.

The key TDM measures recommended include:

- Enhanced connectivity of pedestrians and cyclists to the adjacent network and adjacent Gladstone LRT station
- Engagement with local bike share programs (e.g. VeloGO) to include onsite space for bike rack/storage
- Posting of pedestrian, cycling, and transit information and maps at primary entrances/exits
- Inclusion of a 1-month Presto card for first time new residential tenants, along with a set time frame for this offer (e.g. 6-months) from the ‘opening’ of the building/tower.

9 Neighbourhood Traffic Management

The existing (and future background) volumes along Gladstone Avenue at Preston Avenue are approximately 550 vehicles during the peak hours in the peak direction. This exceeds the TIA Guidelines threshold of 300 vehicles during the peak hour. This threshold is too low for collector roadways and is not considered to be an existing or background issue, and the increase of approximately 60-70 vehicles during the peak hours in the peak direction from the subject site is not considered significant for a collector roadway.

10 Transit

10.1 Route Capacity

The existing Trillium line provides capacity for 1,000 passengers per direction per hour on a 15-minute service schedule. The future plans include a study increase in service time to 8-minutes (1,750 passengers per direction per hour) as demand increases.

Based on the trip distribution and forecasted transit trips for the site, an upper limit of 375 northbound and 200 southbound outbound trips during the AM peak, and 200 northbound and 135 southbound inbound trips during the PM peak could be expected on the Trillium LRT. The range of the impacts are 13.5-37.5% of the existing service capacity of the Trillium LRT. Therefore, a revised service time schedule of 10-12 minutes may be required to support this development.

If a maximum of 10% of the transit mode share utilizes the existing route #14, this may see the need for an additional single bus (55-person capacity) during the peak hours to accommodate the additional demand.

10.2 Transit Priority

No transit priority is required/considered for the study area.

11 Review of Network Concept

The background and forecasted site trips do not exceed the anticipated lane capacities on the boundary road network. The construction and connectivity to the future Gladstone LRT Station is a priority to ensure the transit modal share is achieved and there is a minimal impact on the road network.

12 Network Intersection Design

12.1 Intersection Control

The operation of the Somerset Street W and Breezehill Avenue intersection does not warrant signalization. The warrant calculation has been provided in Appendix F.

12.2 Intersection Design

12.2.1 Total Future Conditions

The future total future traffic volumes for both the 2023 and 2028 horizons are the same and have been illustrated in Figure 11 and the intersection operations are summarized in [Table 12](#)~~Table 9~~. The level of service is based on the HCM criteria for average delay at unsignalized and signalized intersections. The synchro worksheets have been provided in Appendix G.

Figure 11: Future Total Traffic Volumes

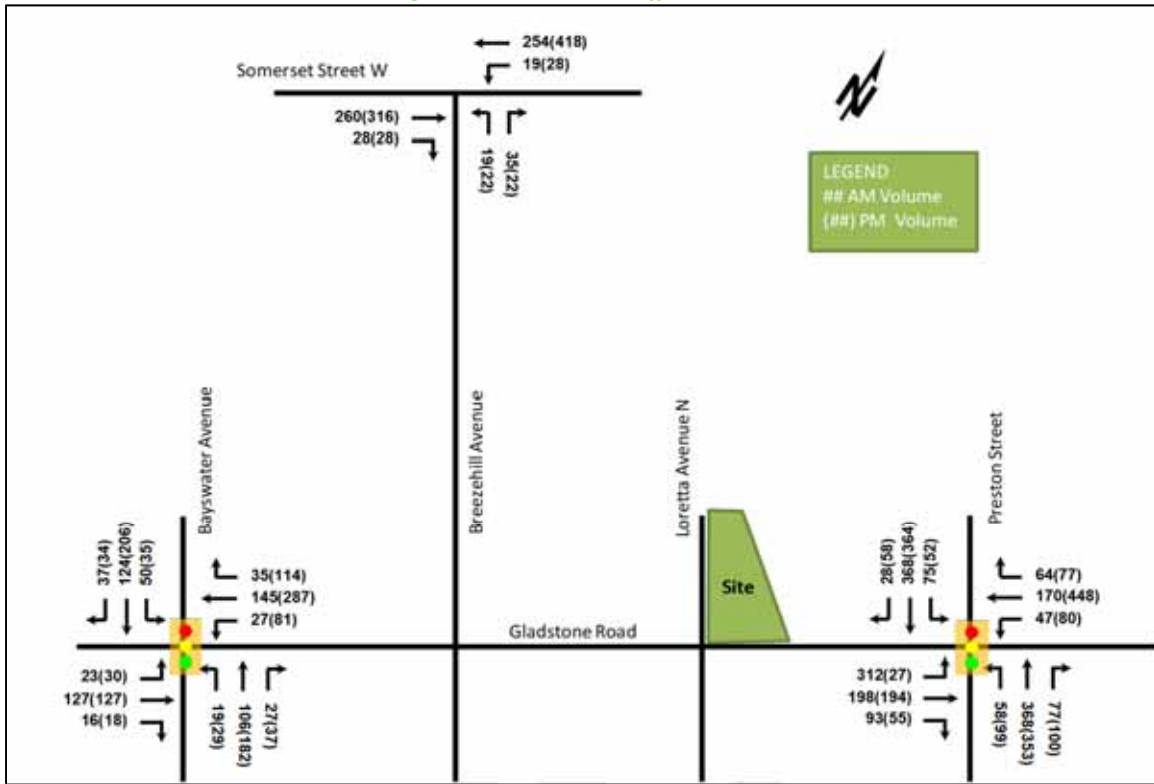


Table 129: Future Total Access Intersection Operations

Intersection	Lane	AM Peak Hour				PM Peak Hour			
		LOS	Delay	V/C	Q (95 th)	LOS	Delay	V/C	Q (95 th)
Gladstone Avenue & Preston Street <i>Signalized</i>	EB	F	423.6	1.87	#167.5	C	20.5	0.55	41.6
	WBL	C	22.9	0.20	11.7	B	17.5	0.25	14.8
	WBT/R	C	24.3	0.52	39.4	D	39.4	0.89	#101.1
	NBL	A	8.1	0.12	7.6	B	15.0	0.28	16.8
	NBT/R	B	10.6	0.47	45.7	B	16.5	0.57	62.3
	SBL	A	8.8	0.17	9.6	B	13.2	0.16	9.5
	SBT/R	B	10.2	0.42	40.4	B	16.0	0.53	57.5
Overall	F	146.4	-	-	-	C	23.2	-	-
Gladstone Avenue & Bayswater Avenue <i>Signalized</i>	EB	C	22.6	0.47	24.3	B	11.4	0.30	16.9
	WB	C	24.5	0.57	29.2	C	24.0	0.79	53.6
	NB	A	5.9	0.16	13.7	B	14.8	0.36	35.6
	SB	A	6.6	0.23	19.3	B	15.6	0.40	40.2
	Overall	B	15.1	-	-	-	B	18.2	-
Somerset Street W & Breezehill Avenue <i>Unsignalized</i>	EB	A	0.0	0.00	0.0	A	0.0	0.00	0.0
	WB	A	0.5	0.02	0.0	A	0.5	0.02	0.1
	NB	B	11.2	0.09	0.3	B	13.6	0.10	0.3
	Overall	A	1.2	-	-	-	A	1.0	-

The future total intersection operations are similar to the existing conditions.

No signal timing changes have been applied due to the coordinated timing of the corridors through the study area.

12.2.2 Design Elements

No intersection modifications are recommended for the study area intersections.

13 Summary of Improvements Indicated and Modifications Options

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

Proposed Site and Screening

- The proposed site includes 931 residential units, 141,750 sq. ft of office space, and 21,686 sq. ft. of retail space and is located on the northeast quadrant of the Gladstone Avenue and Loretta Avenue N intersection
- A one-way access loop will be provided along Loretta Avenue N and the existing access on Gladstone Avenue will continue to be used
- A pedestrian connect to the future Gladstone LRT Station is also proposed
- The development is proposed to be completed as a single phase by 2023
- The Trip Generation, Location, and Safety triggers were all met for the TIA Screening

Existing Conditions

- Gladstone Avenue (collector), Loretta Avenue N, Breezehill Avenue, Bayswater Avenue (collector), Preston Street (arterial), and Somerset Street W (arterial) are the local road ways, posted at 40km/h or unposted at 50 km/h
- The study area roads have sidewalks on at least one side of the local roads and both sides of the collectors and arterials
- Bike lanes are provided on Somerset Street W, east of Breezehill Avenue, and Gladstone Avenue, Bayswater Avenue and Somerset Street W are suggested bike routes
- The Trillium Pathway runs along the east side of the Trillium LRT corridor
- The existing transit route #14 travels along Gladstone Avenue, route #11 along Somerset Street W and #85 along Preston Street
- The Carling and Bayview Trillium LRT Stations are within a 1.1km walk from the site
- The eastbound approach of the Gladstone Avenue and Preston Street intersection may be experience significant delays during the AM peak
- No other operational issues are noted for the study area intersections

Development Generated Travel Demand

- The proposed development is forecasted to generate 1,237 people two-way trips during the AM peak and 1,151 people two-way trips during the PM peak
- Based on the transit-oriented design area mode shares, a total of 184 two-way vehicle trips will be generated during the AM peak and 157 two-way vehicles trips during the PM peak
- The distribution of the site trips is estimated to be 20% to the north, 35% to the south, 25% to the east, and 20% to the west

Background Conditions

- Adjacent developments have either been on hold for extended periods of time with an unknown horizon, or are too small to have a noticeable impact on the adjacent road network
- Additionally, the background growth in the Ottawa core has been decreasing and a 0% growth was assumed for the area
- The future background intersection operations are the same as the existing intersections

Design Review Component

- The review of the Development Design, Parking, Boundary Street Design, and Access Intersection Design will be completed during the Site Plan submission

TDM

- The development is planned to be completed along side the future Gladstone LRT Station and is the primary supportive infrastructure element to achieve the assumed mode shares and site success
- Additional supportive TDM measures include:
 - Enhanced connectivity of pedestrians and cyclists to the adjacent network and adjacent Gladstone LRT station
 - Engagement with local bike share programs (e.g. VeloGO) to include onsite space for bike rack/storage
 - Posting of pedestrian, cycling, and transit information and maps at primary entrances/exits
 - Inclusion of a 1-month Presto card for first time new residential tenants, along with a set time frame for this offer (e.g. 6-months) from the 'opening' of the building/tower.

Neighbourhood Traffic Management

- The TIA thresholds are met for the existing and background conditions for collector roadways on Gladstone Avenue
- The forecasted site traffic will be minimal and it is not considered an issue for the adjacent neighbourhood

Transit

- The forecasted transit trips will include 795 two-way trips during the AM peak and 681 two-way trips during the PM peak
- An additional peak hour bus for route #14 may be required to support the proposed development
- The Trillium LRT service time may need to be increased, reducing the 15-minute service time to a 10-12-minute service time to support the proposed development
- No transit priority measures are recommended

Review of Network Concept

- The site is not anticipated to impact the transportation network concepts

Network Intersection Design

- No improvements for the study area intersection are required to support the proposed development
- The existing operational issues are not exacerbated by the additional site auto traffic

14 Next Steps

Following the circulation and review of this OPA/ZBA Forecasting report, any outstanding comments, within the context of an OPA/ZBA submission, will be addressed. Once confirmed, an updated TIA report will be completed for the Site Plan submission, pending developer timelines. This updated report will update the forecasting report modules and provide the Design Review Component analysis of the TIA guidelines.

Appendix A

TIA Screening Form and PM Certification Form

DRAFT



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

1. 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;
2. 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;
3. 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
4. I am either a licensed¹ or registered² professional in good standing, whose field of expertise [check appropriate field(s)] 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
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Ville d'Ottawa
Services d'infrastructure et Viabilité des
collectivités
Urbanisme et Gestion de la croissance
110, avenue Laurier Ouest
Ottawa (Ontario) K1P 1J1
Tél. : 613-580-2424
Télécopieur: 613-560-6006

Dated at Ottawa this 20 day of September, 2018.
(City)

Name: Andrew Harte
(Please Print)

Professional Title: Professional Engineer



Signature of Individual certifier that s/he meets the above four criteria

Office Contact Information (Please Print)
Address: 13 Markham Avenue
City / Postal Code: Ottawa / K2G 3Z1
Telephone / Extension: (613) 697-3797
E-Mail Address: Andrew.Harte@CGHTransportation.com



City of Ottawa 2017 TIA Guidelines
Step 1 - Screening Form

Date: Oct. 5, 2018
Project Number: 2018-36
Project Reference: Trinity - Gladstone-Loretta

1.1 Description of Proposed Development	
Municipal Address	951 Gladstone Ave, 145 Loretta Ave N
Description of Location	PLAN 73 BLK C LOTS 2 AND 3;PT LOT 1 WCA LOTS 1 TO 4 ELA;PT BLK C PT CHAMPAGNE AVE; PLAN 73 BLK C LOTS 5 TO 8
Land Use Classification	Apartments (Bachelor-3 Bdrm), Office, Retail
Development Size	Apartments: 931 units, Office: 141,750 sq. ft, Retail 21,686 sq.ft
Accesses	2 accesses, Loretta Ave
Phase of Development	Single Phase
Buildout Year	2023
TIA Requirement	Full TIA Required

1.2 Trip Generation Trigger	
Land Use Type	Townhomes or apartments
Development Size	931 Units
Trip Generation Trigger	Yes

1.3 Location Triggers	
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?	Yes
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?	Yes
Location Trigger	Yes

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

Appendix B

Turning Movement Counts

DRAFT



Transportation Services - Traffic Services W.O. 36100

Turning Movement Count - 15 Minute Summary Report

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

Time Period	BAYSWATER AVE									GLADSTONE AVE									Grand Total
	Northbound			Southbound			Eastbound			Westbound			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	
07:00 07:15	0	13	3	16	11	31	6	48	64	5	22	3	30	2	11	6	19	49	113
07:15 07:30	2	21	2	25	3	23	3	29	54	5	21	3	29	2	18	5	25	54	108
07:30 07:45	1	19	2	22	10	32	2	44	66	9	24	3	36	3	21	8	32	68	134
07:45 08:00	2	25	7	34	8	35	5	48	82	5	28	3	36	4	14	4	22	58	140
08:00 08:15	3	20	5	28	18	30	11	59	87	5	36	1	42	3	19	7	29	71	158
08:15 08:30	5	32	3	40	8	29	7	44	84	7	28	4	39	1	22	9	32	71	155
08:30 08:45	3	24	7	34	10	32	15	57	91	5	23	8	36	5	26	10	41	77	168
08:45 09:00	8	30	7	45	14	33	4	51	96	6	25	3	34	5	38	9	52	86	182
09:00 09:15	3	27	8	38	9	24	7	40	78	7	28	3	38	5	19	8	32	70	148
09:15 09:30	4	18	10	32	10	28	9	47	79	3	29	2	34	2	20	8	30	64	143
09:30 09:45	7	13	8	28	10	14	5	29	57	6	23	5	34	3	21	7	31	65	122
09:45 10:00	4	12	5	21	9	19	2	30	51	5	24	3	32	1	25	6	32	64	115
11:30 11:45	4	28	5	37	2	21	5	28	65	2	27	2	31	12	24	10	46	77	142
11:45 12:00	5	15	14	34	10	23	6	39	73	1	30	3	34	5	46	14	65	99	172
12:00 12:15	6	25	9	40	8	28	8	44	84	5	28	0	33	7	35	8	50	83	167
12:15 12:30	6	17	5	28	8	23	13	44	72	4	26	4	34	6	38	15	59	93	165
12:30 12:45	7	28	10	45	5	18	3	26	71	8	29	4	41	3	27	6	36	77	148
12:45 13:00	7	27	13	47	10	15	4	29	76	3	26	5	34	7	28	10	45	79	155
13:00 13:15	3	14	3	20	7	24	4	35	55	4	30	3	37	4	32	16	52	89	144
13:15 13:30	5	20	8	33	10	17	4	31	64	9	33	4	46	2	38	10	50	96	160
15:00 15:15	4	48	5	57	10	30	9	49	106	6	32	3	41	7	27	11	45	86	192
15:15 15:30	2	53	3	58	6	42	8	56	114	8	20	8	36	9	35	26	70	106	220
15:30 15:45	1	52	7	60	4	38	2	44	104	7	28	2	37	11	60	35	106	143	247
15:45 16:00	4	46	5	55	8	25	6	39	94	5	25	5	35	9	46	23	78	113	207
16:00 16:15	6	57	7	70	12	35	10	57	127	11	30	6	47	13	69	33	115	162	289
16:15 16:30	7	44	3	54	9	47	9	65	119	8	26	1	35	24	66	27	117	152	271
16:30 16:45	8	44	8	60	5	69	9	83	143	7	26	8	41	11	66	32	109	150	293
16:45 17:00	8	37	10	55	9	55	6	70	125	4	18	3	25	26	66	22	114	139	264
17:00 17:15	9	40	2	51	6	58	15	79	130	9	26	6	41	22	57	27	106	147	277
17:15 17:30	5	36	10	51	9	37	12	58	109	9	23	6	38	16	73	26	115	153	262
17:30 17:45	3	28	5	36	6	35	8	49	85	11	29	5	45	11	50	13	74	119	204
17:45 18:00	6	26	9	41	10	28	10	48	89	6	21	2	29	5	38	11	54	83	172
TOTAL:	148	939	208	1295	274	998	227	1499	2794	195	844	121	1160	246	1175	462	1883	3043	5837

Note: U-Turns are included in Totals.

Comment:



Transportation Services - Traffic Services
Turning Movement Count - Cyclist Volume Report

Work Order
36100

BAYSWATER AVE @ GLADSTONE AVE

Count Date: Wednesday, July 27, 2016

Start Time: 07:00

Time Period	BAYSWATER AVE			GLADSTONE AVE			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	6	2	8	29	14	43	51
08:00 09:00	12	7	19	63	18	81	100
09:00 10:00	5	0	5	19	15	34	39
11:30 12:30	2	0	2	11	14	25	27
12:30 13:30	2	0	2	10	0	10	12
15:00 16:00	3	4	7	10	9	19	26
16:00 17:00	3	7	10	21	51	72	82
17:00 18:00	11	11	22	35	40	75	97
Total	44	31	75	198	161	359	434

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

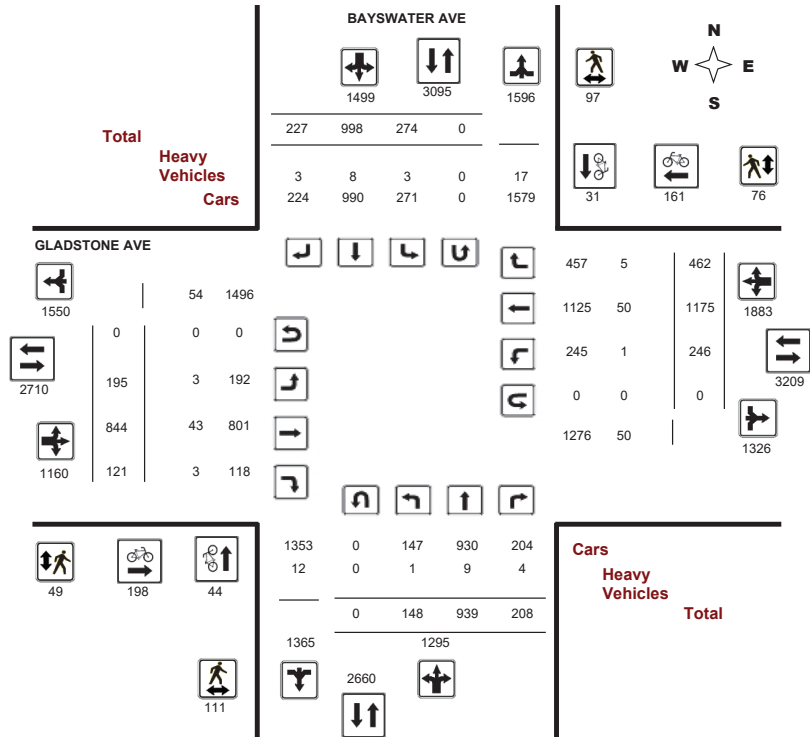


Transportation Services - Traffic Services
Turning Movement Count - Full Study Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

WO#: 36100
 Device: Miovision



Comments



Transportation Services - Traffic Services
Turning Movement Count - Heavy Vehicle Report

W.O.
36100

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

Time Period	BAYSWATER AVE								GLADSTONE AVE								W TOT	STR TOT	Grand Total
	Northbound				Southbound				Eastbound				Westbound						
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT			
07:00	0	0	1	1	1	1	0	2	3	2	2	0	4	1	8	0	9	13	16
08:00	0	2	0	2	0	3	1	4	6	0	4	2	6	0	7	1	8	14	20
09:00	0	1	0	1	0	1	0	1	2	0	4	0	4	0	5	0	5	9	11
11:30	0	1	3	4	1	0	1	2	6	0	6	0	6	0	8	2	10	16	22
12:30	1	5	0	6	1	2	0	3	9	0	9	1	10	0	9	0	9	19	28
15:00	0	0	0	0	0	0	0	0	0	0	9	0	9	0	3	2	5	14	14
16:00	0	0	0	0	0	0	1	1	1	1	6	0	7	0	6	0	6	13	14
17:00	0	0	0	0	0	1	0	1	1	0	3	0	3	0	4	0	4	7	8
Sub Total	1	9	4	14	3	8	3	14	28	3	43	3	49	1	50	5	56	105	133
U-Turns (Heavy Vehicles)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	1	9	4	14	3	8	3	14	28	3	43	3	49	1	50	5	56	105	133

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



Transportation Services - Traffic Services

Work Order
36100

Turning Movement Count - Pedestrian Volume Report

BAYSWATER AVE @ GLADSTONE AVE

Count Date: Wednesday, July 27, 2016

Start Time: 07:00

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	1	1	2	0	1	1	3
07:15 07:30	3	0	3	1	0	1	4
07:30 07:45	4	5	9	2	1	3	12
07:45 08:00	3	3	6	1	6	7	13
07:00 08:00	11	9	20	4	8	12	32
08:00 08:15	2	5	7	1	3	4	11
08:15 08:30	5	6	11	1	4	5	16
08:30 08:45	8	2	10	0	0	0	10
08:45 09:00	1	5	6	1	1	2	8
08:00 09:00	16	18	34	3	8	11	45
09:00 09:15	3	5	8	2	0	2	10
09:15 09:30	2	2	4	1	2	3	7
09:30 09:45	4	3	7	2	2	4	11
09:45 10:00	2	1	3	0	3	3	6
09:00 10:00	11	11	22	5	7	12	34
11:30 11:45	1	4	5	0	1	1	6
11:45 12:00	3	0	3	0	4	4	7
12:00 12:15	3	0	3	0	9	9	12
12:15 12:30	4	1	5	2	1	3	8
11:30 12:30	11	5	16	2	15	17	33
12:30 12:45	3	0	3	2	1	3	6
12:45 13:00	5	1	6	0	0	0	6
13:00 13:15	4	1	5	0	2	2	7
13:15 13:30	5	2	7	1	3	4	11
12:30 13:30	17	4	21	3	6	9	30
15:00 15:15	0	1	1	0	1	1	2
15:15 15:30	3	1	4	4	2	6	10
15:30 15:45	4	2	6	1	2	3	9
15:45 16:00	2	2	4	0	3	3	7
15:00 16:00	9	6	15	5	8	13	28
16:00 16:15	6	9	15	3	4	7	22
16:15 16:30	2	1	3	4	0	4	7
16:30 16:45	8	7	15	5	5	10	25
16:45 17:00	11	6	17	1	2	3	20
16:00 17:00	27	23	50	13	11	24	74
17:00 17:15	3	8	11	3	1	4	15
17:15 17:30	1	7	8	3	7	10	18
17:30 17:45	2	3	5	2	5	7	12
17:45 18:00	3	3	6	6	0	6	12
17:00 18:00	9	21	30	14	13	27	57
Total	111	97	208	49	76	125	333

Comment:



Transportation Services - Traffic Services

Work Order
36100

Turning Movement Count - Full Study Summary Report

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

Total Observed U-Turns

AADT Factor

Northbound: 0	Southbound: 0
Eastbound: 0	Westbound: 0

.90

Full Study

Period	BAYSWATER AVE								GLADSTONE AVE								WB TOT	STR TOT	Grand Total								
	Northbound				Southbound				Eastbound				Westbound														
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT											
07:00 08:00	5	78	14	97	32	121	16	169	266	24	95	12	131	11	64	23	98	229	495								
08:00 09:00	19	106	22	147	50	124	37	211	358	23	112	16	151	14	105	35	154	305	663								
09:00 10:00	18	70	31	119	38	85	23	146	265	21	104	13	138	11	85	29	125	263	528								
11:30 12:30	21	85	33	139	28	95	32	155	294	12	111	9	132	30	143	47	220	352	646								
12:30 13:30	22	89	34	145	32	74	15	121	266	24	118	16	158	16	125	42	183	341	607								
15:00 16:00	11	199	20	230	28	135	25	188	418	26	105	18	149	36	168	95	299	448	866								
16:00 17:00	29	182	28	239	35	206	34	275	514	30	100	18	148	74	267	114	455	603	1117								
17:00 18:00	23	130	26	179	31	158	45	234	413	35	99	19	153	54	218	77	349	502	915								
Sub Total	148	939	208	1295	274	998	227	1499	2794	195	844	121	1160	246	1175	462	1883	3043	5837								
U Turns	0								0								0								0	0	0
Total	148	939	208	1295	274	998	227	1499	2794	195	844	121	1160	246	1175	462	1883	3043	5837								
EQ 12Hr	206	1305	289	1800	381	1387	316	2084	3884	271	1173	168	1612	342	1633	642	2617	4229	8113								
Note:	These values are calculated by multiplying the totals by the appropriate expansion factor.																1.39										
AVG 12Hr	185	1175	260	1620	343	1248	284	1875	3495	244	1056	151	1451	308	1470	578	2356	3807	7302								
Note:	These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																.90										
AVG 24Hr	243	1539	341	2122	449	1636	372	2457	4579	320	1383	198	1901	403	1926	757	3086	4987	9566								
Note:	These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																1.31										

Comments:

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



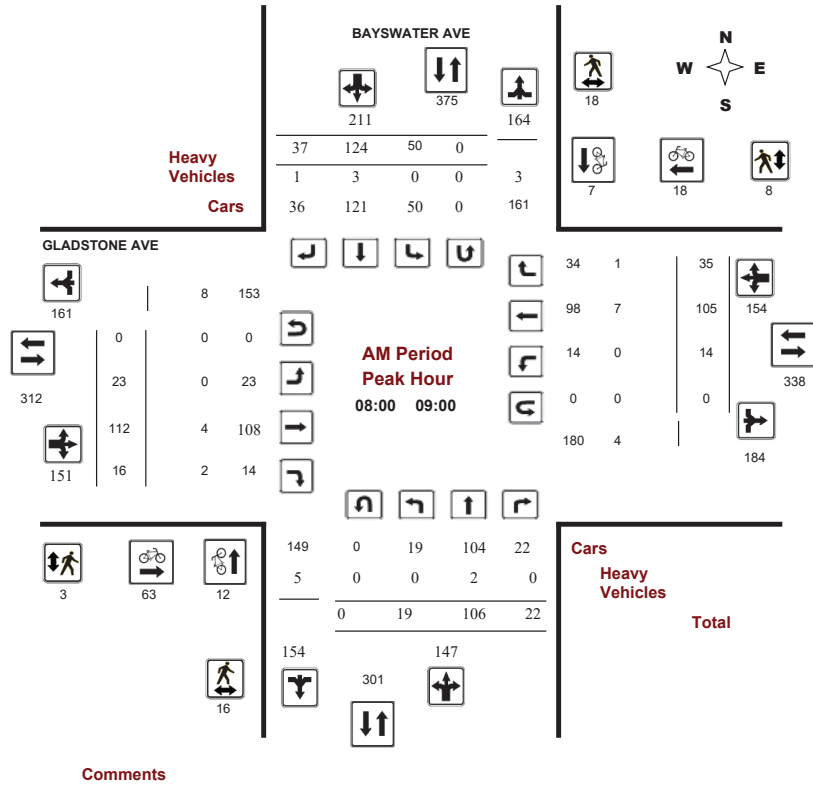
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016
Start Time: 07:00

WO No: 36100
Device: Miovision



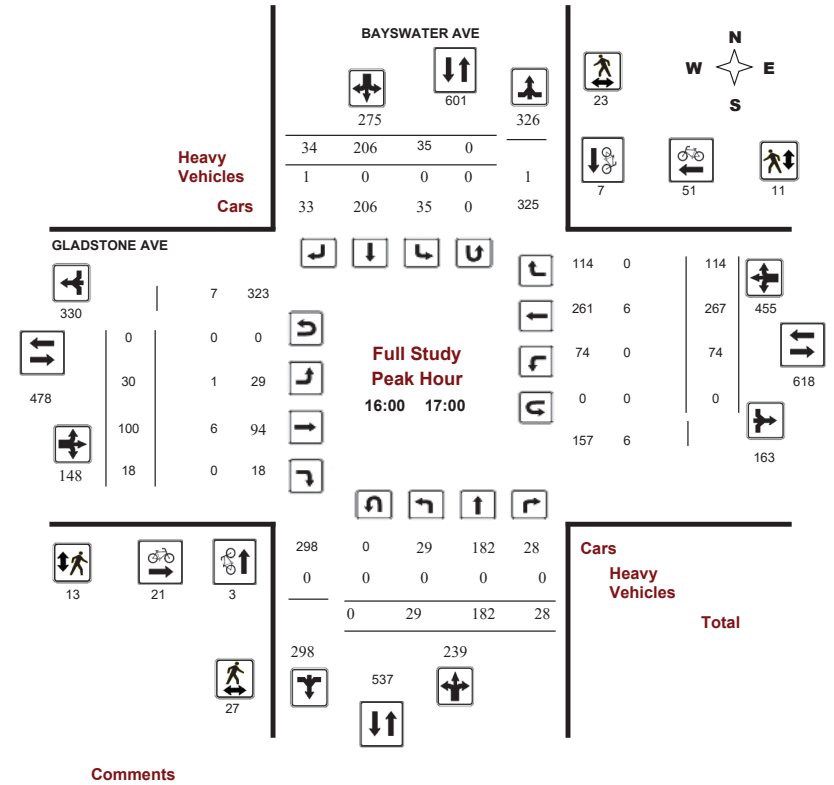
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016
Start Time: 07:00

WO No: 36100
Device: Miovision





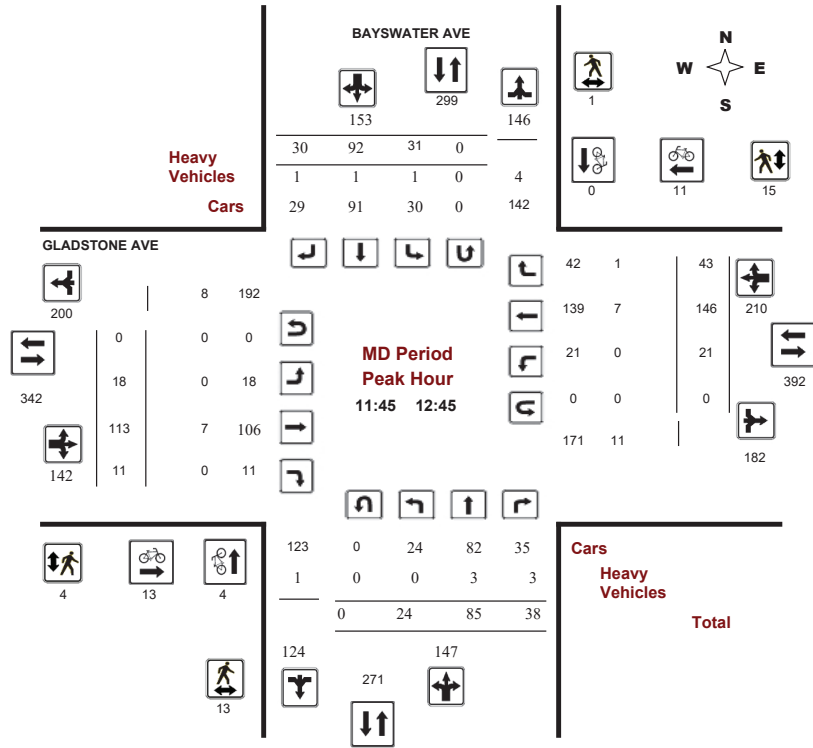
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016
Start Time: 07:00

WO No: 36100
Device: Miovision



Comments



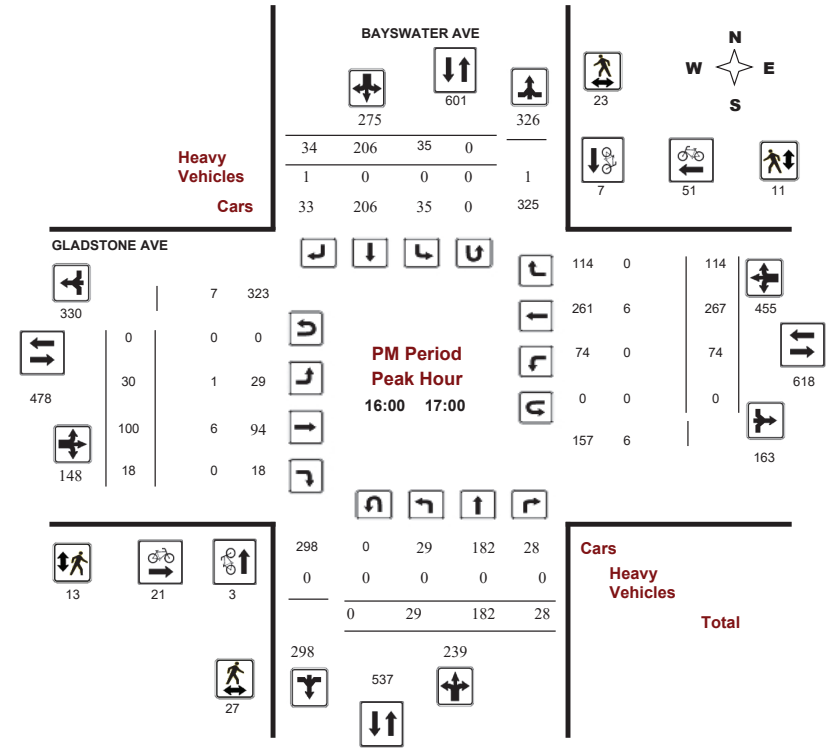
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016
Start Time: 07:00

WO No: 36100
Device: Miovision



Comments



Transportation Services - Traffic Services

Work Order
36100

Turning Movement Count - 15 Min U-Turn Total Report

BAYSWATER AVE @ GLADSTONE AVE

Survey Date: Wednesday, July 27, 2016

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



Transportation Services - Traffic Services

W.O. 35301

Turning Movement Count - 15 Minute Summary Report

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 4 Westbound: 2

BREEZEHILL AVE														SOMERSET ST								Grand Total
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				
07:00 07:15	2	0	2	4	0	0	0	0	4	0	27	5	32	3	21	0	24	56	60			
07:15 07:30	0	0	6	6	0	0	0	0	6	0	29	3	32	2	35	0	37	69	75			
07:30 07:45	2	0	3	5	0	0	0	0	5	0	53	2	55	1	35	0	36	91	96			
07:45 08:00	2	0	4	6	0	0	0	0	6	0	62	3	65	4	54	0	58	123	129			
08:00 08:15	3	0	6	9	0	0	0	0	9	0	65	5	70	4	56	0	60	130	139			
08:15 08:30	4	0	5	9	0	0	0	0	9	0	92	3	95	4	42	0	46	141	150			
08:30 08:45	3	0	4	7	0	0	0	0	7	0	54	5	59	3	40	0	43	102	109			
08:45 09:00	3	0	9	12	0	0	0	0	12	0	64	4	68	4	50	0	54	122	134			
09:00 09:15	3	0	6	9	0	0	0	0	9	0	63	8	71	5	68	0	73	144	153			
09:15 09:30	5	0	4	9	0	0	0	0	9	0	62	4	66	5	53	0	58	124	133			
09:30 09:45	6	0	7	13	0	0	0	0	13	0	76	3	79	2	66	0	68	147	160			
09:45 10:00	2	0	5	7	0	0	0	0	7	0	59	10	70	2	67	0	69	139	146			
11:30 11:45	5	0	2	7	0	0	0	0	7	0	81	2	83	3	74	0	77	160	167			
11:45 12:00	9	0	3	12	0	0	0	0	12	0	81	3	84	5	69	0	74	158	170			
12:00 12:15	7	0	12	19	0	0	0	0	19	0	78	8	86	12	80	0	92	178	197			
12:15 12:30	4	0	8	12	0	0	0	0	12	0	69	4	74	5	70	0	75	149	161			
12:30 12:45	6	0	3	9	0	0	0	0	9	0	71	5	76	2	64	0	66	142	151			
12:45 13:00	1	0	4	5	0	0	0	0	5	0	80	9	89	5	72	0	77	166	171			
13:00 13:15	4	0	3	7	0	0	0	0	7	0	65	7	72	2	66	0	68	140	147			
13:15 13:30	5	0	5	10	0	0	0	0	10	0	49	5	54	6	86	0	92	146	156			
15:00 15:15	6	0	2	8	0	0	0	0	8	0	65	5	70	2	74	0	76	146	154			
15:15 15:30	7	0	6	13	0	0	0	0	13	0	66	2	68	5	89	0	94	162	175			
15:30 15:45	8	0	8	16	0	0	0	0	16	0	58	4	62	3	93	0	96	158	174			
15:45 16:00	4	0	2	6	0	0	0	0	6	0	61	4	66	6	75	0	81	147	153			
16:00 16:15	2	0	7	9	0	0	0	0	9	0	73	3	76	5	96	0	101	177	186			
16:15 16:30	3	0	5	8	0	0	0	0	8	0	87	7	94	7	108	0	115	209	217			
16:30 16:45	5	0	3	8	0	0	0	0	8	0	65	8	73	4	104	0	109	182	190			
16:45 17:00	3	0	4	7	0	0	0	0	7	0	86	3	89	6	114	0	120	209	216			
17:00 17:15	8	0	3	11	0	0	0	0	11	0	78	5	83	2	92	0	94	177	188			
17:15 17:30	4	0	3	7	0	0	0	0	7	0	78	3	81	7	113	0	121	202	209			
17:30 17:45	4	0	5	9	0	0	0	0	9	0	64	3	68	7	110	0	117	185	194			
17:45 18:00	2	0	6	8	0	0	0	0	8	0	76	2	78	3	93	0	96	174	182			
TOTAL:	132	0	155	287	0	0	0	0	287	0	2137	147	2288	136	2329	0	2467	4755	5042			

Note: U-Turns are included in Totals.

Comment:



Transportation Services - Traffic Services
Turning Movement Count - Cyclist Volume Report

Work Order
35301

BREEZEHILL AVE @ SOMERSET ST

Count Date: Thursday, August 13, 2015

Start Time: 07:00

Time Period	BREEZEHILL AVE			SOMERSET ST			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	6	0	6	38	24	62	68
08:00 09:00	17	0	17	99	39	138	155
09:00 10:00	6	0	6	33	28	61	67
11:30 12:30	4	0	4	28	25	53	57
12:30 13:30	2	0	2	21	30	51	53
15:00 16:00	3	0	3	41	34	75	78
16:00 17:00	3	0	3	50	79	129	132
17:00 18:00	4	0	4	59	101	160	164
Total	45	0	45	369	360	729	774

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

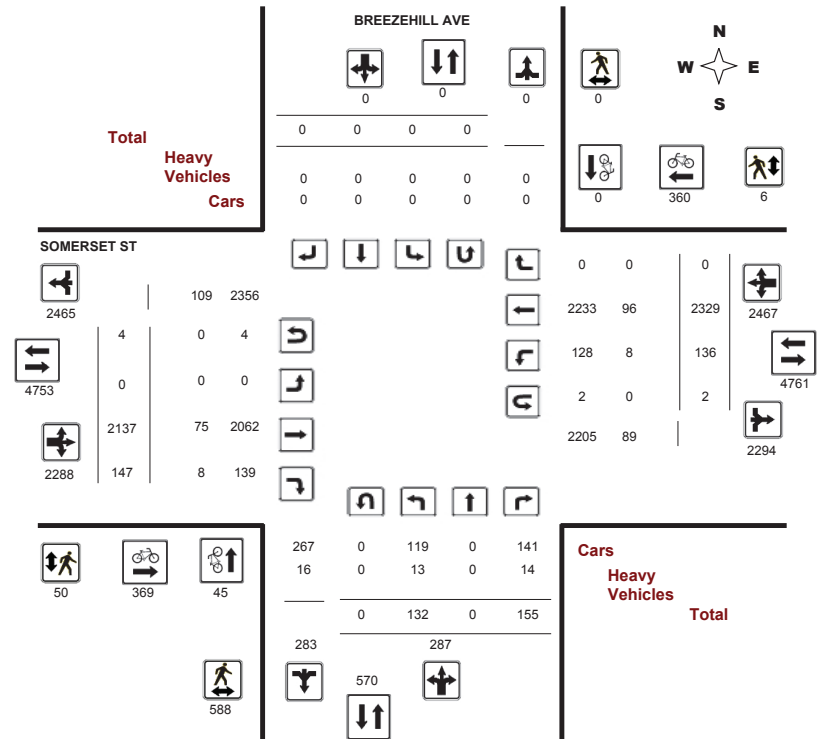


Transportation Services - Traffic Services
Turning Movement Count - Full Study Diagram

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

WO#: 35301
Device: Miovision



Comments



Transportation Services - Traffic Services

W.O. 35301

Turning Movement Count - Heavy Vehicle Report

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

Table with columns for Time Period, BREEZEHILL AVE (Northbound/Southbound), SOMERSET ST (Eastbound/Westbound), and Grand Total. Includes sub-totals for U-Turns and overall totals.

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



Transportation Services - Traffic Services

Work Order 35301

Turning Movement Count - Pedestrian Volume Report

BREEZEHILL AVE @ SOMERSET ST

Count Date: Thursday, August 13, 2015

Start Time: 07:00

Table with columns for Time Period, NB Approach, SB Approach, Total, EB Approach, WB Approach, Grand Total. Shows pedestrian volume data for various time intervals.

Comment:



Transportation Services - Traffic Services

Work Order
35301

Turning Movement Count - Full Study Summary Report

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

Total Observed U-Turns

AADT Factor

Northbound: 0	Southbound: 0	.90
Eastbound: 4	Westbound: 2	

Full Study

Period	BREEZEHILL AVE									SOMERSET ST									Grand Total
	Northbound			Southbound			Eastbound			Westbound			STR TOT	WB TOT	STR TOT	WB TOT			
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT					EB TOT	LT	
07:00 08:00	6	0	15	21	0	0	0	0	21	0	171	13	184	10	145	0	155	339	360
08:00 09:00	13	0	24	37	0	0	0	0	37	0	275	17	292	15	188	0	203	495	532
09:00 10:00	16	0	22	38	0	0	0	0	38	0	260	25	285	14	254	0	268	553	591
11:30 12:30	25	0	25	50	0	0	0	0	50	0	309	17	326	25	293	0	318	644	694
12:30 13:30	16	0	15	31	0	0	0	0	31	0	265	26	291	15	288	0	303	594	625
15:00 16:00	25	0	18	43	0	0	0	0	43	0	250	15	265	16	331	0	347	612	655
16:00 17:00	13	0	19	32	0	0	0	0	32	0	311	21	332	22	422	0	444	776	808
17:00 18:00	18	0	17	35	0	0	0	0	35	0	296	13	309	19	408	0	427	736	771
Sub Total	132	0	155	287	0	0	0	0	287	0	2137	147	2284	136	2329	0	2465	4749	5036
U Turns				0				0	0				4				2	6	6
Total	132	0	155	287	0	0	0	0	287	0	2137	147	2288	136	2329	0	2467	4755	5042
EQ 12Hr	183	0	215	399	0	0	0	0	399	0	2970	204	3180	189	3237	0	3429	6609	7008
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.																	1.39		
AVG 12Hr	165	0	194	359	0	0	0	0	359	0	2673	184	2862	170	2914	0	3086	5948	6307
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																	.90		
AVG 24Hr	216	0	254	470	0	0	0	0	470	0	3502	241	3750	223	3817	0	4043	7793	8263
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																	1.31		

Comments:

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



Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

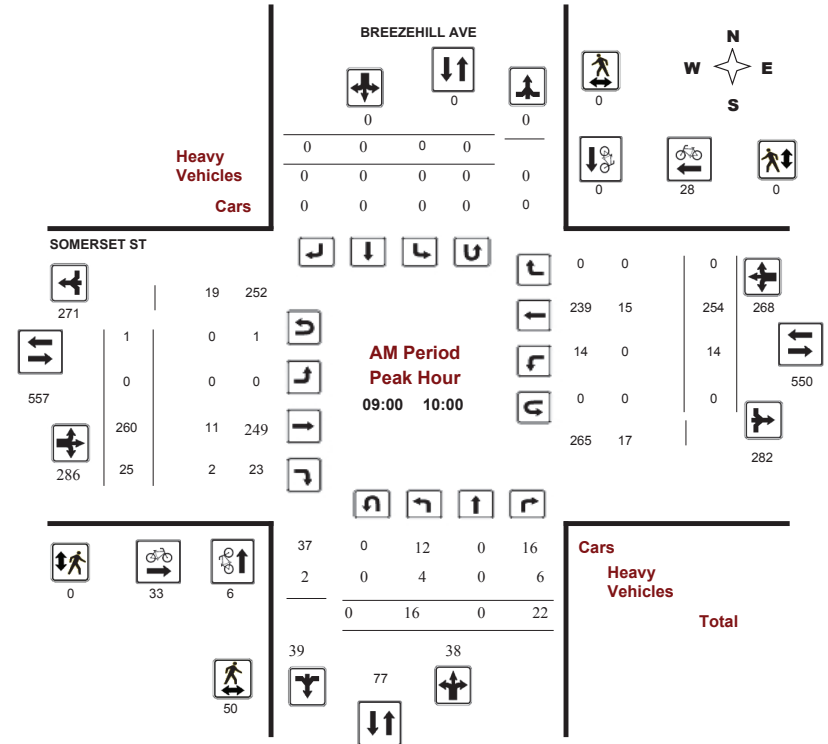
BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

WO No: 35301

Start Time: 07:00

Device: Miovision





Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

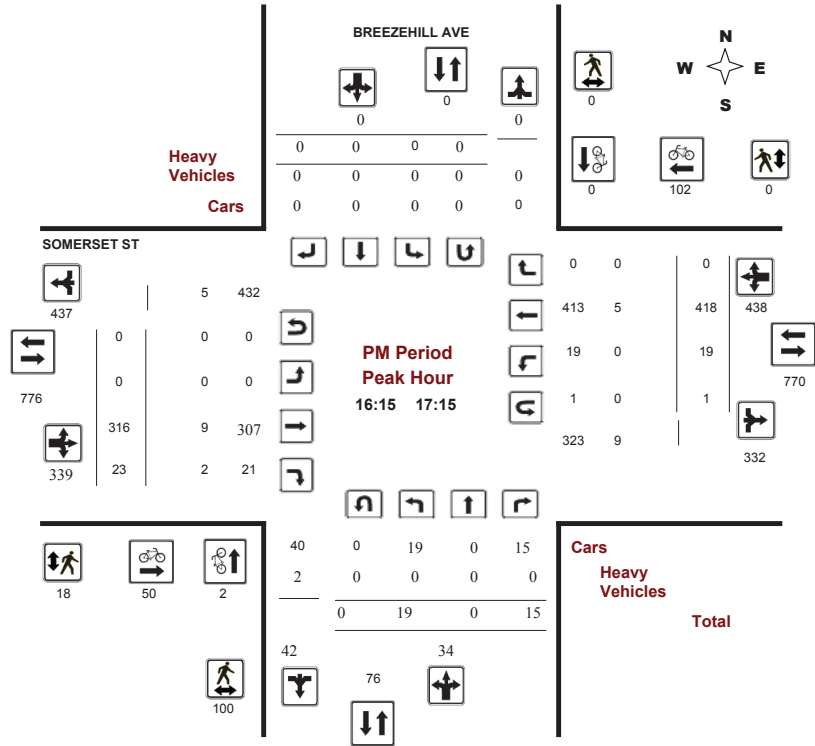
BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

Start Time: 07:00

WO No: 35301

Device: Miovision



Comments



Transportation Services - Traffic Services

Work Order 35301

Turning Movement Count - 15 Min U-Turn Total Report

BREEZEHILL AVE @ SOMERSET ST

Survey Date: Thursday, August 13, 2015

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	1	0	1
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	1	0	1
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	1	0	1
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	1	1
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	1	1
17:30 - 17:45	0	0	1	0	1
17:45 - 18:00	0	0	0	0	0
Total	0	0	4	2	6



Turning Movement Count - 15 Minute Summary Report

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0
Eastbound: 1 Westbound: 0

PRESTON ST

GLADSTONE AVE

Time Period	Northbound			Southbound			Eastbound			Westbound			W TOT	STR TOT	Grand Total				
	LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT				E TOT	LT	ST	RT
07:00 07:15	12	66	16	94	12	82	2	96	190	4	25	10	39	10	27	19	56	95	285
07:15 07:30	3	78	19	100	14	104	3	121	221	2	24	8	34	10	23	12	45	79	300
07:30 07:45	13	85	15	113	10	70	4	84	197	3	29	13	45	8	25	12	45	90	287
07:45 08:00	13	95	15	123	17	90	7	114	237	11	32	10	53	13	24	14	51	104	341
08:00 08:15	12	99	17	128	19	85	3	107	235	7	39	16	62	13	28	21	62	124	359
08:15 08:30	14	100	27	141	18	91	10	119	260	9	56	19	84	17	40	17	74	158	418
08:30 08:45	9	120	21	150	20	91	3	114	264	5	52	14	71	6	49	14	69	140	404
08:45 09:00	10	94	16	120	16	78	0	94	214	10	50	13	73	12	41	16	69	142	356
09:00 09:15	13	81	20	114	21	108	10	139	253	5	27	13	45	12	35	17	64	109	362
09:15 09:30	19	61	18	98	23	94	8	125	223	8	27	12	47	12	40	21	73	120	343
09:30 09:45	14	79	17	110	24	84	11	119	229	9	25	10	45	21	26	15	62	107	336
09:45 10:00	9	73	19	101	16	75	3	94	195	4	30	11	45	11	38	17	66	111	306
11:30 11:45	8	70	20	98	20	63	4	87	185	5	24	14	43	29	22	20	71	114	299
11:45 12:00	9	67	23	99	15	89	13	117	216	2	38	12	52	27	53	27	107	159	375
12:00 12:15	13	79	21	113	11	84	11	106	219	5	35	13	53	30	41	28	99	152	371
12:15 12:30	11	89	25	125	16	67	5	88	213	5	35	14	54	22	44	29	95	149	362
12:30 12:45	7	53	19	79	18	97	11	126	205	6	33	13	52	21	34	27	82	134	339
12:45 13:00	16	63	27	106	21	77	4	102	208	8	32	19	59	22	44	25	91	150	358
13:00 13:15	13	89	19	121	14	83	9	106	227	9	40	19	68	24	44	21	89	157	384
13:15 13:30	12	73	22	107	29	75	8	112	219	10	35	11	56	21	41	21	83	139	358
15:00 15:15	15	84	29	128	8	95	8	111	239	5	39	26	70	24	62	27	113	183	422
15:15 15:30	21	118	24	163	17	97	9	123	286	6	40	11	57	16	64	15	95	152	438
15:30 15:45	12	98	16	126	13	73	10	96	222	5	39	14	58	26	92	20	138	196	418
15:45 16:00	13	108	16	137	12	86	6	104	241	10	48	14	72	19	96	15	130	202	443
16:00 16:15	27	118	19	164	15	83	9	107	271	4	40	8	52	22	97	14	133	185	456
16:15 16:30	14	104	22	140	12	95	10	117	257	3	48	11	62	18	107	20	145	207	464
16:30 16:45	16	83	29	128	9	86	8	103	231	6	51	13	70	24	101	20	145	215	446
16:45 17:00	22	92	23	137	15	103	10	128	265	3	43	6	52	18	114	24	156	208	473
17:00 17:15	24	95	27	146	16	80	21	117	263	8	45	8	61	20	117	13	150	211	474
17:15 17:30	12	79	24	115	7	85	8	100	215	1	40	9	50	24	100	20	144	194	409
17:30 17:45	13	86	31	130	15	71	7	93	223	8	48	8	64	26	85	25	136	200	423
17:45 18:00	13	84	12	109	6	94	11	111	220	8	45	12	65	27	78	20	125	190	410
TOTAL:	432	2763	668	3863	499	2735	246	3480	7343	194	1214	404	1813	605	1832	626	3063	4876	12219

Note: U-Turns are included in Totals.

Comment:



GLADSTONE AVE @ PRESTON ST

Count Date: Tuesday, June 20, 2017

Start Time: 07:00

PRESTON ST

GLADSTONE AVE

Time Period	PRESTON ST			GLADSTONE AVE			Grand Total
	Northbound	Southbound	Street Total	Eastbound	Westbound	Street Total	
07:00 08:00	0	8	8	19	14	33	41
08:00 09:00	10	14	24	47	25	72	96
09:00 10:00	7	8	15	15	21	36	51
11:30 12:30	5	9	14	10	8	18	32
12:30 13:30	8	10	18	4	14	18	36
15:00 16:00	8	8	16	17	15	32	48
16:00 17:00	11	13	24	20	42	62	86
17:00 18:00	7	8	15	27	38	65	80
Total	56	78	134	159	177	336	470

Comment:

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

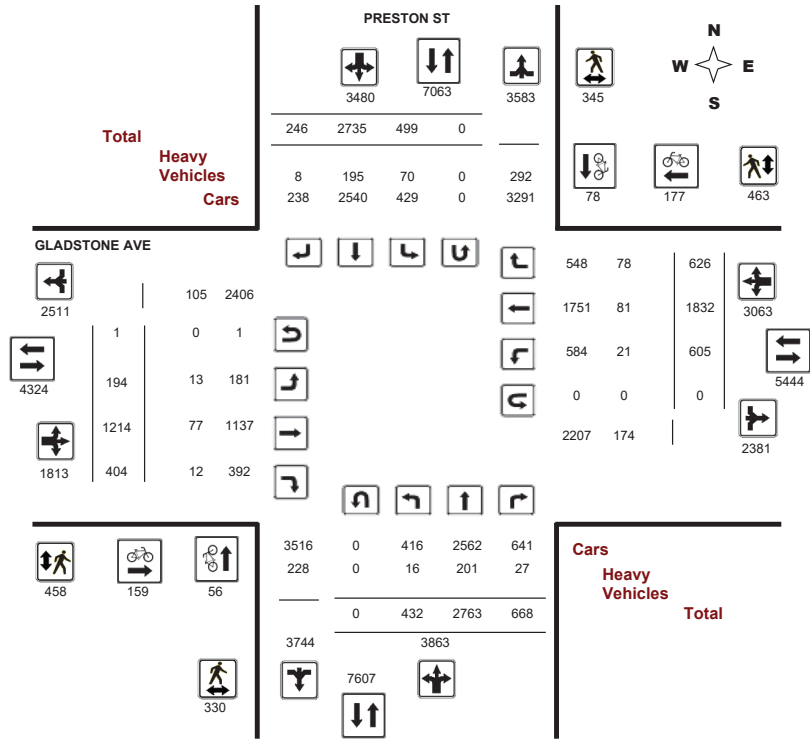


Transportation Services - Traffic Services
Turning Movement Count - Full Study Diagram

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

WO#: 37132
 Device: Miovision



Comments



Transportation Services - Traffic Services

W.O.
37132

Turning Movement Count - Heavy Vehicle Report

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

Time Period	PRESTON ST								GLADSTONE AVE								W TOT	STR TOT	Grand Total	
	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
07:00	08:00	1	26	5	32	13	22	1	36	68	2	12	1	15	0	9	5	14	29	97
08:00	09:00	1	28	5	34	11	26	0	37	71	4	10	3	17	4	12	10	26	43	114
09:00	10:00	4	33	5	42	12	40	0	52	94	2	12	4	18	3	13	12	28	46	140
11:30	12:30	1	25	2	28	6	29	4	39	67	1	9	1	11	3	9	14	26	37	104
12:30	13:30	5	27	2	34	15	22	0	37	71	1	10	2	13	7	11	11	29	42	113
15:00	16:00	3	27	4	34	3	24	3	30	64	3	6	1	10	3	12	8	23	33	97
16:00	17:00	1	21	3	25	7	18	0	25	50	0	11	0	11	0	9	11	20	31	81
17:00	18:00	0	14	1	15	3	14	0	17	32	0	7	0	7	1	6	7	14	21	53
Sub Total		16	201	27	244	70	195	8	273	517	13	77	12	102	21	81	78	180	282	799
U-Turns (Heavy Vehicles)		0			0				0	0				0				0	0	0
Total		16	201	27	244	70	195	8	273	517	13	77	12	102	21	81	78	180	282	799

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.



Transportation Services - Traffic Services

Work Order
37132

Turning Movement Count - Pedestrian Volume Report

GLADSTONE AVE @ PRESTON ST

Count Date: Tuesday, June 20, 2017

Start Time: 07:00

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	1	3	4	1	3	4	8
07:15 07:30	7	5	12	3	4	7	19
07:30 07:45	7	10	17	8	12	20	37
07:45 08:00	19	6	25	12	14	26	51
07:00 08:00	34	24	58	24	33	57	115
08:00 08:15	10	7	17	9	16	25	42
08:15 08:30	8	9	17	4	15	19	36
08:30 08:45	26	22	48	21	40	61	109
08:45 09:00	13	16	29	10	23	33	62
08:00 09:00	57	54	111	44	94	138	249
09:00 09:15	12	6	18	3	9	12	30
09:15 09:30	8	6	14	5	14	19	33
09:30 09:45	4	9	13	9	3	12	25
09:45 10:00	9	10	19	10	12	22	41
09:00 10:00	33	31	64	27	38	65	129
11:30 11:45	9	4	13	8	14	22	35
11:45 12:00	8	9	17	11	9	20	37
12:00 12:15	14	13	27	18	13	31	58
12:15 12:30	14	9	23	27	8	35	58
11:30 12:30	45	35	80	64	44	108	188
12:30 12:45	10	9	19	16	20	36	55
12:45 13:00	8	8	16	13	16	29	45
13:00 13:15	6	11	17	20	14	34	51
13:15 13:30	4	6	10	12	12	24	34
12:30 13:30	28	34	62	61	62	123	185
15:00 15:15	6	7	13	16	14	30	43
15:15 15:30	9	11	20	10	19	29	49
15:30 15:45	10	5	15	17	11	28	43
15:45 16:00	21	11	32	11	13	24	56
15:00 16:00	46	34	80	54	57	111	191
16:00 16:15	8	14	22	22	14	36	58
16:15 16:30	10	15	25	20	16	36	61
16:30 16:45	10	16	26	33	22	55	81
16:45 17:00	16	12	28	28	12	40	68
16:00 17:00	44	57	101	103	64	167	268
17:00 17:15	15	16	31	23	18	41	72
17:15 17:30	13	17	30	18	22	40	70
17:30 17:45	9	18	27	13	8	21	48
17:45 18:00	6	25	31	27	23	50	81
17:00 18:00	43	76	119	81	71	152	271
Total	330	345	675	458	463	921	1596

Comment:



Transportation Services - Traffic Services

Work Order
37132

Turning Movement Count - Full Study Summary Report

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

Total Observed U-Turns

AADT Factor

Northbound: 0	Southbound: 0	.90
Eastbound: 1	Westbound: 0	

Full Study

Period	PRESTON ST								GLADSTONE AVE								STR TOT	Grand Total	
	Northbound				Southbound				Eastbound				Westbound						
	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT			WB TOT
07:00 08:00	41	324	65	430	53	346	16	415	845	20	110	41	171	41	99	57	197	368	1213
08:00 09:00	45	413	81	539	73	345	16	434	973	31	197	62	290	48	158	68	274	564	1537
09:00 10:00	55	294	74	423	84	361	32	477	900	26	109	46	181	56	139	70	265	446	1346
11:30 12:30	41	305	89	435	62	303	33	398	833	17	132	53	202	108	160	104	372	574	1407
12:30 13:30	48	278	87	413	82	332	32	446	859	33	140	62	235	88	163	94	345	580	1439
15:00 16:00	61	408	85	554	50	351	33	434	988	26	166	65	257	85	314	77	476	733	1721
16:00 17:00	79	397	93	569	51	367	37	455	1024	16	182	38	236	82	419	78	579	815	1839
17:00 18:00	62	344	94	500	44	330	47	421	921	25	178	37	240	97	380	78	555	795	1716
Sub Total	432	2763	668	3863	499	2735	246	3480	7343	194	1214	404	1812	605	1832	626	3063	4875	12218
U Turns	0								1								0	1	1
Total	432	2763	668	3863	499	2735	246	3480	7343	194	1214	404	1813	605	1832	626	3063	4876	12219
EQ 12Hr	600	3841	929	5370	694	3802	342	4837	10207	270	1687	562	2520	841	2546	870	4258	6778	16985
Note:	These values are calculated by multiplying the totals by the appropriate expansion factor.																1.39		
AVG 12Hr	540	3457	836	4833	624	3421	308	4353	9186	243	1519	505	2268	757	2292	783	3832	6100	15286
Note:	These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.																.90		
AVG 24Hr	708	4528	1095	6331	818	4482	403	5703	12034	318	1990	662	2971	991	3002	1026	5020	7991	20025
Note:	These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.																1.31		

Comments:

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



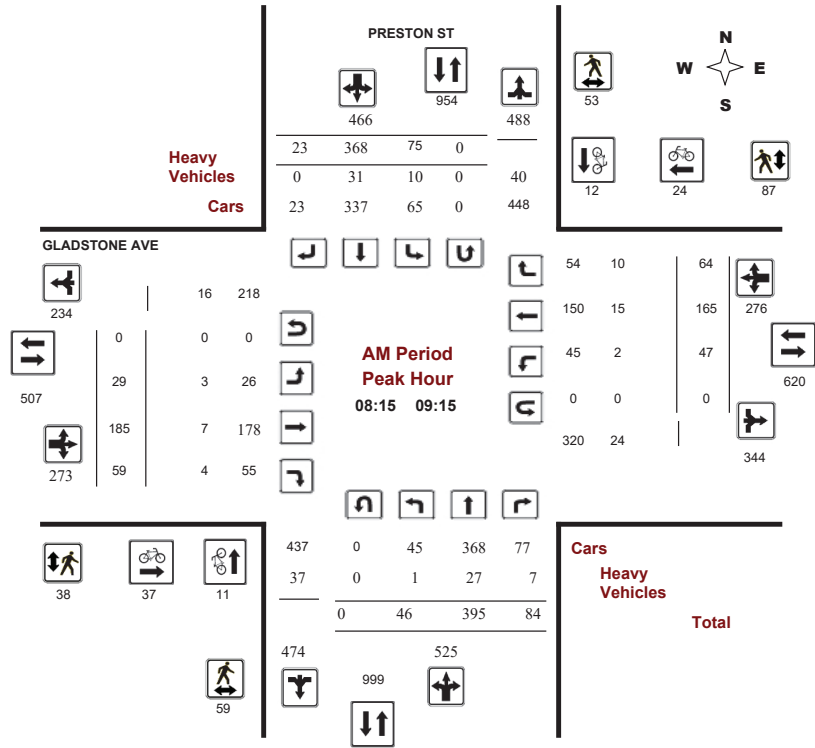
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017
Start Time: 07:00

WO No: 37132
Device: Miovision



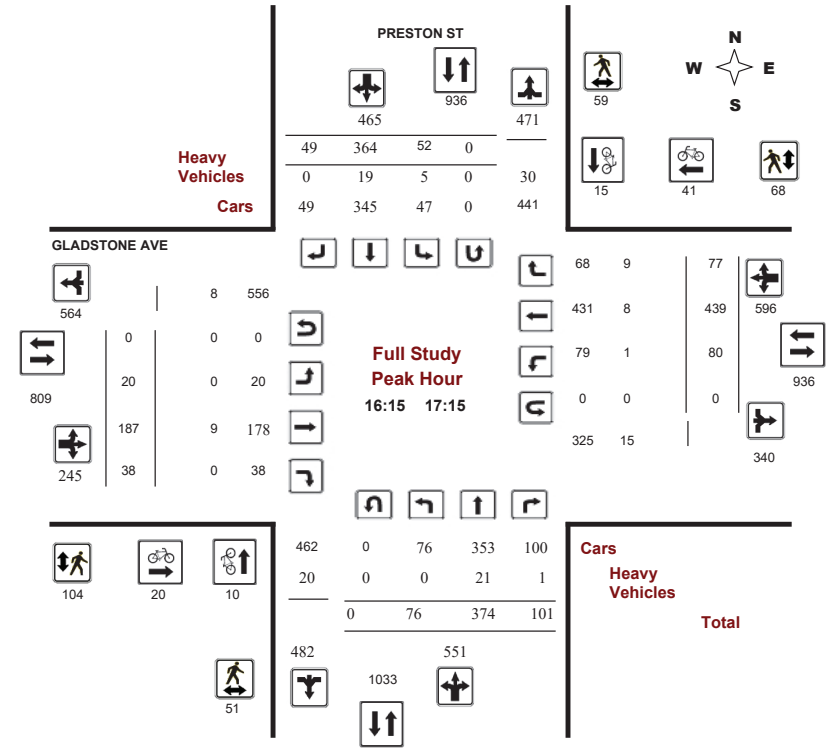
Transportation Services - Traffic Services

Turning Movement Count - Peak Hour Diagram

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017
Start Time: 07:00

WO No: 37132
Device: Miovision





Transportation Services - Traffic Services

Work Order
37132

Turning Movement Count - 15 Min U-Turn Total Report

GLADSTONE AVE @ PRESTON ST

Survey Date: Tuesday, June 20, 2017

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	1	0	1
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	1	0	1

Appendix C

Existing Synchro Worksheets

DRAFT

Lanes, Volumes, Timings
1: Preston & Gladstone

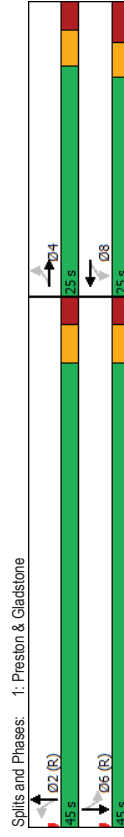
11-12-2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	299	185	59	47	165	64	45	368	77	75	368	23
Future Volume (vph)	299	185	59	47	165	64	45	368	77	75	368	23
Satd. Flow (prot)	0	1635	0	1621	1634	0	1621	1662	0	1621	1691	0
Flt Permitted	0.626		0.543			0.457					0.409	
Satd. Flow (perm)	0	1052	0	926	1634	0	780	1662	0	698	1691	0
Satd. Flow (RTOR)	9			27			25				7	
Lane Group Flow (vph)	0	604	0	52	254	0	50	495	0	83	435	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases	4	4		8	8		2	2		6	6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.5	21.5	22.5	22.5	22.5	23.7	23.7	23.7	23.7	23.7	23.7	23.7
Total Split (s)	25.0	25.0	25.0	25.0	25.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Total Split (%)	35.7%	35.7%	35.7%	35.7%	35.7%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%	64.3%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	3.5	3.5	3.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	6.5	6.5	6.5	5.7	5.7	5.7	5.7	5.7	5.7	5.7
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	C	A	B	A	B	A	B
Act Effct Green (s)	19.5	18.5	18.5	18.5	18.5	39.3	39.3	39.3	39.3	39.3	39.3	39.3
Actuated G/C Ratio	0.28	0.26	0.26	0.26	0.26	0.56	0.56	0.56	0.56	0.56	0.56	0.56
v/c Ratio	2.02	2.01	2.01	2.01	2.01	1.11	1.11	1.11	1.11	1.11	1.11	1.11
Control Delay	491.6	491.6	229	255	255	8.1	11.5	11.5	9.4	10.8	10.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	491.6	491.6	229	255	255	8.1	11.5	11.5	9.4	10.8	10.8	10.8
LOS	F	F	C	C	C	A	B	A	B	A	B	B
Approach Delay	491.6	491.6	250	250	250	11.2	11.2	11.2	10.6	10.6	10.6	10.6
Approach LOS	F	F	C	C	C	B	B	B	B	B	B	B
Queue Length 50th (m)	~118.1	4.9	23.4	2.6	31.8	4.5	27.5	4.5	27.5	4.5	27.5	27.5
Queue Length 95th (m)	#171.3	12.5	43.0	6.8	53.0	10.9	45.5	10.9	45.5	10.9	45.5	45.5
Internal Link Dist (m)	118.4		126.7		144.2		119.4					
Turn Bay Length (m)			36.0		18.0		27.0					
Base Capacity (vph)	299	244	451	437	944	391	952	391	952	391	952	952
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.02	2.02	0.21	0.56	0.11	0.52	0.21	0.52	0.21	0.46	0.46	0.46
Intersection Summary												
Cycle Length: 70												
Actuated Cycle Length: 70												
Offset: 37 (53%), Referenced to phase 2:NBLT and 6:SBTL, Start of Green												
Natural Cycle: 80												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings
1: Preston & Gladstone

11-12-2018

Maximum v/c Ratio: 2.02	Intersection LOS: F
Intersection Signal Delay: 160.3	ICU Level of Service F
Intersection Capacity Utilization 98.0%	
Analysis Period (min) 15	
~ Volume exceeds capacity, queue is theoretically infinite.	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	



Splits and Phases: 1: Preston & Gladstone

Lanes, Volumes, Timings
2: Bayswater & Gladstone

11-12-2018

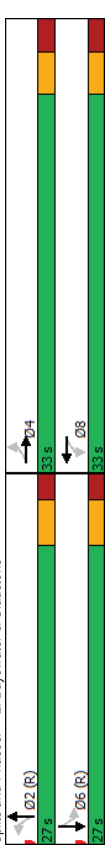
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	23	112	16	14	105	35	19	106	22	50	124	37
Traffic Volume (vph)	23	112	16	14	105	35	19	106	22	50	124	37
Future Volume (vph)	0	1669	0	0	1645	0	0	1662	0	0	1645	0
Satd. Flow (prot)	0.923			0.963			0.956				0.908	
Flt Permitted	0	1552	0	0	1592	0	0	1598	0	0	1512	0
Satd. Flow (RTOR)	13			32			16				20	
Lane Group Flow (vph)	0	168	0	0	172	0	0	163	0	0	235	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases	4	4		8	8		2	2		6	6	
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Minimum Split (s)	21.5	21.5	21.5	21.5	21.5	20.3	20.3	20.3	20.3	20.3	20.3	20.3
Total Split (s)	33.0	33.0	33.0	33.0	33.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Total Split (%)	55.0%	55.0%	55.0%	55.0%	55.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	3.3	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	2.5	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.5	5.5	5.5	5.5	5.5	5.3	5.3	5.3	5.3	5.3	5.3	5.3
Lead/Lag Optimize?												
Recall Mode	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max	C-Max
Act Effct Green (s)	12.2	12.2	12.2	12.2	12.2	12.2	41.2	41.2	41.2	41.2	41.2	41.2
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.69	0.69	0.69	0.69	0.69	0.69
v/c Ratio	0.52	0.49	0.49	0.49	0.49	0.15	0.15	0.23	0.23	0.23	0.23	0.23
Control Delay	25.0	25.0	21.7	21.7	21.7	5.4	5.4	5.8	5.8	5.8	5.8	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	25.0	21.7	21.7	21.7	5.4	5.4	5.8	5.8	5.8	5.8	5.8
LOS	C	C	C	C	C	A	A	A	A	A	A	A
Approach Delay	25.0	25.0	21.7	21.7	21.7	5.4	5.4	5.8	5.8	5.8	5.8	5.8
Approach LOS	C	C	C	C	C	A	A	A	A	A	A	A
Queue Length 50th (m)	14.3	12.8	12.8	12.8	12.8	5.1	5.1	7.9	7.9	7.9	7.9	7.9
Queue Length 95th (m)	25.9	24.3	24.3	24.3	24.3	13.6	13.6	20.0	20.0	20.0	20.0	20.0
Internal Link Dist (m)	86.5	86.5	86.5	86.5	86.5	86.5	86.5	86.6	86.6	86.6	86.6	86.6
Turn Bay Length (m)												
Base Capacity (vph)	718	747	747	747	747	1102	1102	1044	1044	1044	1044	1044
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.23	0.23	0.23	0.23	0.15	0.15	0.23	0.23	0.23	0.23	0.23

Intersection Summary	
Cycle Length:	60
Actuated Cycle Length:	60
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	45
Control Type:	Actuated-Coordinated

Lanes, Volumes, Timings
2: Bayswater & Gladstone

11-12-2018

Maximum v/c Ratio:	0.52
Intersection Signal Delay:	13.8
Intersection Capacity Utilization:	43.2%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service A	



Lanes, Volumes, Timings
1: Preston & Gladstone

11-12-2018

Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 25.8
 Intersection LOS: C
 ICU Level of Service D
 Intersection Capacity Utilization 80.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



Lanes, Volumes, Timings
2: Bayswater & Gladstone

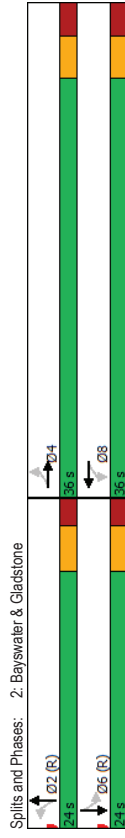
11-12-2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	100	18	74	267	114	29	192	28	35	206	34
Future Volume (vph)	30	100	18	74	267	114	29	182	28	35	206	34
Satd. Flow (prot)	0	1662	0	0	1635	0	0	1669	0	0	1667	0
Flt/Permitted	0.874			0.918				0.937			0.935	
Satd. Flow (perm)	0	1467	0	0	1513	0	0	1573	0	0	1568	0
Satd. Flow (RTOR)	17			41				12			12	
Lane Group Flow (vph)	0	164	0	0	506	0	0	265	0	0	306	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4			8			2			6		
Detector Phase	4	4		8	8	8	2	2		6	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	21.5	21.5		21.5	21.5	20.3	20.3	20.3		20.3	20.3	
Total Split (s)	36.0	36.0		36.0	36.0	24.0	24.0	24.0		24.0	24.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%	40.0%	40.0%	40.0%		40.0%	40.0%	
Yellow Time (s)	3.0	3.0		3.0	3.0	3.3	3.3	3.3		3.3	3.3	
All-Red Time (s)	2.5	2.5		2.5	2.5	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	5.5	5.5		5.5	5.5	5.3	5.3	5.3		5.3	5.3	
Lead/Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None		C-Max	C-Max	
Act Effct Green (s)	24.0			24.0		24.0		25.2		25.2		25.2
Actuated g/C Ratio	0.40			0.40		0.40		0.42		0.42		0.42
v/c Ratio	0.27			0.80		0.80		0.40		0.46		0.46
Control Delay	10.5			24.3		24.3		15.9		16.9		16.9
Queue Delay	0.0			0.0		0.0		0.0		0.0		0.0
Total Delay	10.5			24.3		24.3		15.9		16.9		16.9
LOS	B			C		C		B		B		B
Approach Delay	10.5			24.3		24.3		15.9		16.9		16.9
Approach LOS	B			C		C		B		B		B
Queue Length 50th (m)	9.3			38.9		38.9		17.4		21.0		21.0
Queue Length 95th (m)	15.6			57.4		57.4		38.7		45.6		45.6
Internal Link Dist (m)	86.5			86.5		86.5		86.5		86.5		86.5
Turn Bay Length (m)												
Base Capacity (vph)	754			789		789		667		664		664
Starvation Cap Reductn	0			0		0		0		0		0
Spillback Cap Reductn	0			0		0		0		0		0
Storage Cap Reductn	0			0		0		0		0		0
Reduced v/c Ratio	0.22			0.64		0.64		0.40		0.46		0.46
Intersection Summary												
Cycle Length: 60												
Actuated Cycle Length: 60												
Offset: 53 (88%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green												
Natural Cycle: 50												
Control Type: Actuated-Coordinated												

Lanes, Volumes, Timings
2: Bayswater & Gladstone

11-12-2018

Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 18.8
 Intersection Capacity Utilization 63.3%
 Analysis Period (min) 15



HCM 2010 TWSC

3: Breezehill & Somersset

11-12-2018

Intersection	EBT	EBR	WBL	WBR	NBL	NBR																																																																																			
Int Delay, s/veh	0.8																																																																																								
Movement	EBT	EBR	WBL	WBR	NBL	NBR																																																																																			
Lane Configurations	<table border="0"> <tr> <td>316</td><td>23</td><td>19</td><td>418</td><td>19</td><td>15</td> </tr> <tr> <td>Traffic Vol, veh/h</td> <td>316</td><td>23</td><td>19</td><td>418</td><td>19</td><td>15</td> </tr> <tr> <td>Future Vol, veh/h</td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> </tr> <tr> <td>Conflicting Peds, #/hr</td> <td>Free</td><td>Free</td><td>Free</td><td>Free</td><td>Stop</td><td>Stop</td> </tr> <tr> <td>Sign Control</td> <td>- None</td><td>- None</td><td>- None</td><td>- None</td><td>- None</td><td>- None</td> </tr> <tr> <td>RT Channelized</td> <td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td> </tr> <tr> <td>Storage Length</td> <td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td> </tr> <tr> <td>Veh in Median Storage, #</td> <td>0</td><td>-</td><td>-</td><td>0</td><td>0</td><td>-</td> </tr> <tr> <td>Grade, %</td> <td>0</td><td>-</td><td>-</td><td>0</td><td>0</td><td>-</td> </tr> <tr> <td>Peak Hour Factor</td> <td>90</td><td>90</td><td>90</td><td>90</td><td>90</td><td>90</td> </tr> <tr> <td>Heavy Vehicles, %</td> <td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td> </tr> <tr> <td>Mvmt Flow</td> <td>351</td><td>26</td><td>21</td><td>464</td><td>21</td><td>17</td> </tr> </table>						316	23	19	418	19	15	Traffic Vol, veh/h	316	23	19	418	19	15	Future Vol, veh/h	0	0	0	0	0	0	Conflicting Peds, #/hr	Free	Free	Free	Free	Stop	Stop	Sign Control	- None	- None	- None	- None	- None	- None	RT Channelized	-	-	-	-	-	-	Storage Length	-	-	-	-	-	-	Veh in Median Storage, #	0	-	-	0	0	-	Grade, %	0	-	-	0	0	-	Peak Hour Factor	90	90	90	90	90	90	Heavy Vehicles, %	2	2	2	2	2	2	Mvmt Flow	351	26	21	464	21	17
316	23	19	418	19	15																																																																																				
Traffic Vol, veh/h	316	23	19	418	19	15																																																																																			
Future Vol, veh/h	0	0	0	0	0	0																																																																																			
Conflicting Peds, #/hr	Free	Free	Free	Free	Stop	Stop																																																																																			
Sign Control	- None	- None	- None	- None	- None	- None																																																																																			
RT Channelized	-	-	-	-	-	-																																																																																			
Storage Length	-	-	-	-	-	-																																																																																			
Veh in Median Storage, #	0	-	-	0	0	-																																																																																			
Grade, %	0	-	-	0	0	-																																																																																			
Peak Hour Factor	90	90	90	90	90	90																																																																																			
Heavy Vehicles, %	2	2	2	2	2	2																																																																																			
Mvmt Flow	351	26	21	464	21	17																																																																																			
Major/Minor	Major1	Major2	Minor1																																																																																						
Conflicting Flow All	0	0	377	0	870	364																																																																																			
Stage 1	-	-	-	-	364	-																																																																																			
Stage 2	-	-	-	-	506	-																																																																																			
Critical Hdwy	-	-	4.12	-	6.42	6.22																																																																																			
Critical Hdwy Stg 1	-	-	-	-	5.42	-																																																																																			
Critical Hdwy Stg 2	-	-	-	-	5.42	-																																																																																			
Follow-up Hdwy	-	2.218	-	3.518	3.318	-																																																																																			
Pot Cap-1 Maneuver	-	1181	-	322	681	-																																																																																			
Stage 1	-	-	-	-	703	-																																																																																			
Stage 2	-	-	-	-	606	-																																																																																			
Platoon blocked, %	-	-	-	-	-	-																																																																																			
Mov Cap-1 Maneuver	-	1181	-	314	681	-																																																																																			
Mov Cap-2 Maneuver	-	-	-	314	-	-																																																																																			
Stage 1	-	-	-	703	-	-																																																																																			
Stage 2	-	-	-	591	-	-																																																																																			
Approach	EB	WB	WB	NB																																																																																					
HCM Control Delay, s	0	0.4	0.4	14.6																																																																																					
HCM LOS	B																																																																																								
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT	WBT																																																																																			
Capacity (veh/h)	412	-	-	1181	-	-																																																																																			
HCM Lane V/C Ratio	0.092	-	-	0.018	-	-																																																																																			
HCM Control Delay (s)	14.6	-	-	8.1	0	0																																																																																			
HCM Lane LOS	B	-	-	A	A	A																																																																																			
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-	-																																																																																			

Appendix D

Collision Data

DRAFT

Appendix E

TDM Checklist

DRAFT

TDM Measures Checklist:
Non-Residential Developments (office, institutional, retail or industrial)

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: <i>Non-residential developments</i>		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	<input checked="" type="checkbox"/>
1.2 Travel surveys		
BETTER	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>
2.2 Bicycle skills training		
<i>Commuter travel</i>		
BETTER ★	2.2.1 Offer on-site cycling courses for commuters, or subsidize off-site courses	<input type="checkbox"/>
2.3 Valet bike parking		
<i>Visitor travel</i>		
BETTER	2.3.1 Offer secure valet bike parking during public events when demand exceeds fixed supply (e.g. for festivals, concerts, games)	<input type="checkbox"/>

TDM measures: *Non-residential developments*

TDM measures: <i>Non-residential developments</i>		Check if proposed & add descriptions
3. TRANSIT		
3.1 Transit information		
BASIC	3.1.1 Display relevant transit schedules and route maps at entrances	<input checked="" type="checkbox"/>
BASIC	3.1.2 Provide online links to OC Transpo and STO information	<input checked="" type="checkbox"/>
BETTER	3.1.3 Provide real-time arrival information display at entrances	<input checked="" type="checkbox"/>
3.2 Transit fare incentives		
<i>Commuter travel</i>		
BETTER	3.2.1 Offer preloaded PRESTO cards to encourage commuters to use transit	<input checked="" type="checkbox"/>
BETTER ★	3.2.2 Subsidize or reimburse monthly transit pass purchases by employees	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.2.3 Arrange inclusion of same-day transit fare in price of tickets (e.g. for festivals, concerts, games)	<input type="checkbox"/>
3.3 Enhanced public transit service		
<i>Commuter travel</i>		
BETTER	3.3.1 Contract with OC Transpo to provide enhanced transit services (e.g. for shift changes, weekends)	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.3.2 Contract with OC Transpo to provide enhanced transit services (e.g. for festivals, concerts, games)	<input type="checkbox"/>
3.4 Private transit service		
<i>Commuter travel</i>		
BETTER	3.4.1 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for shift changes, weekends)	<input type="checkbox"/>
<i>Visitor travel</i>		
BETTER	3.4.2 Provide shuttle service when OC Transpo cannot offer sufficient quality or capacity to serve demand (e.g. for festivals, concerts, games)	<input type="checkbox"/>

TDM measures: Non-residential developments		Check if proposed & add descriptions
4. RIDESHARING		
4.1 Ridematching service		
<i>Commuter travel</i>		
BASIC	4.1.1 Provide a dedicated ridematching portal at OttawaRideMatch.com	<input type="checkbox"/>
4.2 Carpool parking price incentives		
<i>Commuter travel</i>		
BETTER	4.2.1 Provide discounts on parking costs for registered carpools	<input checked="" type="checkbox"/>
4.3 Vanpool service		
<i>Commuter travel</i>		
BETTER	4.3.1 Provide a vanpooling service for long-distance commuters	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Bikeshare stations & memberships		
BETTER	5.1.1 Contract with provider to install on-site bikeshare station for use by commuters and visitors	<input checked="" type="checkbox"/>
<i>Commuter travel</i>		
BETTER	5.1.2 Provide employees with bikeshare memberships for local business travel	<input type="checkbox"/>
5.2 Carshare vehicles & memberships		
<i>Commuter travel</i>		
BETTER	5.2.1 Contract with provider to install on-site carshare vehicles and promote their use by tenants	<input checked="" type="checkbox"/>
BETTER	5.2.2 Provide employees with carshare memberships for local business travel	<input type="checkbox"/>
6. PARKING		
6.1 Priced parking		
<i>Commuter travel</i>		
BASIC	6.1.1 Charge for long-term parking (daily, weekly, monthly)	<input type="checkbox"/>
BASIC	6.1.2 Unbundle parking cost from lease rates at multi-tenant sites	<input checked="" type="checkbox"/>
<i>Visitor travel</i>		
BETTER	6.1.3 Charge for short-term parking (hourly)	<input type="checkbox"/>

TDM measures: Non-residential developments		Check if proposed & add descriptions
7. TDM MARKETING & COMMUNICATIONS		
7.1 Multimodal travel information		
<i>Commuter travel</i>		
BASIC	7.1.1 Provide a multimodal travel option information package to new/relocating employees and students	<input checked="" type="checkbox"/>
<i>Visitor travel</i>		
BETTER	7.1.2 Include multimodal travel option information in invitations or advertising that attract visitors or customers (e.g. for festivals, concerts, games)	<input type="checkbox"/>
7.2 Personalized trip planning		
<i>Commuter travel</i>		
BETTER	7.2.1 Offer personalized trip planning to new/relocating employees	<input type="checkbox"/>
7.3 Promotions		
<i>Commuter travel</i>		
BETTER	7.3.1 Deliver promotions and incentives to maintain awareness, build understanding, and encourage trial of sustainable modes	<input type="checkbox"/>
8. OTHER INCENTIVES & AMENITIES		
8.1 Emergency ride home		
<i>Commuter travel</i>		
BETTER	8.1.1 Provide emergency ride home service to non-driving commuters	<input type="checkbox"/>
8.2 Alternative work arrangements		
<i>Commuter travel</i>		
BASIC	8.2.1 Encourage flexible work hours	<input type="checkbox"/>
BETTER	8.2.2 Encourage compressed workweeks	<input type="checkbox"/>
BETTER	8.2.3 Encourage telework	<input type="checkbox"/>
8.3 Local business travel options		
<i>Commuter travel</i>		
BASIC	8.3.1 Provide local business travel options that minimize the need for employees to bring a personal car to work	<input type="checkbox"/>
8.4 Commuter incentives		
<i>Commuter travel</i>		
BETTER	8.4.1 Offer employees a taxable, mode-neutral commuting allowance	<input type="checkbox"/>
8.5 On-site amenities		
<i>Commuter travel</i>		
BETTER	8.5.1 Provide on-site amenities/services to minimize mid-day or mid-commute errands	<input type="checkbox"/>

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	<input type="checkbox"/>
1.2 Travel surveys		
BETTER	1.2.1 Conduct periodic surveys to identify travel-related behaviours, attitudes, challenges and solutions, and to track progress	<input type="checkbox"/>
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 (<i>multi-family, condominium</i>)	<input checked="" type="checkbox"/>
2.2 Bicycle skills training		
BETTER	2.2.1 Offer on-site cycling courses for residents, or subsidize off-site courses	<input type="checkbox"/>

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 (<i>multi-family, condominium</i>)	<input checked="" type="checkbox"/>
BETTER	3.1.2 Provide real-time arrival information display at entrances (<i>multi-family, condominium</i>)	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>
BETTER	3.2.2 Offer at least one year of free monthly transit passes on residence purchase/move-in	<input type="checkbox"/>
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 (<i>subdivision</i>)	<input type="checkbox"/>
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)	<input type="checkbox"/>
4. CARSHARING & BIKESHARING		
4.1 Bikeshare stations & memberships		
BETTER	4.1.1 Contract with provider to install on-site bikeshare station (<i>multi-family</i>)	<input checked="" type="checkbox"/>
BETTER	4.1.2 Provide residents with bikeshare memberships, either free or subsidized (<i>multi-family</i>)	<input type="checkbox"/>
4.2 Carshare vehicles & memberships		
BETTER	4.2.1 Contract with provider to install on-site carshare vehicles and promote their use by residents	<input type="checkbox"/>
BETTER	4.2.2 Provide residents with carshare memberships, either free or subsidized	<input type="checkbox"/>
5. PARKING		
5.1 Priced parking		
BASIC ★	5.1.1 Unbundle parking cost from purchase price (<i>condominium</i>)	<input checked="" type="checkbox"/>
BASIC ★	5.1.2 Unbundle parking cost from monthly rent (<i>multi-family</i>)	<input checked="" type="checkbox"/>

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 package to new residents	<input type="checkbox"/>
6.2 Personalized trip planning		
BETTER ★	6.2.1 Offer personalized trip planning to new residents	<input type="checkbox"/>

TDM-Supportive Development Design and Infrastructure Checklist: Non-Residential Developments (office, institutional, retail or industrial)

Legend

REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
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

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	<input checked="" type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see Official Plan policy 4.3.3)	<input checked="" type="checkbox"/>
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings; between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see Official Plan policy 4.3.12)	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see <i>Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see <i>Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see <i>Official Plan policy 4.3.11</i>)	<input checked="" type="checkbox"/>
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	<input checked="" type="checkbox"/>
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input checked="" type="checkbox"/>
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	<input checked="" type="checkbox"/>
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	<input checked="" type="checkbox"/>
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions; that no more than 50% of spaces are vertical spaces; and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met), plus the expected peak number of customer/visitor cyclists	<input type="checkbox"/>
BETTER	2.1.5 Provide bicycle parking spaces equivalent to the expected number of commuter and customer/visitor cyclists, plus an additional buffer (e.g. 25 percent extra) to encourage other cyclists and ensure adequate capacity in peak cycling season	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single office building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to the expected number of commuter cyclists (assuming the cycling mode share target is met)	<input type="checkbox"/>
2.3 Shower & change facilities		
BASIC	2.3.1 Provide shower and change facilities for the use of active commuters	<input checked="" type="checkbox"/>
BETTER	2.3.2 In addition to shower and change facilities, provide dedicated lockers, grooming stations, drying racks and laundry facilities for the use of active commuters	<input checked="" type="checkbox"/>
2.4 Bicycle repair station		
BETTER	2.4.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input type="checkbox"/>

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input checked="" type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input checked="" type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input checked="" type="checkbox"/>
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input checked="" type="checkbox"/>
4.2 Carpool parking		
BASIC	4.2.1 Provide signed parking spaces for carpools in a priority location close to a major building entrance, sufficient in number to accommodate the mode share target for carpools	<input type="checkbox"/>
BETTER	4.2.2 At large developments, provide spaces for carpools in a separate, access-controlled parking area to simplify enforcement	<input type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide carshare parking spaces in permitted non-residential zones, occupying either required or provided parking spaces (see <i>Zoning By-law Section 94</i>)	<input type="checkbox"/>
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: Non-residential developments		Check if completed & add descriptions, explanations or plan/drawing references
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input checked="" type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i>)	<input checked="" type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see <i>Zoning By-law Section 111</i>)	<input type="checkbox"/>
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Separate short-term and long-term parking areas using signage or physical barriers, to permit access controls and simplify enforcement (i.e. to discourage employees from parking in visitor spaces, and vice versa)	<input type="checkbox"/>
7. OTHER		
7.1 On-site amenities to minimize off-site trips		
BETTER	7.1.1 Provide on-site amenities to minimize mid-day or mid-commute errands	<input type="checkbox"/>

**TDM-Supportive Development Design and Infrastructure Checklist:
Residential Developments (multi-family or condominium)**

Legend	
REQUIRED	The Official Plan or Zoning By-law provides related guidance that must be followed
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

TDM-supportive design & infrastructure measures: Residential developments		Check if completed & add descriptions, explanations or plan/drawing references
1. WALKING & CYCLING: ROUTES		
1.1 Building location & access points		
BASIC	1.1.1 Locate building close to the street, and do not locate parking areas between the street and building entrances	<input checked="" type="checkbox"/>
BASIC	1.1.2 Locate building entrances in order to minimize walking distances to sidewalks and transit stops/stations	<input checked="" type="checkbox"/>
BASIC	1.1.3 Locate building doors and windows to ensure visibility of pedestrians from the building, for their security and comfort	<input checked="" type="checkbox"/>
1.2 Facilities for walking & cycling		
REQUIRED	1.2.1 Provide convenient, direct access to stations or major stops along rapid transit routes within 600 metres; minimize walking distances from buildings to rapid transit; provide pedestrian-friendly, weather-protected (where possible) environment between rapid transit accesses and building entrances; ensure quality linkages from sidewalks through building entrances to integrated stops/stations (see <i>Official Plan policy 4.3.3</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.2 Provide safe, direct and attractive pedestrian access from public sidewalks to building entrances through such measures as: reducing distances between public sidewalks and major building entrances; providing walkways from public streets to major building entrances; within a site, providing walkways along the front of adjoining buildings, between adjacent buildings, and connecting areas where people may congregate, such as courtyards and transit stops; and providing weather protection through canopies, colonnades, and other design elements wherever possible (see <i>Official Plan policy 4.3.12</i>)	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: Residential developments		Check if completed & add descriptions, explanations or plan/drawing references
REQUIRED	1.2.3 Provide sidewalks of smooth, well-drained walking surfaces of contrasting materials or treatments to differentiate pedestrian areas from vehicle areas, and provide marked pedestrian crosswalks at intersection sidewalks (see <i>Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.4 Make sidewalks and open space areas easily accessible through features such as gradual grade transition, depressed curbs at street corners and convenient access to extra-wide parking spaces and ramps (see <i>Official Plan policy 4.3.10</i>)	<input checked="" type="checkbox"/>
REQUIRED	1.2.5 Include adequately spaced inter-block/street cycling and pedestrian connections to facilitate travel by active transportation. Provide links to the existing or planned network of public sidewalks, multi-use pathways and on-road cycle routes. Where public sidewalks and multi-use pathways intersect with roads, consider providing traffic control devices to give priority to cyclists and pedestrians (see <i>Official Plan policy 4.3.11</i>)	<input checked="" type="checkbox"/>
BASIC	1.2.6 Provide safe, direct and attractive walking routes from building entrances to nearby transit stops	<input checked="" type="checkbox"/>
BASIC	1.2.7 Ensure that walking routes to transit stops are secure, visible, lighted, shaded and wind-protected wherever possible	<input checked="" type="checkbox"/>
BASIC	1.2.8 Design roads used for access or circulation by cyclists using a target operating speed of no more than 30 km/h, or provide a separated cycling facility	<input checked="" type="checkbox"/>
1.3 Amenities for walking & cycling		
BASIC	1.3.1 Provide lighting, landscaping and benches along walking and cycling routes between building entrances and streets, sidewalks and trails	<input checked="" type="checkbox"/>
BASIC	1.3.2 Provide wayfinding signage for site access (where required, e.g. when multiple buildings or entrances exist) and egress (where warranted, such as when directions to reach transit stops/stations, trails or other common destinations are not obvious)	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
2. WALKING & CYCLING: END-OF-TRIP FACILITIES		
2.1 Bicycle parking		
REQUIRED	2.1.1 Provide bicycle parking in highly visible and lighted areas, sheltered from the weather wherever possible (see <i>Official Plan policy 4.3.6</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.2 Provide the number of bicycle parking spaces specified for various land uses in different parts of Ottawa; provide convenient access to main entrances or well-used areas (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
REQUIRED	2.1.3 Ensure that bicycle parking spaces and access aisles meet minimum dimensions, that no more than 50% of spaces are vertical spaces, and that parking racks are securely anchored (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BASIC	2.1.4 Provide bicycle parking spaces equivalent to the expected number of resident-owned bicycles, plus the expected peak number of visitor cyclists	<input type="checkbox"/>
2.2 Secure bicycle parking		
REQUIRED	2.2.1 Where more than 50 bicycle parking spaces are provided for a single residential building, locate at least 25% of spaces within a building/structure, a secure area (e.g. supervised parking lot or enclosure) or bicycle lockers (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
BETTER	2.2.2 Provide secure bicycle parking spaces equivalent to at least the number of units at condominiums or multi-family residential developments	<input checked="" type="checkbox"/>
2.3 Bicycle repair station		
BETTER	2.3.1 Provide a permanent bike repair station, with commonly used tools and an air pump, adjacent to the main bicycle parking area (or secure bicycle parking area, if provided)	<input checked="" type="checkbox"/>
3. TRANSIT		
3.1 Customer amenities		
BASIC	3.1.1 Provide shelters, lighting and benches at any on-site transit stops	<input checked="" type="checkbox"/>
BASIC	3.1.2 Where the site abuts an off-site transit stop and insufficient space exists for a transit shelter in the public right-of-way, protect land for a shelter and/or install a shelter	<input checked="" type="checkbox"/>
BETTER	3.1.3 Provide a secure and comfortable interior waiting area by integrating any on-site transit stops into the building	<input checked="" type="checkbox"/>

TDM-supportive design & infrastructure measures: <i>Residential developments</i>		Check if completed & add descriptions, explanations or plan/drawing references
4. RIDESHARING		
4.1 Pick-up & drop-off facilities		
BASIC	4.1.1 Provide a designated area for carpool drivers (plus taxis and ride-hailing services) to drop off or pick up passengers without using fire lanes or other no-stopping zones	<input checked="" type="checkbox"/>
5. CARSHARING & BIKESHARING		
5.1 Carshare parking spaces		
BETTER	5.1.1 Provide up to three carshare parking spaces in an R3, R4 or RS Zone for specified residential uses (see <i>Zoning By-law Section 94</i>)	<input type="checkbox"/>
5.2 Bikeshare station location		
BETTER	5.2.1 Provide a designated bikeshare station area near a major building entrance, preferably lighted and sheltered with a direct walkway connection	<input checked="" type="checkbox"/>
6. PARKING		
6.1 Number of parking spaces		
REQUIRED	6.1.1 Do not provide more parking than permitted by zoning, nor less than required by zoning, unless a variance is being applied for	<input type="checkbox"/>
BASIC	6.1.2 Provide parking for long-term and short-term users that is consistent with mode share targets, considering the potential for visitors to use off-site public parking	<input checked="" type="checkbox"/>
BASIC	6.1.3 Where a site features more than one use, provide shared parking and reduce the cumulative number of parking spaces accordingly (see <i>Zoning By-law Section 104</i>)	<input checked="" type="checkbox"/>
BETTER	6.1.4 Reduce the minimum number of parking spaces required by zoning by one space for each 13 square metres of gross floor area provided as shower rooms, change rooms, locker rooms and other facilities for cyclists in conjunction with bicycle parking (see <i>Zoning By-law Section 111</i>)	<input checked="" type="checkbox"/>
6.2 Separate long-term & short-term parking areas		
BETTER	6.2.1 Provide separate areas for short-term and long-term parking (using signage or physical barriers) to permit access controls and simplify enforcement (i.e. to discourage residents from parking in visitor spaces, and vice versa)	<input checked="" type="checkbox"/>

Appendix F

TAC Signal Warrant

DRAFT

City of Ottawa Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	Somerset St W	Direction (EW or NS)	EW	Road Authority:	City of Ottawa
Side Street (name)	Breezhill Ave	Direction (EW or NS)	NS	City:	City of Ottawa
Quadrant / Int #		Comments	Enter Comments about the analysis here.	Analysis Date:	
CHECK SHEET				Count Date:	
press 'CHECK SHEET' button to calculate results				Date Entry Format:	(yyyy-mm-dd)

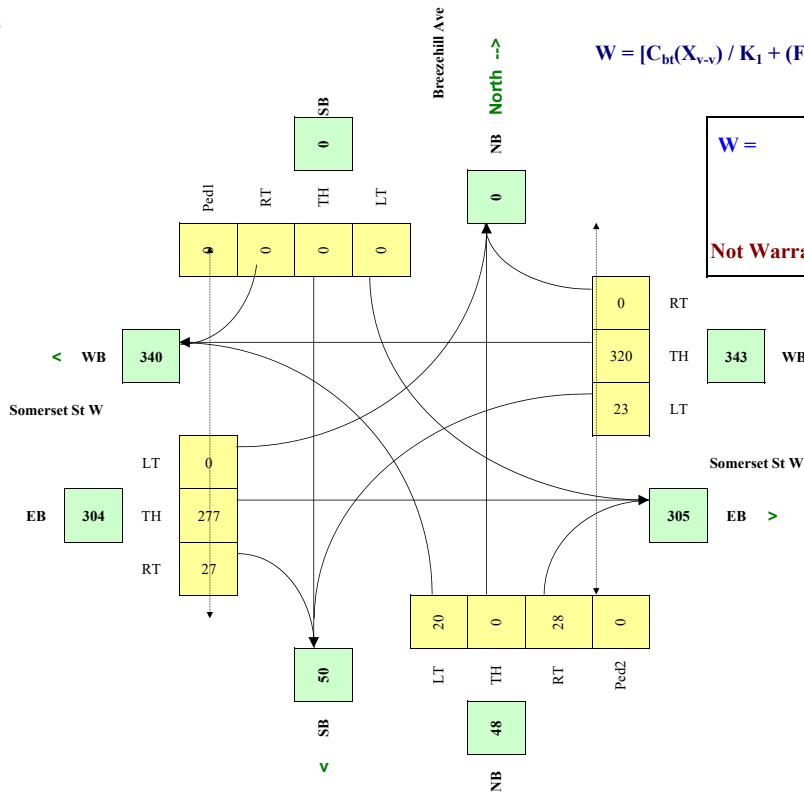
Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Somerset St W	WB		1					435	1
Somerset St W	EB					1		105	1
Breezhill Ave	NB				1				
Breezhill Ave	SB								

Demographics	
Elem. School/Mobility Impaired	(y/n)
Senior's Complex	(y/n)
Pathway to School	(y/n)
Metro Area Population	(#)
Central Business District	(y/n)

Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Somerset St W	EW	50	2.0%	y	0.0
Breezhill Ave	NS		2.0%	n	

Set Peak Hours													Ped1	Ped2	Ped3	Ped4
	NB			SB			WB			EB			NS	NS	EW	EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
press 'Set Peak Hours' Button to set the peak hour periods	17	0	32	0	0	0	17	229	0	0	234	25				
	19	0	35	0	0	0	19	254	0	0	260	28				
	22	0	41	0	0	0	22	298	0	0	305	33				
	17	0	17	0	0	0	22	323	0	0	244	22				
	22	0	22	0	0	0	28	418	0	0	316	28				
	21	0	21	0	0	0	27	399	0	0	302	27				
Total (6-hour peak)	118	0	168	0	0	0	135	1,921	0	0	1,661	163	0	0	0	0
Average (6-hour peak)	20	0	28	0	0	0	23	320	0	0	277	27	0	0	0	0

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v-v}) / K_1 + (F(X_{v-p})L) / K_2] \times C_i$$

$W =$ Veh Ped Not Warranted - Vs<75

RESET SHEET

Appendix G

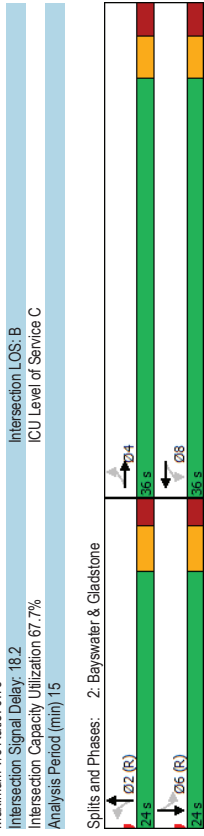
Future Total Synchro Worksheets

DRAFT

Lanes, Volumes, Timings
2: Bayswater & Gladstone

11-12-2018

Maximum v/c Ratio: 0.79
Intersection Signal Delay: 18.2
Intersection Capacity Utilization 67.7%
Analysis Period (min) 15



HCM 2010 TWSC
3: Breezehill & Somersset

11-12-2018

Intersection	1																																																																																																																																																																						
In/Delay, s/veh																																																																																																																																																																							
Movement	EBT	EBR	WBL	WBT	NBL	NBR																																																																																																																																																																	
Lane Configurations	<table border="0"> <tr> <td>EBT</td><td>EBR</td><td>WBL</td><td>WBT</td><td>NBL</td><td>NBR</td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>316</td><td>28</td><td>28</td><td>418</td><td>22</td><td>22</td> <td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Traffic Vol, veh/h</td> <td>316</td><td>28</td><td>28</td><td>418</td><td>22</td><td>22</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Future Vol, veh/h</td> <td>316</td><td>28</td><td>28</td><td>418</td><td>22</td><td>22</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Conflicting Peds, #/hr</td> <td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Sign Control</td> <td>Free</td><td>Free</td><td>Free</td><td>Free</td><td>Stop</td><td>Stop</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>RT Channelized</td> <td>-</td><td>None</td><td>-</td><td>None</td><td>-</td><td>None</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Storage Length</td> <td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>0</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Veh in Median Storage, #</td> <td>0</td><td>-</td><td>-</td><td>0</td><td>0</td><td>-</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Grade, %</td> <td>0</td><td>-</td><td>-</td><td>0</td><td>0</td><td>-</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Peak Hour Factor</td> <td>100</td><td>100</td><td>100</td><td>100</td><td>100</td><td>100</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Heavy Vehicles, %</td> <td>2</td><td>2</td><td>2</td><td>2</td><td>2</td><td>2</td> <td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Mvmt Flow</td> <td>316</td><td>28</td><td>28</td><td>418</td><td>22</td><td>22</td> <td></td><td></td><td></td><td></td><td></td> </tr> </table>											EBT	EBR	WBL	WBT	NBL	NBR							316	28	28	418	22	22							Traffic Vol, veh/h	316	28	28	418	22	22						Future Vol, veh/h	316	28	28	418	22	22						Conflicting Peds, #/hr	0	0	0	0	0	0						Sign Control	Free	Free	Free	Free	Stop	Stop						RT Channelized	-	None	-	None	-	None						Storage Length	-	-	-	-	-	0						Veh in Median Storage, #	0	-	-	0	0	-						Grade, %	0	-	-	0	0	-						Peak Hour Factor	100	100	100	100	100	100						Heavy Vehicles, %	2	2	2	2	2	2						Mvmt Flow	316	28	28	418	22	22					
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Stage 2	-	-	-	-	474	-																																																																																																																																																																	
Critical Hdwy	-	-	4.12	-	6.42	6.22																																																																																																																																																																	
Critical Hdwy Stg 1	-	-	-	-	5.42	-																																																																																																																																																																	
Critical Hdwy Stg 2	-	-	-	-	5.42	-																																																																																																																																																																	
Follow-up Hdwy	-	2.218	-	3.518	3.318	-																																																																																																																																																																	
Pot Cap-1 Maneuver	-	-	1215	-	352	712																																																																																																																																																																	
Stage 1	-	-	-	-	728	-																																																																																																																																																																	
Stage 2	-	-	-	-	626	-																																																																																																																																																																	
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Mov Cap-1 Maneuver	-	-	1215	-	341	712																																																																																																																																																																	
Mov Cap-2 Maneuver	-	-	-	-	341	-																																																																																																																																																																	
Stage 1	-	-	-	-	728	-																																																																																																																																																																	
Stage 2	-	-	-	-	607	-																																																																																																																																																																	
Approach	EB	WB	WB	NB																																																																																																																																																																			
HCM Control Delay, s	0	0.5	0.5	13.6																																																																																																																																																																			
HCM LOS					B																																																																																																																																																																		
Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT																																																																																																																																																																		
Capacity (veh/h)	461	-	-	1215	-																																																																																																																																																																		
HCM Lane V/C Ratio	0.095	-	-	0.023	-																																																																																																																																																																		
HCM Control Delay (s)	13.6	-	-	8	0																																																																																																																																																																		
HCM Lane LOS	B	-	-	A	A																																																																																																																																																																		
HCM 95th %tile Q(veh)	0.3	-	-	0.1	-																																																																																																																																																																		