November 13th, 2024 **JDE** Project 18088

Lanarose Midland Ltd.
28 Sandiford Dr., Ste. 201,
Stouffville, ON L4A 1L8

RE: 1191 Harbourview Drive – Traffic Impact Study Addendum
Site Plan Revisions

JD Northcote Engineering Inc. [JD Engineering] has been retained by **Kaitlin Corporation** [the Developer] to prepare an addendum to the Traffic Impact Study (dated March 2020) [TIS] completed for the proposed development of 1191 Harbourview Drive in the Town of Midland [Town], County of Simcoe [County].

The TIS reviewed a plan for the proposed development that consisted of a hotel (117 rooms) with a restaurant (100 seats) and retail space (863 sq.ft. of GFA) [2020 Site Plan]. The proposed development has been revised to include 416 condominium units, a hotel (88 rooms) and retail space (1,143 sq.ft. of GFA) [2024 Site Plan] (site plan provided in the **Appendix**).

The 2024 Site Plan includes a single right-in right-out [RIRO] driveway onto Harbourview Drive [North Access] and a single full-movement driveway onto Marina Park Avenue [South Access], which is consistent with the 2020 Site Plan.

This addendum letter is intended to update the TIS and review the impact of the revised layout in the study area. The study area, scope and analysis periods reviewed are unchanged from the TIS.

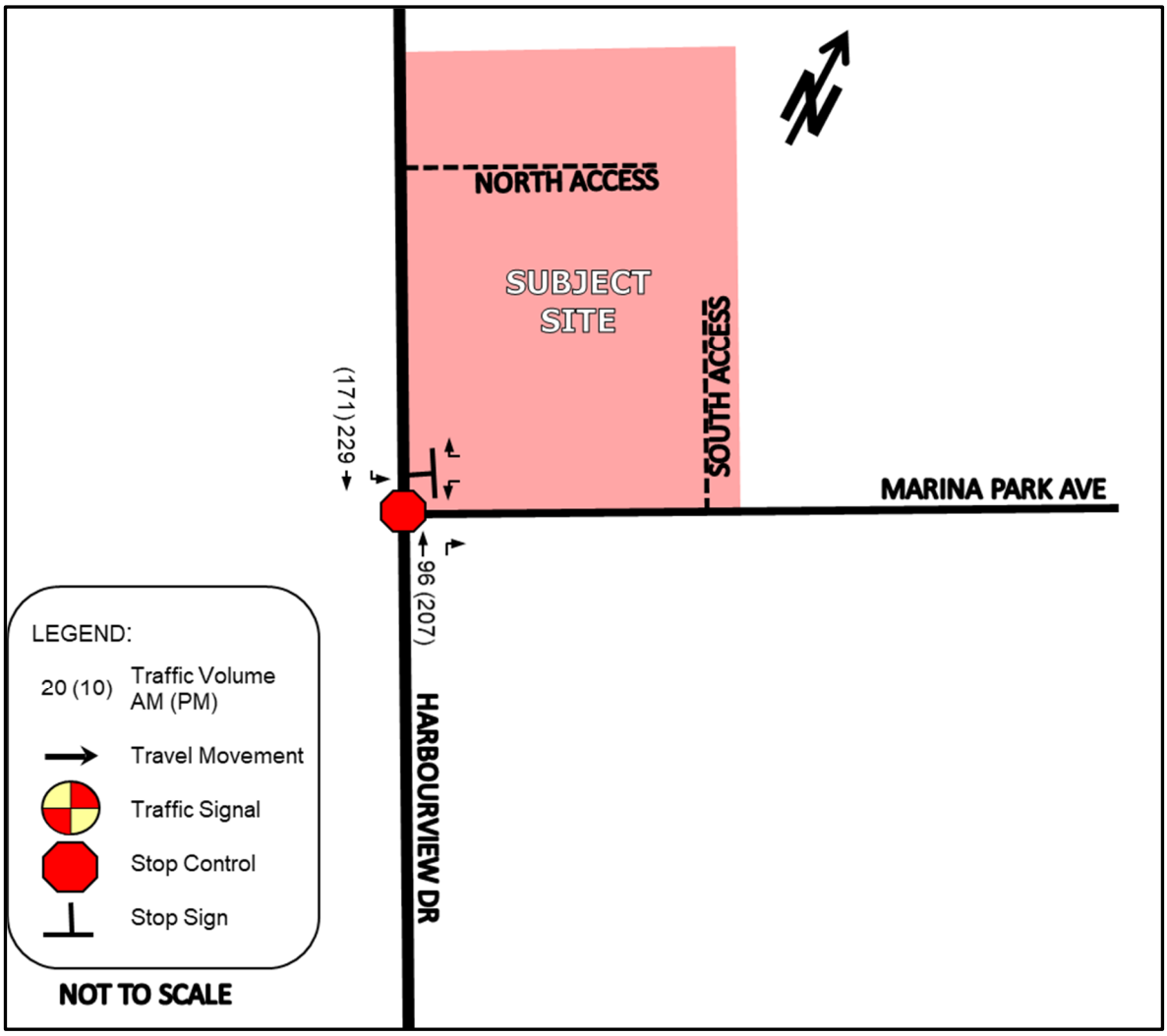
1.0 OTHER DEVELOPMENTS WITHING STUDY AREA

The adjacent development assumptions used in the TIS have been applied in this analysis.

Figure 1[1] illustrates the traffic assignment during the AM and PM peak hour for all the adjacent developments (2024 & 2029) within the study area.

[1] Obtained from Figure 10 in the TIS (excerpts provided in the **Appendix**).

Figure 1 – Total Adjacent Development Traffic Assignment (2024 & 2029)



2.0 EXISTING (2019) AND BACKGROUND (2024 & 2029) TRAFFIC VOLUMES

The existing (2019) traffic volumes was obtained from Figure 12 in the TIS (excerpts provided in the **Appendix**). As noted in the TIS, the existing traffic volumes have been adjusted to reflect the traffic in the summer months, including the operation of the existing Bay Port Yachting Centre. **Figure 2** illustrates the existing (2019) AM and PM peak hour traffic volumes in the study area, adjusted to reflect typical summer traffic conditions.

The background (2024 & 2029) traffic volumes were obtained from TIS Figures 13 and 14, respectively (excerpts provided in the **Appendix**). In addition to the adjacent development traffic volumes (outlined in Section 1.0), the background traffic growth rate discussed in Section 2.5 in the TIS has also been applied to the existing traffic volumes to estimate the background (2024 & 2029) horizon year traffic volumes.

Figures 3 and **4** illustrate the background (2024 & 2029) AM and PM peak hour traffic volumes in the study area respectively.

Figure 2 – Existing (2019) Traffic Volumes

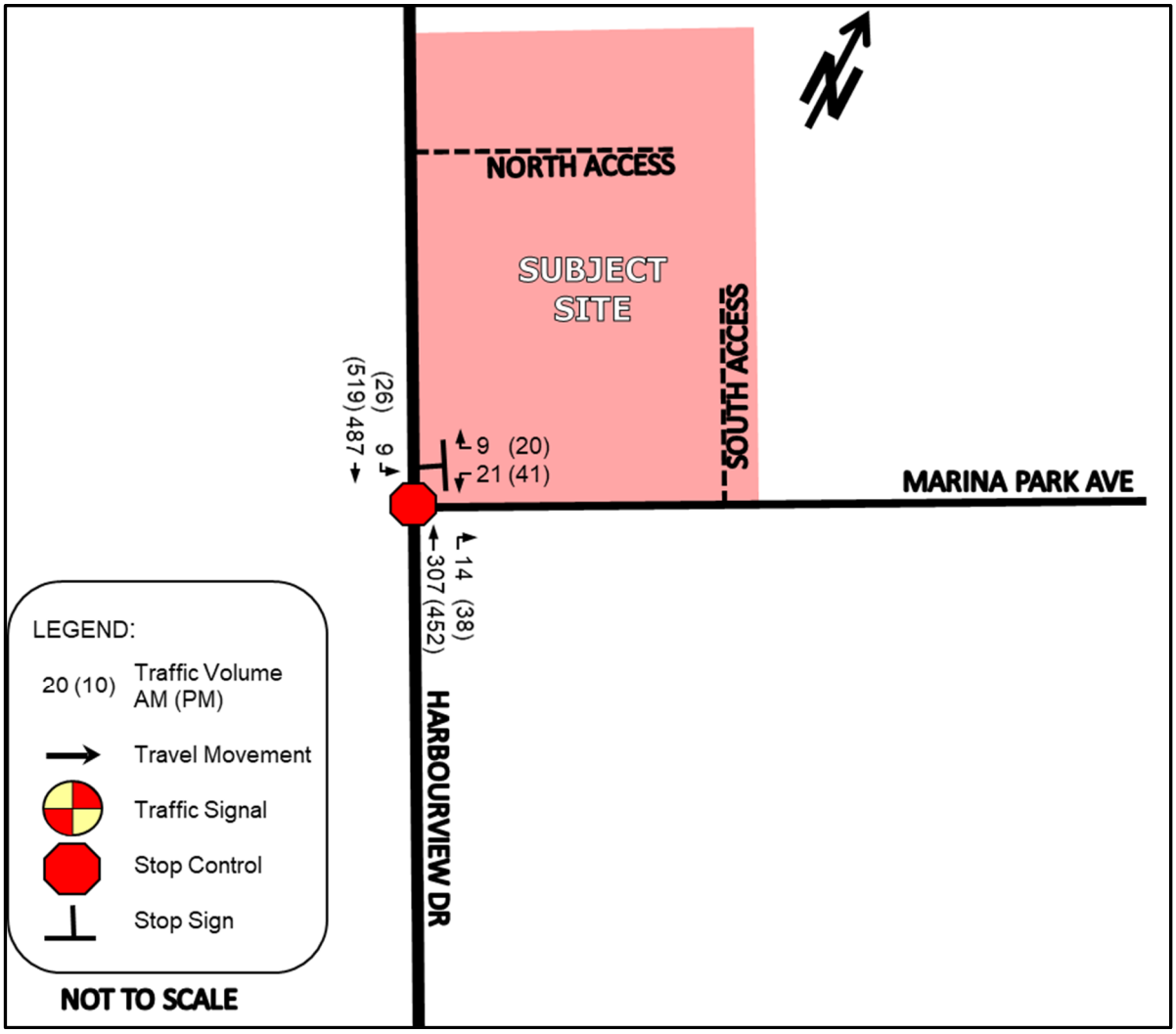


Figure 3 - Background (2024) Traffic Volumes

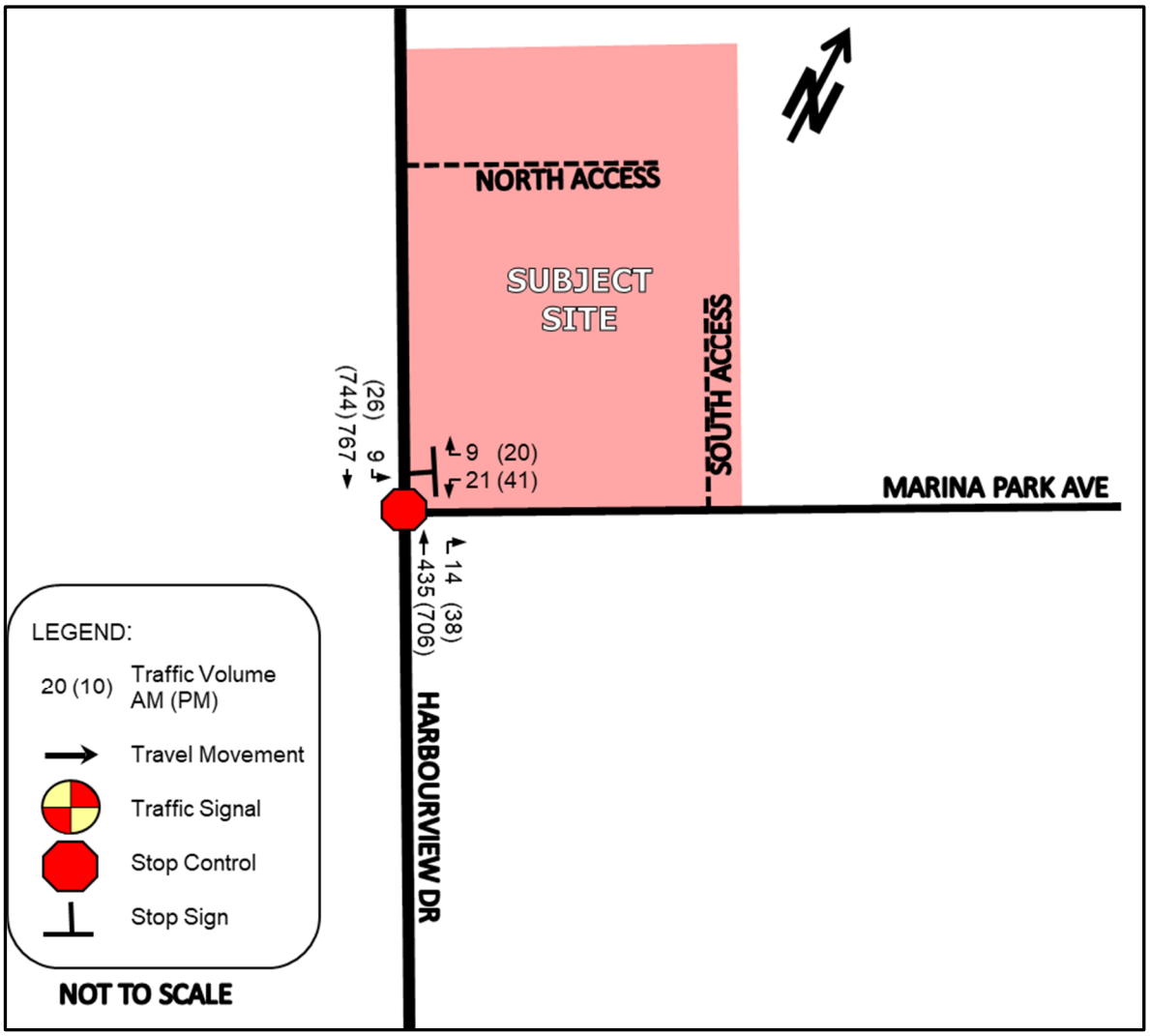
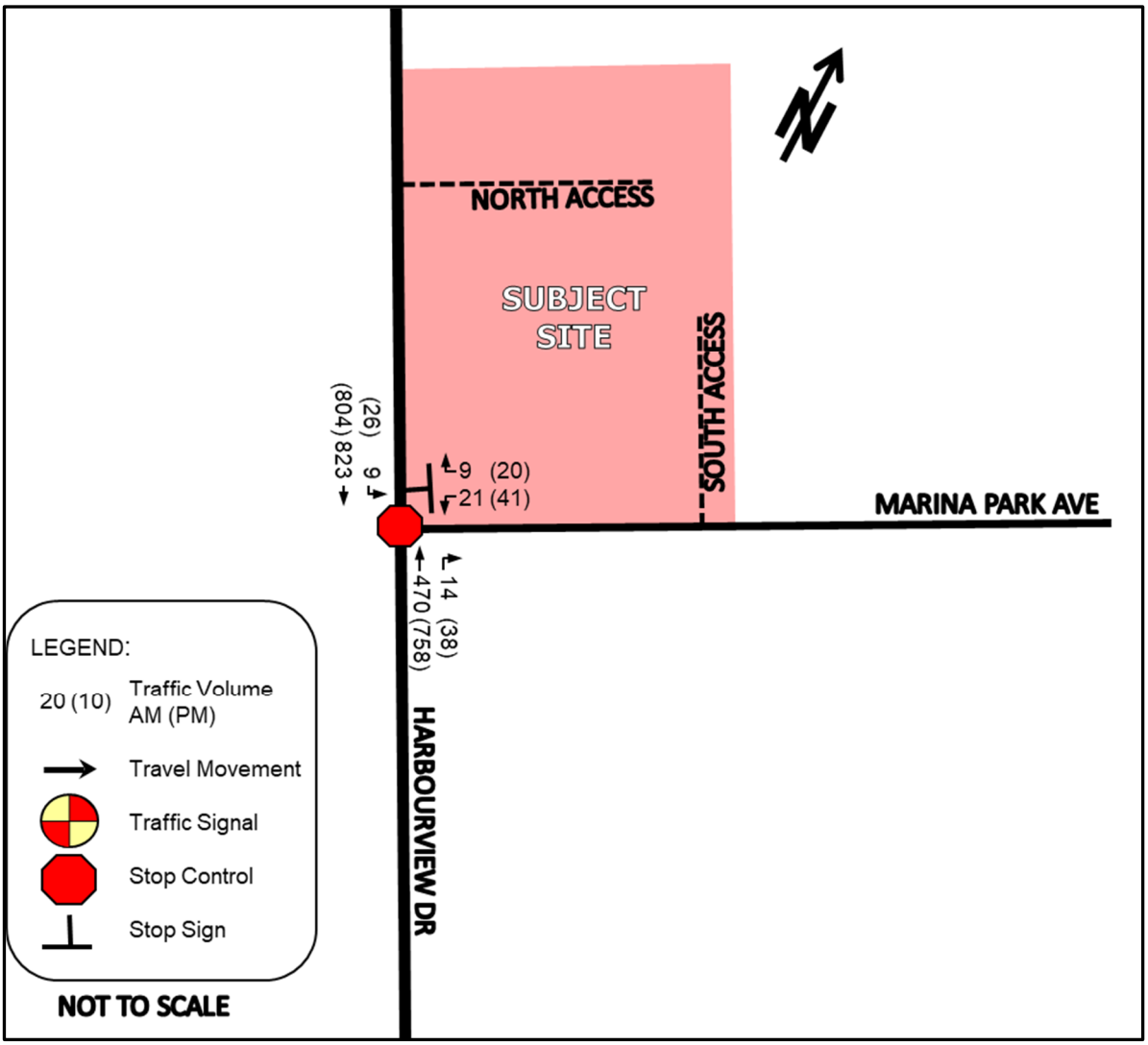


Figure 4 - Background (2029) Traffic Volumes



3.0 INTERSECTION OPERATION WITHOUT PROPOSED DEVELOPMENT

3.1 INTERSECTION CAPACITY ANALYSIS CRITERIA

Intersection performance was measured in the TIS using the traffic analysis software, Synchro 10, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analysing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America. The traffic software since the completion of the TIS has been updated to Synchro 11 and is applied in the traffic analysis in this addendum letter.

Synchro 11 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign-controlled intersections are shown in **Table 1.** A description of traffic performance characteristics is included for each LOS.

Table 1 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	**Stop Controlled Intersections**
A	Very low delay; most vehicles do not stop (**Excellent**)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (**Very Good**)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping **(Good**)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (**Satisfactory**)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of **acceptable** delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (**Unacceptable**)	greater than 80.0	greater than 50.0

3.2 Existing (2019) Intersection Operation

The results of the LOS analysis under existing (2019) traffic volumes during the AM and PM peak hours can be found below in **Table 2**. The existing intersection geometry and traffic control at the Harbourview Drive / Marina Park Avenue intersection has been utilized for this scenario. Detailed output of the Synchro analysis can be found in the **Appendix.**

Table 2 - Existing (2019) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Harbourview Drive / Marina Park Avenue (unsignalized)	-	0.7	A	-	-	-	1.6	A	-	-
WB	0.09	15.9	C	-	-	0.23	21.6	C	-	-

The results of the LOS analysis indicates that the Harbourview Drive / Marina Park Avenue intersection is operating within the typical design limits noted in Section 3.1.

There are no issues with the anticipated 95th percentile queue length in the study area.

An analysis was completed for left turn movements at the Harbourview Drive / Marina Park Avenue intersection, based on the criteria outlined in Appendix 9A of the Ontario Ministry of Transportation Design Supplement for TAC Geometric Design Guide for Canadian Roads June 2017 [MTO DS]. Based on the low volume of left turn movements, a left-turn lane is not recommended (results provided in the **Appendix**).

A review of the need for an additional auxiliary right turn lane at the Harbourview Drive / Marina Park Avenue intersection was completed as part of our analysis. Based on the volume of right turn movements, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 Signal Justification, traffic signals are not warranted at the Harbourview Drive / Marina Park Avenue intersection (results are provided in the **Appendix**).

No infrastructure improvements are recommended within the study area.

3.3 Background (2024) Intersection Operation

The results of the LOS analysis under background (2024) traffic volumes during the AM and PM peak hours can be found below in **Table 3**. Existing traffic control at the Harbourview Drive / Marina Park Avenue intersection has been utilized for the scenario.

An analysis was completed for the southbound left turn movements at the Harbourview Drive / Marina Park Avenue intersection, based on the criteria outlined in Appendix 9A of the MTO DS (results provided in the **Appendix**). The percentage of left turn movements at this intersection is relatively low (under 2%) which typically does not trigger the warrant for a left turn lane; however, based on the high volume of advancing and opposing through movements on Harbourview Drive, a southbound left turn lane is recommended. It is recommended that the southbound left turn lane include a 35 metre parallel length and an 65 metre taper length at the Harbourview Drive / North Access intersection be constructed.

Detailed output of the Synchro analysis can be found in the **Appendix.**

Table 3 - Background (2024) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Harbourview Drive / Marina Park Avenue (unsignalized)	-	0.7	A	-	-	-	2.0	A	-	-
WB	0.16	25.7	D	-	-	0.44	48.4	E	-	-

The results of the LOS analysis indicates that the Harbourview Drive / Marina Park Avenue intersection is operating within the typical design limits noted in Section 3.1.

There are no issues with the anticipated 95th percentile queue length in the study area.

A review of the need for additional auxiliary right turn lanes at the Harbourview Drive / Marina Park Avenue intersection was completed as part of our analysis. Based on the volume of right turn movements, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 Signal Justification, traffic signals are not warranted at the Harbourview Drive / Marina Park Avenue intersection (results are provided in the **Appendix**).

No further improvements are recommended within the study area.

3.4 Background (2029) Intersection Operation

The results of the LOS analysis under background (2029) traffic volumes during the AM and PM peak hours can be found below in **Table 4**. The proposed improvements noted in Section 3.3 and existing traffic control have been utilized for the scenario. Detailed output of the Synchro analysis can be found in the **Appendix**.

Table 4 - Background (2029) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Harbourview Drive / Marina Park Avenue (unsignalized)	-	0.7	A	-	-	-	2.4	A	-	-
WB	0.18	29.3	D	-	-	0.52	62.2	F	-	-

The results of the LOS analysis indicates that the westbound movement marginally exceeds the typical design limits noted in Section 3.1. Based on the Ontario Traffic Manual Book 12 Signal Justification, traffic signals are not warranted at the Harbourview Drive / Marina Park Avenue intersection (results are provided in the **Appendix**). It is recommended that the Town continue to monitor the traffic volumes at this intersection closer to 2029 as it is anticipated that traffic signals may be warranted as a result of the background traffic volume.

There are no issues with the anticipated 95th percentile queue length in the study area.

A review of the need for additional auxiliary right turn lanes at the Harbourview Drive / Marina Park Avenue intersection was completed as part of our analysis. Based on the volume of right turn movements, an auxiliary right turn lane is not recommended.

Based on the Ontario Traffic Manual Book 12 Signal Justification, traffic signals are not warranted at the Harbourview Drive / Marina Park Avenue intersection (results are provided in the **Appendix**).

No further improvements are recommended within the study area.

4.0 PROPOSED DEVELOPMENT TRAFFIC GENERATION AND ASSIGNMENT

4.1 TRAFFIC GENERATION

The traffic generation for the proposed development has been based on the Institute of Transportation Engineers [ITE] Trip Generation Manual (11th Edition) [ITE Trip Generation Manual]. It is noted, the TIS is based on the 10th Edition of the ITE Trip Generation Manual; for the purposes of this addendum letter, the traffic generation was updated the 11th Edition of the ITE Trip Generation Manual. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use 222 (Multifamily Housing (High-Rise)) – General Urban/Suburban Setting
- ITE land use 310 (Hotel) – General Urban/Suburban Setting
- ITE land use 820 (Shopping Center (> 150k)) – General Urban/Suburban Setting

The estimated trip generation for the proposed development is illustrated below in **Table 5**. The AM and PM peak traffic generation for the proposed development is not expected to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 5 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Multifamily Housing (High-Rise) ITE Land Use: 222	416 units	29	84	113	83	51	134
Hotel ITE Land Use: 310	88 rooms	23	18	41	27	25	52
Strip Retail Plaza ITE Land Use: 822	1,143 sq.ft.	4	3	7	9	8	17
TOTAL TRIP GENERATION		**56**	**105**	**161**	**119**	**84**	**203**
INTERNAL CAPTURE*		-1	-1	-2	-5	-5	-10
NET GENERATION		**55**	**104**	**159**	**114**	**79**	**193**
PASS-BY TRIPS (ITE Land Use: 820)**		0	0	0	-3	-3	-6
TOTAL PRIMARY TRIPS		**55**	**105**	**159**	**111**	**76**	**187**
NET TRIP CHANGE FROM TIS		**-1**	**+60**	**+59**	**+62**	**+33**	**+95**

* The internal capture rates have been calculated using the ITE Trip Generation Handbook. Internal capture reports are provided in the **Appendix**.
** Commercial pass-by trips for the AM and PM peak hour are 0% and 40% respectively, according to the ITE data for ITE land use 821. It is noted, the pass-by data for ITE land use 821 was applied as no data is available for ITE land use 822.

No transportation modal split reduction has been applied to the above-noted traffic generation calculation.

4.2 TRAFFIC ASSIGNMENT

The traffic distribution for the residential component of the proposed development was based on the residential traffic distribution in the adjacent Bayport TIS, which was completed by JD Engineering in May 2019 (excerpt provided in the **Appendix**), as summarized in **Table 6**. The residential traffic distribution was based on the 2016 *Transportation Tomorrow Survey* data for traffic zone 8575.

Table 6 – Proposed Residential Traffic Distribution

Travel Direction (to/from)	Percentage of Total Traffic Generation
South via Harbourview Drive	81%
East via Harbourview Drive	19%
Total	**100%**

The traffic distribution for the hotel and retail component of the proposed development followed the methodology used in the TIS (excerpts provided in the **Appendix**). The hotel and retail traffic distribution is estimated based on the existing traffic distribution at the Harbourview Drive / Marina Park Avenue intersection.

Table 7 illustrates the traffic distribution for the hotel and retail components of the proposed development.

Table 7 – Proposed Hotel and Retail Traffic Distribution

Scenario	Ingress Traffic (From)		Egress Traffic (To)	
	Northbound via Harbourview Drive	**Southbound** via Harbourview Drive	**Southbound** via Harbourview Drive	**Northbound** via Harbourview Drive
AM Peak Hour	39%	61%	62%	38%
PM Peak Hour	47%	53%	54%	46%

Using the traffic distribution patterns noted above, the proposed development residential, hotel, and retail pass-by and primary traffic assignment was calculated for the AM and PM peak hour and is illustrated in **Figures 5, 6** and **7** respectively.

Figure 5 – Proposed Development – Residential Traffic Assignment

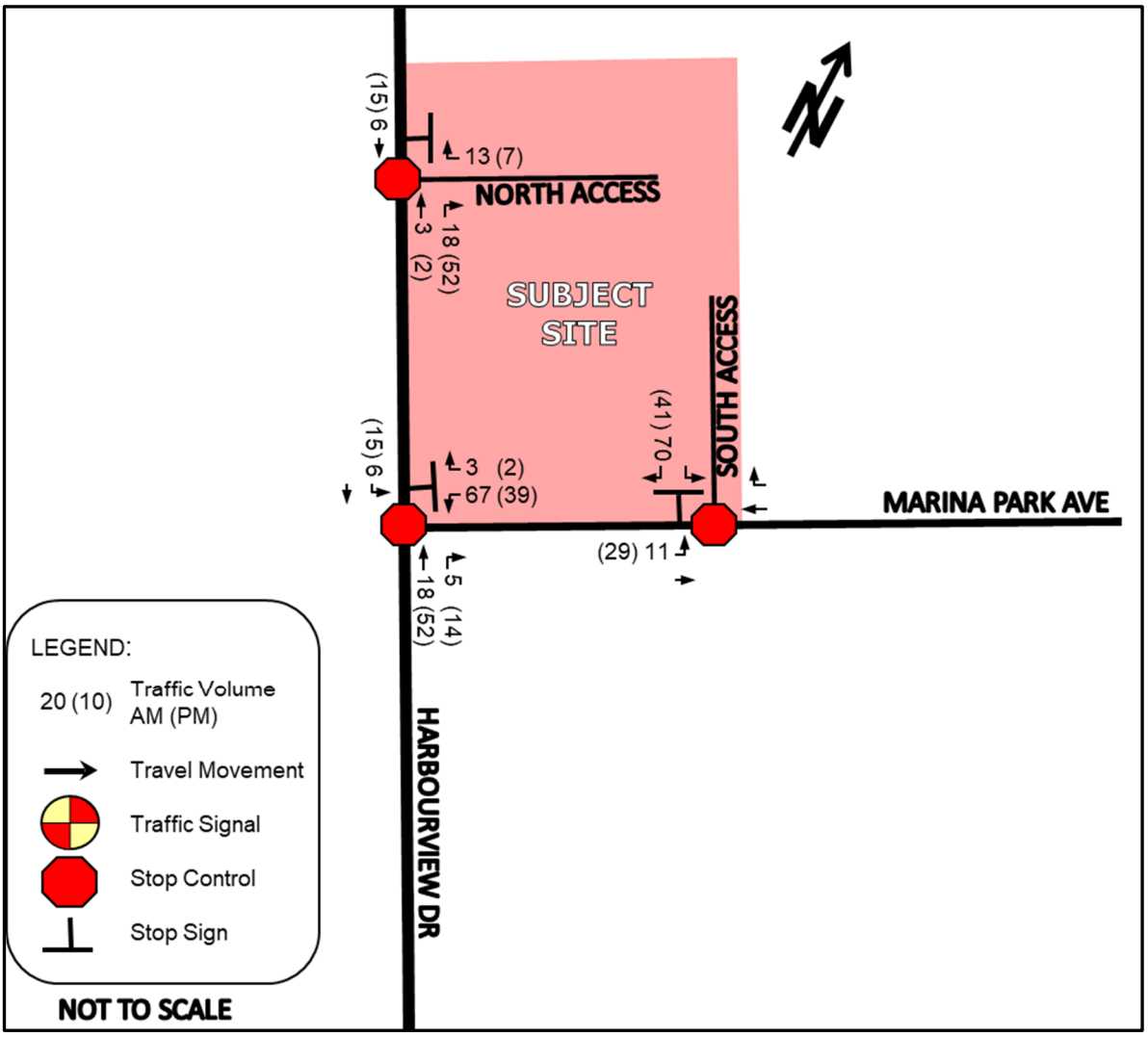


Figure 6 – Proposed Development – Retail Pass-by Traffic Assignment

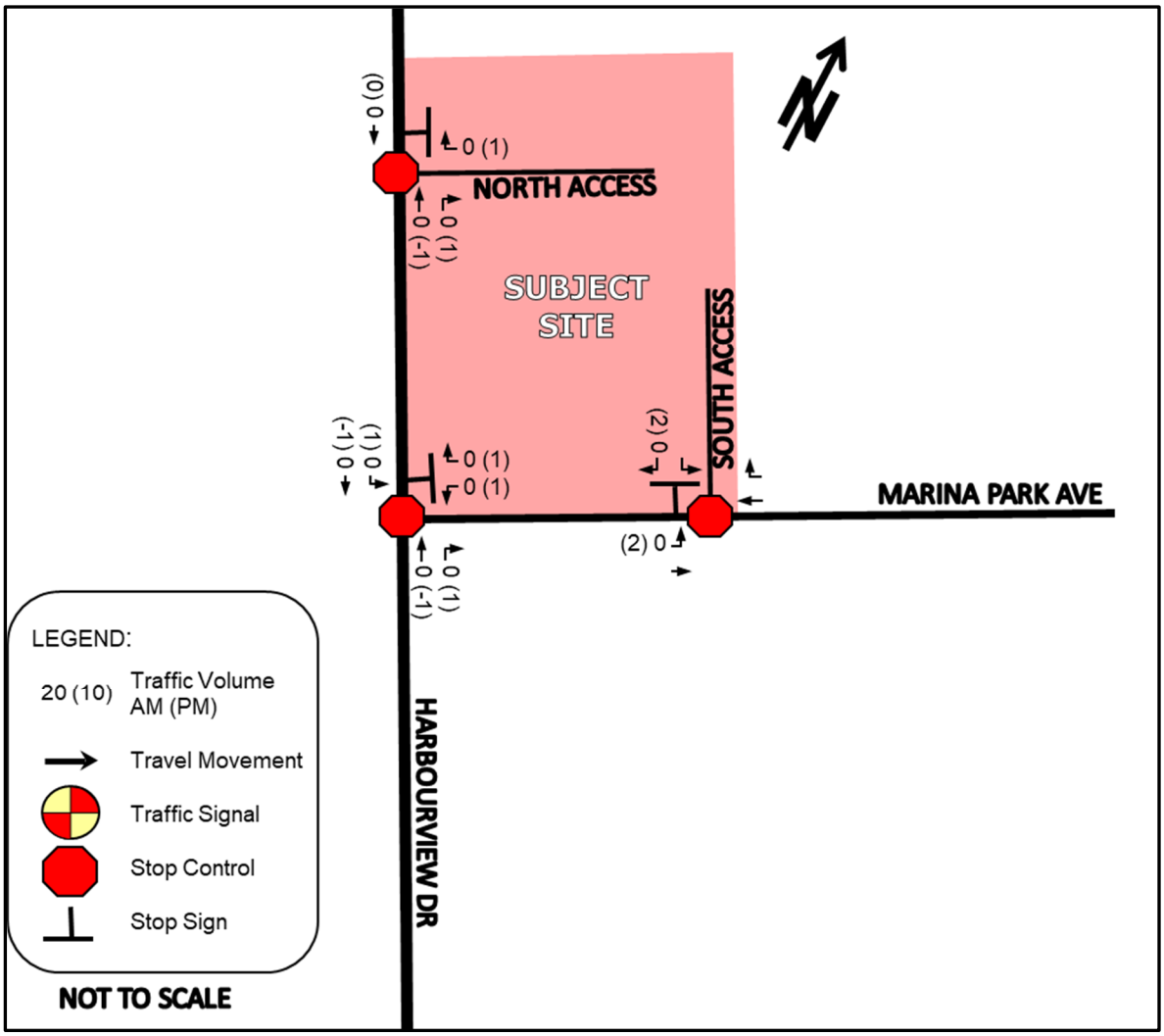
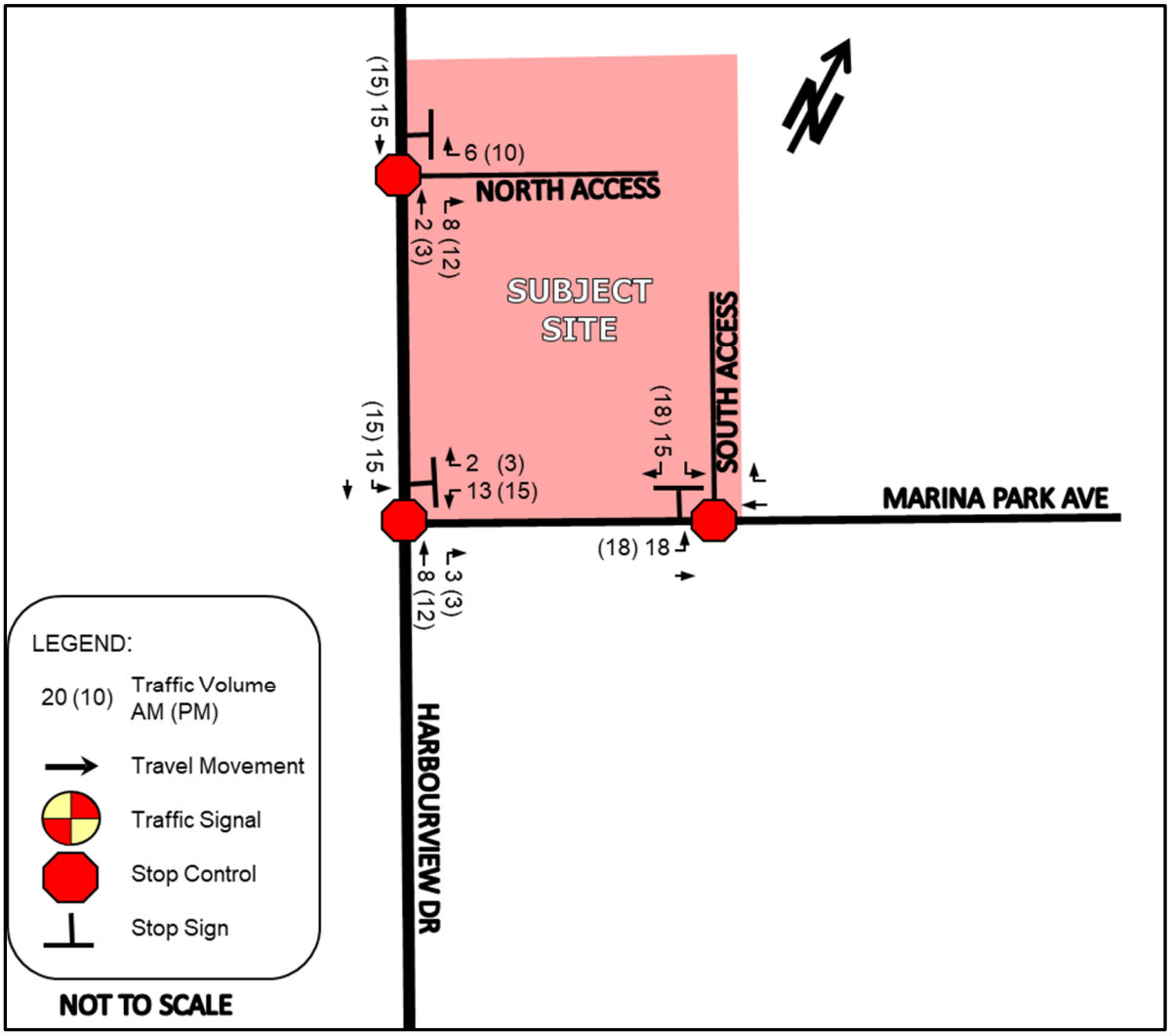


Figure 7 – Proposed Development – Retail + Hotel Primary Traffic Assignment



4.3 TOTAL HORIZON YEAR TRAFFIC VOLUMES WITH THE PROPOSED DEVELOPMENT

For the total (2024 & 2029) horizon year traffic volumes, the proposed development traffic was added to the background (2024 & 2029) traffic volumes. The resulting total (2024 & 2029) horizon year traffic volumes for the AM and PM peak hour are illustrated in **Figures 8** and **9** respectively.

Figure 8 – Total (2024) Traffic Volumes

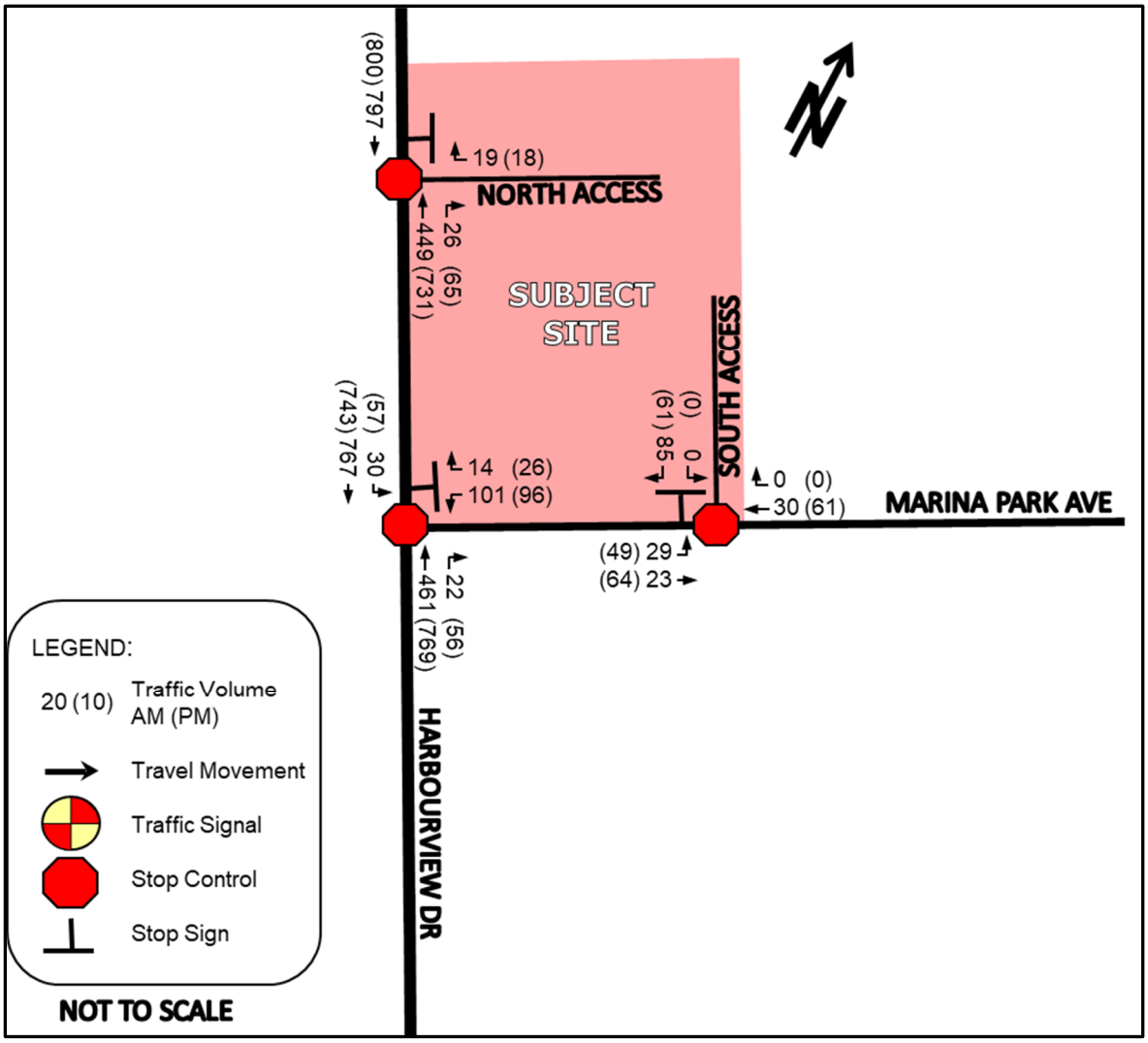
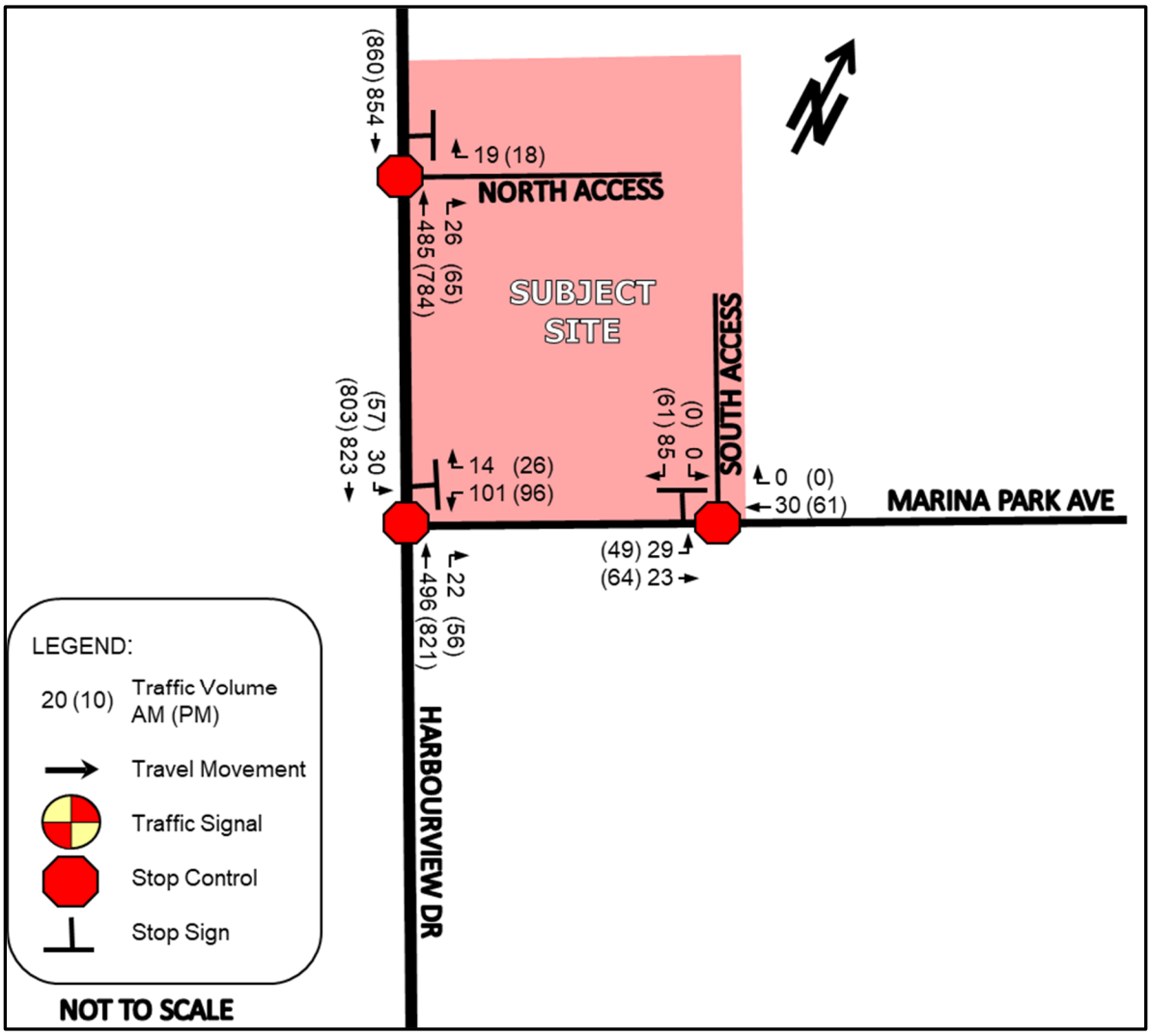


Figure 9 – Total (2029) Traffic Volumes



5.0 INTERSECTION OPERATION WITH PROPOSED DEVELOPMENT

5.1 TOTAL (2024) INTERSECTION OPERATION

The results of the LOS analysis under total (2024) traffic volumes during the AM and PM peak hours can be found below in **Table 8**. The proposed improvements noted in Section 3.3 and existing traffic control have been utilized for the scenario. Detailed output of the Synchro analysis can be found in the **Appendix**.

Table 8 - Total (2024) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Harbourview Drive / Marina Park Avenue (unsignalized)	-	7.5	A	-	-	-	18.0	C	-	-
WB	0.82	88.9	F	-	-	1.26	252.8	F	-	-
Harbourview Drive / North Access (unsignalized)	-	0.2	A	-	-	-	0.2	A	-	-
WB	0.04	11.6	B	-	-	0.05	15.3	C	-	-

The results of the LOS analysis indicate that the westbound movement at the Harbourview Drive / Marina Park Avenue intersection will operate outside typical design limits noted in Section 3.1. Based on the Ontario Traffic Manual Book 12 Signal Justification, traffic signals are not warranted at any of the unsignalized intersections (results are provided in the **Appendix**); however, installation of traffic signals is recommended at the Harbourview Drive / Marina Park Avenue intersection, to improve the westbound control delay. It is also recommended that the construction of the southbound left turn lane (identified in Section 3.3) is coordinated to be completed along with the proposed signalization of the Harbourview Drive / Marina Park Avenue intersection. It is recommended that these improvements are planned to be constructed in the short-term (1-5 years).

The westbound control delay at this intersection is a function of the high traffic volume on Harbourview Drive and is not specifically a function of the traffic volume on Marina Park Avenue, as illustrated by the long control delay identified for this movement in Table 4. It is recommended that the cost for the infrastructure improvements are split proportionately based on the contributing volume of traffic, in accordance with the approach outlined in the Technical Memorandum prepared by JD Engineering for the subject site on September 2020.

The results of the LOS analysis with the above noted improvements can be found below in **Table 9**. Detailed output of the Synchro analysis can be found in the **Appendix**.

Table 9 - Total (2024) LOS with Improvements

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Harbourview Drive / Marina Park Avenue (signalized)	0.65	9.2	A	-	-	0.65	9.4	A	-	-
WB	0.57	33.8	C	-	-	0.55	33.0	C	-	-
NB	0.42	5.2	A	-	-	0.66	8.3	A	-	-
SBL	0.06	3.3	A	5	35	0.23	5.6	A	10	35
SBT	0.66	8.2	A	117	-	0.60	7.2	A	96	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.

The anticipated 95th percentile queue length for the southbound thru movements extend past the proposed southbound auxiliary left turn lane; however, based on our review of development access along Harborview Drive, the queuing will clear after each cycle and no operational issues are anticipated as a result of the anticipated queuing.

There are no other issues with the anticipated 95th percentile queue length in the study area.

A review of the need for additional auxiliary right turn lanes at the study area intersection were completed as part of our analysis. Based on the volume of right turn movements, additional auxiliary right turn lanes are not recommended in the study area.

No further improvements are recommended within the study area.

5.2 TOTAL (2029) INTERSECTION OPERATION

The results of the LOS analysis under total (2029) traffic volumes during the AM and PM peak hours can be found below in **Table 10**. The proposed improvements noted in Section 5.1 have been utilized for this scenario. Detailed output of the Synchro analysis can be found in the **Appendix**.

Table 10 - Total (2029) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95% Queue (m)		V/C	Delay (s)	LOS	95% Queue (m)	
				Queue	Storage				Queue	Storage
Harbourview Drive / Marina Park Avenue (signalized)	0.69	9.7	B	-	-	0.68	10.1	B	-	-
WB	0.57	33.8	C	-	-	0.55	33.0	C	-	-
NB	0.45	5.5	A	-	-	0.71	9.2	A	-	-
SBL	0.06	3.3	A	5	35	0.26	6.3	A	11	35
SBT	0.71	9.3	A	136	-	0.65	7.9	A	112	-
Harbourview Drive / North Access (unsignalized)	-	0.2	A	-	-	-	0.2	A	-	-
WB	0.04	11.6	B	-	-	0.06	16.1	C	-	-

The results of the LOS analysis indicate that all study area intersections are operating within the typical design limits noted in Section 3.1.
The anticipated 95th percentile queue length for the southbound thru movements extend past the proposed southbound auxiliary left turn lane; however, based on our review of development access along Harborview Drive, the queuing will clear after each cycle and no operational issues are anticipated as a result of the anticipated queuing.

There are no other issues with the anticipated 95th percentile queue length in the study area.

A review of the need for additional auxiliary right turn lanes at the study area intersection were completed as part of our analysis. Based on the volume of right turn movements, additional auxiliary right turn lanes are not recommended in the study area.

Based on the Ontario Traffic Manual Book 12 Signal Justification, traffic signals are not warranted at the Harbourview Drive / North Access intersection (results are provided in the **Appendix**).

No further improvements are recommended within the study area.

6.0 SITE ACCESS

The revised plan will not change the driveway layout of the proposed development.

The 2024 Site Plan includes a RIRO driveway onto Harbourview Drive (North Access) and a full-movement driveway onto Marina Park Avenue (South Access), which is consistent with the 2020 Site Plan.

The South Access will operate as full-movement access, with one-way stop control for southbound movements. A single ingress and egress lane at the South Access will provide the necessary capacity to service the proposed development.

The North Access will operate as right-in, right-out access, with one-way stop control for westbound movements. A single ingress and egress lane at the North Access will provide the necessary capacity to service the proposed development.

7.0 MARINA PARK AVENUE

As noted in Section 5.5 in the TIS, the western portion of Marina Park Avenue, which includes the section that the new traffic from the proposed development will be using to access the subject site, is constructed with an 8.0 metre wide asphalt width and 15 metre corner radius. The western portion of Marina Parking Avenue includes a fully urban cross-section with a 1.5-metre-wide sidewalk on the north side of the road. The above-noted configuration of Marina Park Avenue is consistent with the Town's Standard Engineering design for a local road.

8.0 PARKING REVIEW

As illustrated in **Table 11**, the proposed parking supply for the subject site meets the minimum parking requirements identified in the Town's Zoning By-law 2004-90.

Table 11 - Zoning By-law Parking Requirements

Category	Zoning By-Law Section	Parking Standard	Size	Parking	
				Required	Provided
Apartment Dwelling Unit	4.1.5	1.5 per dwelling unit of which 25% shall be for designated visitor parking	416 units	Resident: 468 spaces Visitor: 156 spaces Total: 624 spaces	-
Hotel and Motel	4.1.5	1.25 per guest room plus 1 for each 4 persons that can be accommodated at any one time in a dining room, licensed beverage room, banquet room.	88 rooms	110 spaces	-
Retail	4.1.5	5 per 90 sq.m. GFA	1,143 sq.ft. (106.2 sq.m.)	6 spaces	-
TOTAL PARKING SPACES				740 spaces	748 spaces
Accessibility Parking	4.1.7	6 spaces for required spaces 501 or more	-	6 spaces	6 Spaces

9.0 CONCLUSION

This chapter summarizes the conclusions and recommendations from the study.

1) The proposed development (2024 Site Plan) will generate 159 AM and 193 PM peak hour primary vehicle trips.

2) An intersection operational analysis was completed at the study area intersections, using the existing (2019) and background (2024 and 2029) traffic volumes, without the proposed development traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the proposed development. No improvements are recommended with the study area.

3) An estimate of the amount of traffic that would be generated by the Subject Site was prepared and assigned to the study area intersection. The following improvements are recommended in the short-term (1-5 years):

   Harbourview Drive / Marina Park Avenue
   - Southbound left-turn lane with a 35 metre storage length and 65 metre taper length.
   - Signalization of intersection.

4) It is recommended that the cost for the infrastructure improvements are split proportionately based on the contributing volume of traffic, in accordance with the approach outlined in the Technical Memorandum prepared by JD Engineering for the subject site on September 2020.

5) The proposed North Access driveway will operate efficiently as a RIRO access driveway with one-way stop control for westbound movements. The proposed South Access driveway will operate efficiently as a full-movement access driveway with one-way stop control for southbound movements. A single lane for ingress and egress movements at the North Access and South Access

driveways will provide the necessary capacity to convey the traffic volume generated by the proposed development.

6) The configuration of the western portion of Marina Park Avenue, which includes the section that the new traffic from the proposed development will be using to access the subject site, is constructed in accordance with the Town's Engineering Standards

7) The proposed parking supply is in accordance with the minimum parking requirement identified in the Town's Zoning By-law.

8) In summary the proposed development will not cause any operational issues and will not add significant delay or congestion to the local roadway network.

We trust you will find this submission acceptable. Should you have any questions or concerns or require any additional information in this regard, please contact the undersigned.

Yours truly,
JD Northcote Engineering Inc.

John Northcote, P.Eng.
President

Allister Aresta, P.Eng.

Appendix

JD Engineering
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Site Plan

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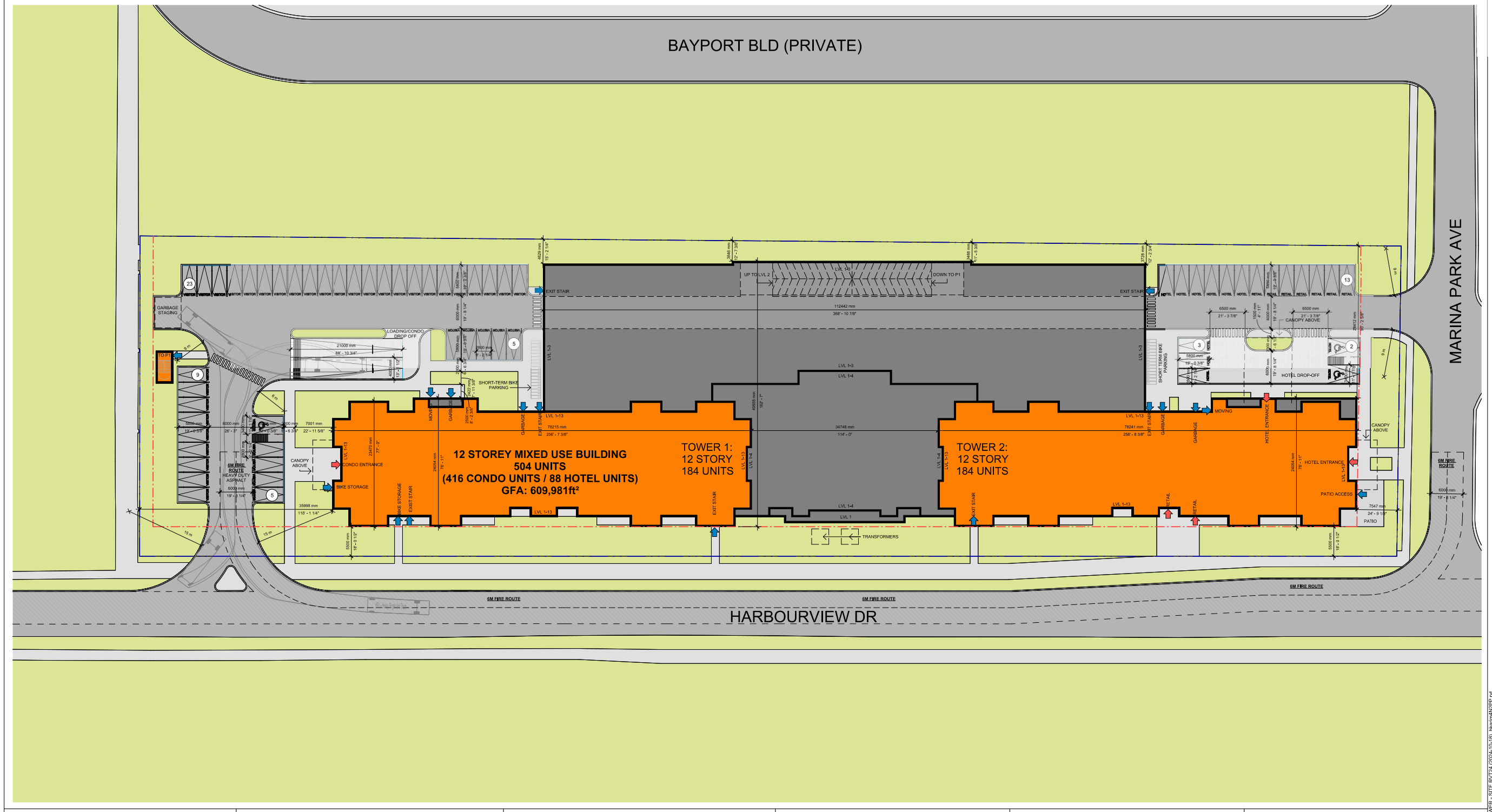

SITE STATISTICS			
DESCRIPTION	AREA (SM)	AREA (SF)	PERCENTAGE
BUILDING FOOTPRINT			
MIXED USE BUILDING	7091.65 m²	76334 ft²	51.3%
	7091.65 m²	76334 ft²	51.3%
HARD LANDSCAPE			
ASPHALT	2066.45 m²	22243 ft²	14.9%
CURB	94.66 m²	1019 ft²	0.7%
PAVERS	533.46 m²	5742 ft²	3.9%
SIDEWALK	811.27 m²	8732 ft²	5.9%
	3505.84 m²	37737 ft²	25.3%
SOFT LANDSCAPE			
LANDSCAPE	3235.48 m²	34826 ft²	23.4%
	3235.48 m²	34826 ft²	23.4%
	13832.97 m²	148897 ft²	100.0%
OVERALL	13822.80 m²	148787 ft²	100.0%

PARKING SCHEDULE BY TYPE	
Type	Count
MIDLAND ACCESSIBLE (5.8M x 3.4M)	6
MIDLAND TYPICAL (5.8M x 2.8M)	742
	748

PARKING SCHEDULE		
Type	Comments	Count
LVL 1		
MIDLAND ACCESSIBLE (5.8M x 3.4M)	HOTEL	2
MIDLAND TYPICAL (5.8M x 2.8M)	HOTEL	108
MIDLAND TYPICAL (5.8M x 2.8M)	RETAIL	7
MIDLAND ACCESSIBLE (5.8M x 3.4M)	VISITOR	1
MIDLAND TYPICAL (5.8M x 2.8M)	VISITOR	47
LVL 1: 165		165
LVL 2		
MIDLAND TYPICAL (5.8M x 2.8M)	CONDO	109
LVL 2: 109		109
LVL 3		
MIDLAND TYPICAL (5.8M x 2.8M)	CONDO	115
LVL 3: 115		115
P1		
MIDLAND ACCESSIBLE (5.8M x 3.4M)	CONDO	3
MIDLAND TYPICAL (5.8M x 2.8M)	CONDO	245
MIDLAND TYPICAL (5.8M x 2.8M)	VISITOR	111
P1: 359		359
		748

OVERALL UNIT MIX			
Name	Area	Count	Count %
1BD	502 ft² ... 1318 ft²	420	83%
1BD SMALL	502 ft² ... 502 ft²	2	0%
2BD	764 ft² ... 1195 ft²	82	16%
		504	

CONDO UNIT MIX			
Name	Area	Count	Count %
1BD	502 ft² ... 728 ft²	346	83%
2BD	764 ft² ... 1195 ft²	70	17%
		416	

HOTEL UNIT MIX			
Name	Area	Count	Count %
1BD	543 ft² ... 1318 ft²	74	84%
1BD SMALL	502 ft² ... 502 ft²	2	2%
2BD	1006 ft² ... 1195 ft²	12	14%
		88	

GFA BY CATEGORY		
Department	Area	Area (%)
CONDO	379925 ft²	62%
HOTEL	163344 ft²	27%
RETAIL	1143 ft²	0%
SHARED	65720 ft²	11%
Grand total: 709	610132 ft²	

GFA BY LEVEL		
Level	Area	Area (%)
LVL 1	75880 ft²	12%
LVL 2	74834 ft²	12%
LVL 3	74834 ft²	12%
LVL 4	72145 ft²	12%
LVL 5	34795 ft²	6%
LVL 6	34795 ft²	6%
LVL 7	34795 ft²	6%
LVL 8	34795 ft²	6%
LVL 9	34795 ft²	6%
LVL 10	34795 ft²	6%
LVL 11	34795 ft²	6%
LVL 12	34795 ft²	6%
T/O ROOF DECK	34076 ft²	6%
Grand total: 709	610132 ft²	

Chamberlain Architects Constructors Managers

Chamberlain Architect Services Limited

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Burlington, Ontario, L7M 0W9
CANADA

Phone: 905.631.7777

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NO.	ISSUED	DATE
	CLIENT REVIEW	2024.08.30
	CLIENT REVIEW	2024.10.18

SEAL

CONSTRUCTION NORTH TRUE NORTH

BAYPORT TOWER

1191 HARBOURVIEW DRIVE
MIDLAND, ON

SHEET NAME

SITE PLAN

START DATE	AUGUST 2024
DRAWN BY	HK
CHECKED BY	JM
SCALE	1 : 350
PROJECT NO.	124043
DRAWING	A001

C:\Users\hkamm\Documents\124043 - BAYPORT TOWER - SITE RVT24 (2024-10-18)_hkammN26P.rvt
11/11/2024 3:28:13 PM

TIS Excerpts

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1191 Harbourview Drive
Town of Midland

Traffic Impact Study for
Kaitlin Corporation

Type of Document:
Final Report

Project Number:
JDE – 19109

Date Submitted:
March 13th, 2020

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ENGINEERING

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Figure 10 – Total Adjacent Development Traffic Assignment (2024 & 2029)

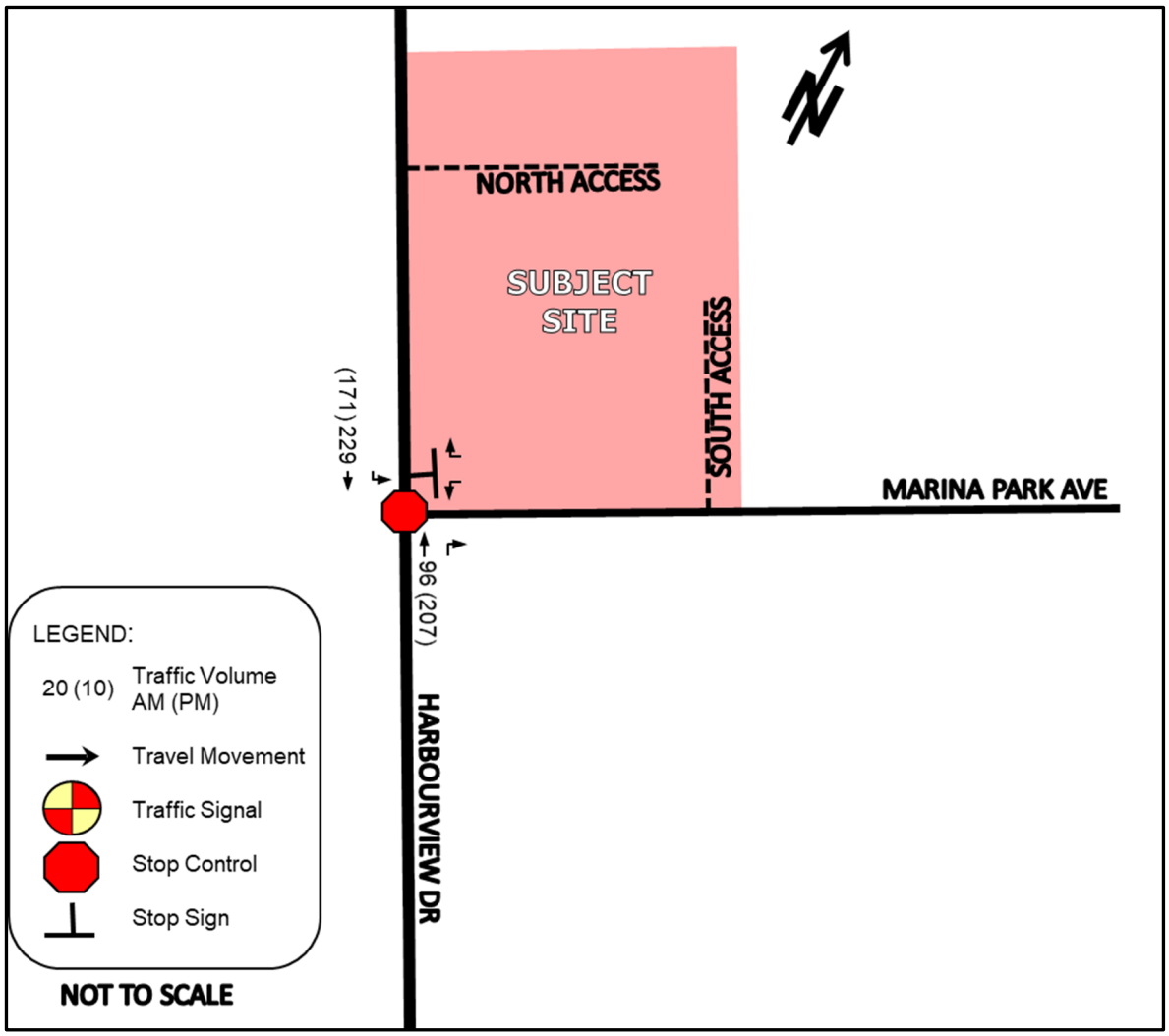


Figure 11 – Bay Port Yachting Centre Traffic Assignment (2019)

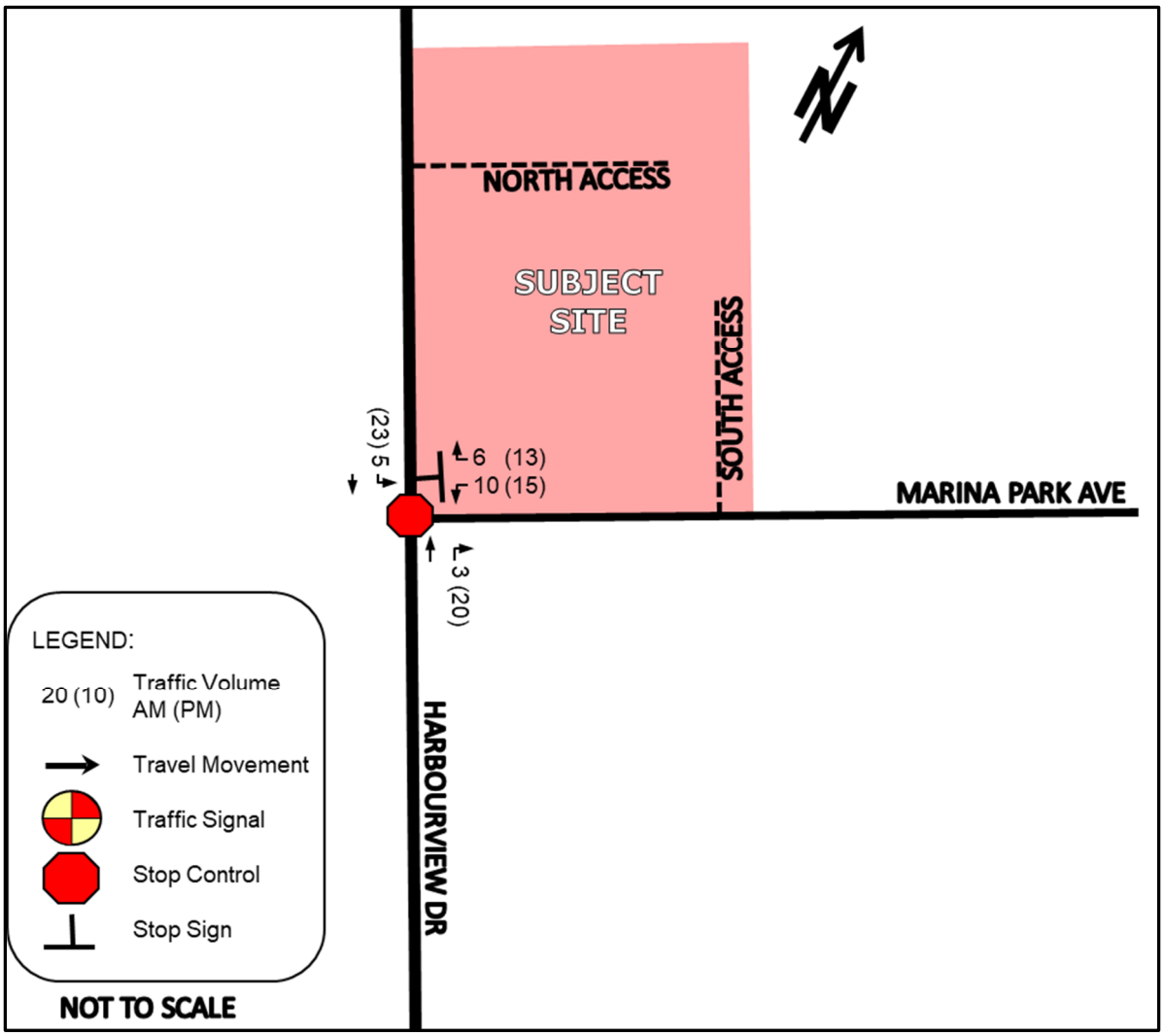


Figure 12 – Existing (2019) Traffic Volumes

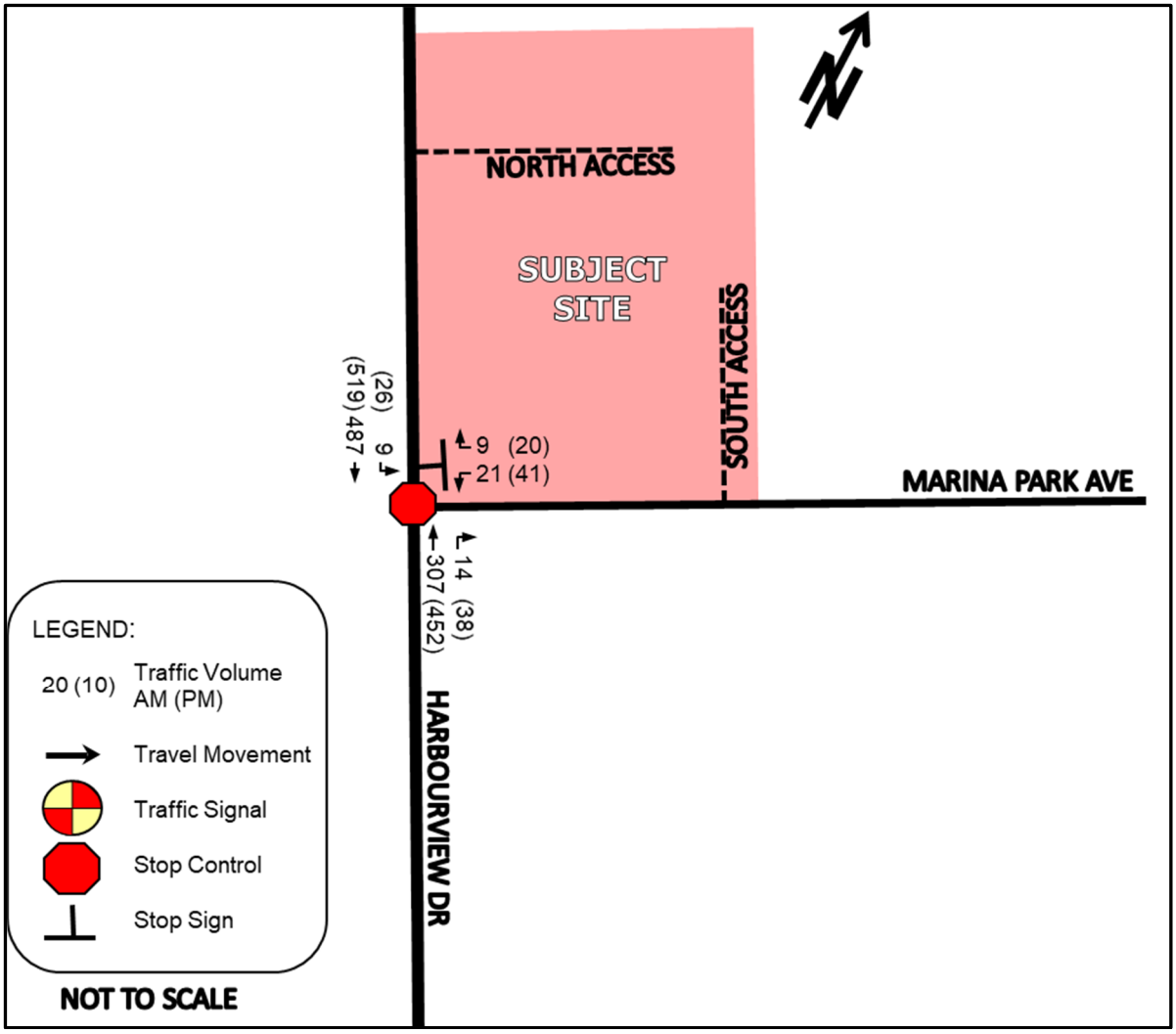


Figure 13 - Background (2024) Traffic Volumes

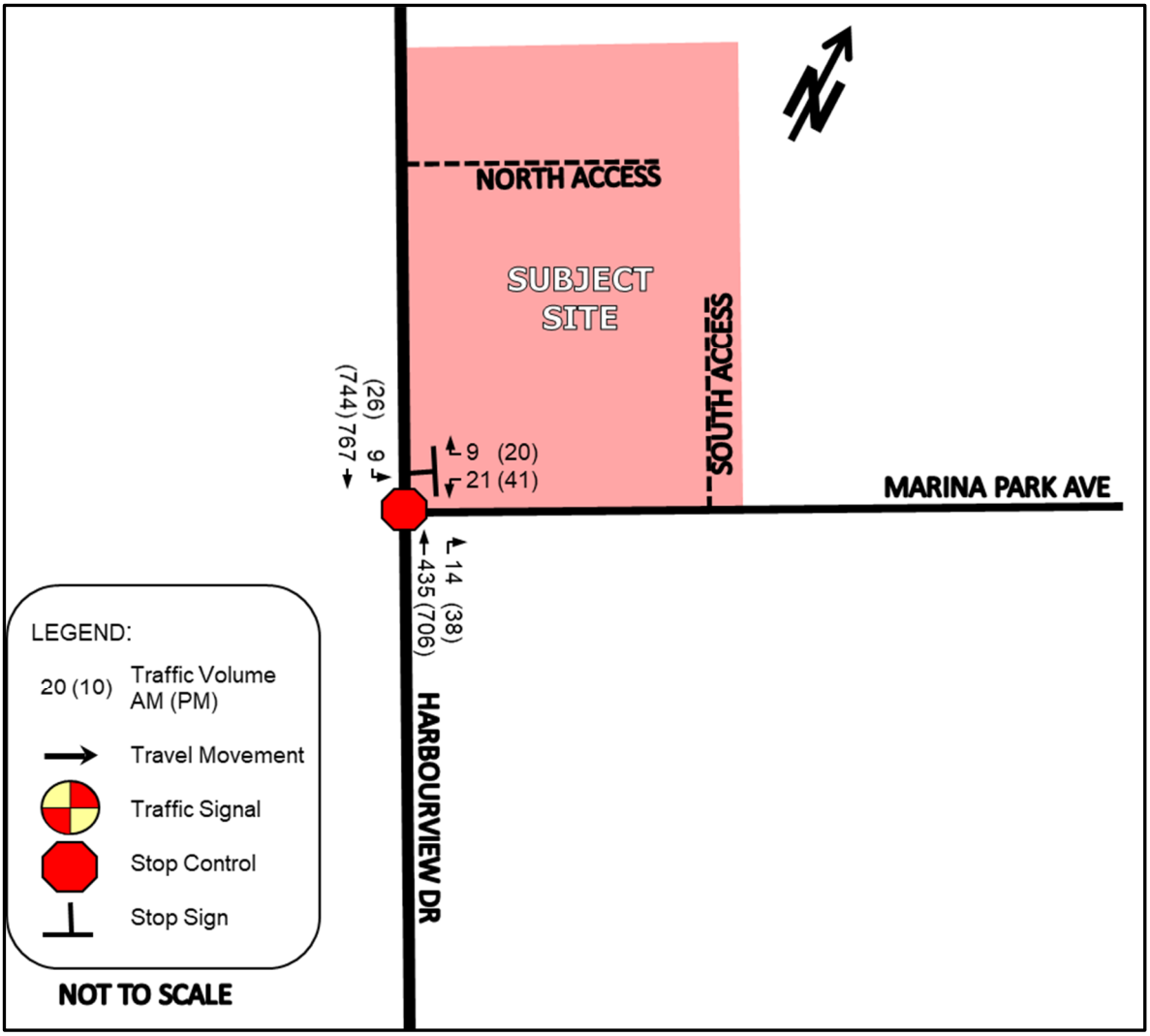
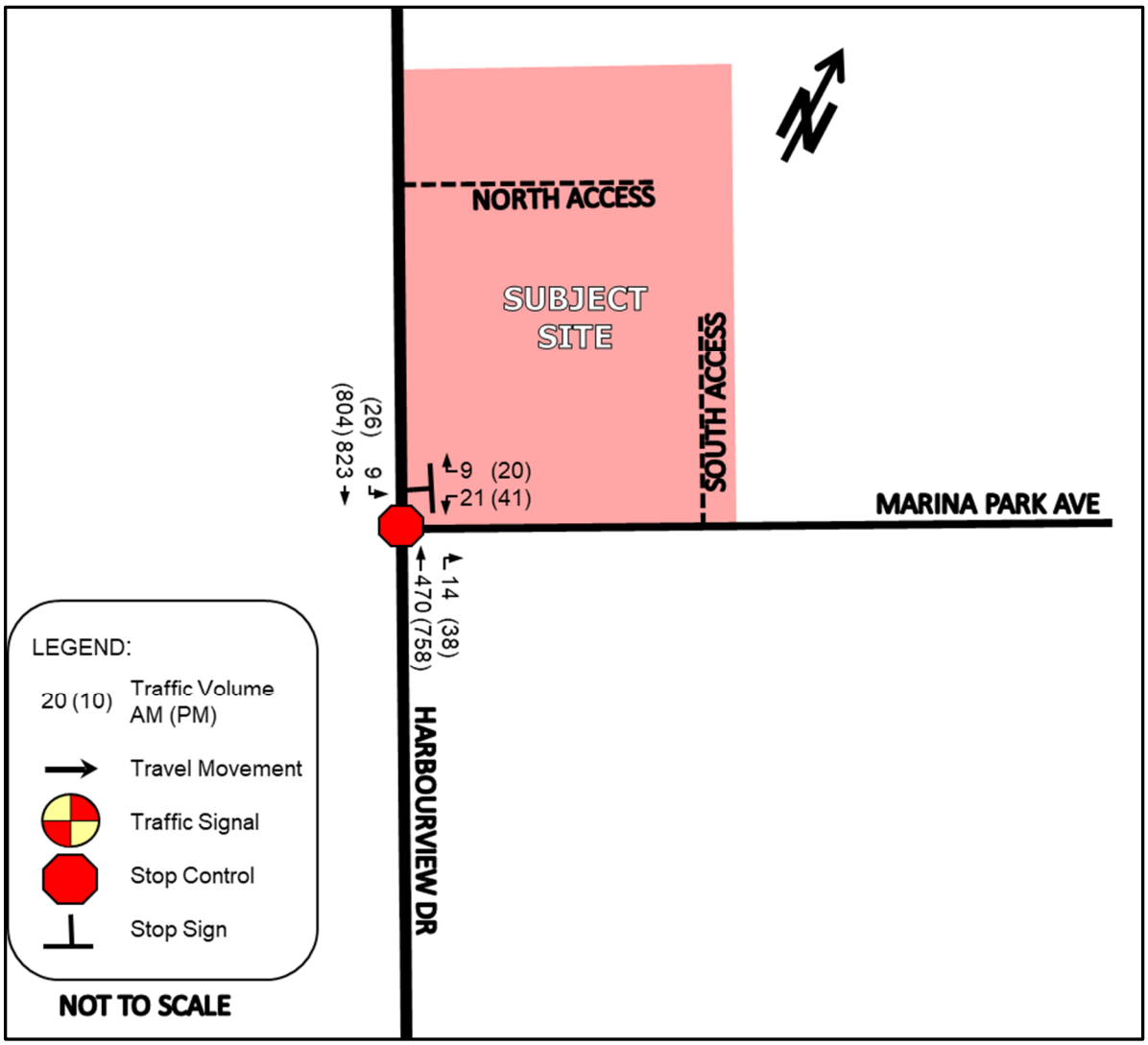


Figure 14 - Background (2029) Traffic Volumes



4 Proposed Hotel Development Traffic Generation and Assignment

4.1 Traffic Generation

The traffic generation for the subject site has been based on the ITE *Trip Generation* data. The following ITE land uses have been applied to estimate the traffic from the proposed development:

- ITE land use #310 (Hotel) – General Urban/Suburban Setting
- ITE land use #932 (High-Turnover (Sit-Down) Restaurant) – General Urban/Suburban
- ITE land use #820 (Shopping Centre) - General Urban/Suburban

The estimated trip generation for the proposed development is illustrated below in **Table 8.** The AM and PM peak traffic generation for the proposed development is not expected to exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 8 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Hotel ITE Land Use: 310	117 rooms	32	23	55	36	35	71
Shopping Centre ITE Land Use: 820	863 sq.ft.	2	1	3	8	9	17
High-Turnover (Sit-Down) Restaurant ITE Land Use: 932	100 seats	25	23	48	24	18	42
TOTAL TRIP GENERATION		**59**	**47**	**106**	**68**	**62**	**130**
INTERNAL CAPTURE*		-3	-3	-6	-9	-9	-18
NET GENERATION		**56**	**44**	**100**	**59**	**53**	**112**
PASS-BY TRIPS (ITE Land Use: 820)**		0	0	0	-2	-2	-4
PASS-BY TRIPS (ITE Land Use: 932)**		0	0	0	-8	-8	-16
TOTAL PASS-BY TRIPS		0	0	0	-10	-10	-20
TOTAL PRIMARY TRIPS		**56**	**44**	**100**	**49**	**43**	**92**

* The internal capture rates have been calculated using the ITE Trip Generation Handbook. Internal capture reports are provided in **Appendix I**.
** Commercial pass-by trips for the AM and PM peak hour are 0% and 34% respectively, according to the ITE data for ITE land use 820.
*** Commercial pass-by trips for the AM and PM peak hour are 0% and 43% respectively, according to the ITE data for ITE land use 932.

No transportation modal split reduction has been applied to the above-noted traffic generation calculation.

4.2 Traffic Assignment

The distribution of site traffic has been estimated based on the existing traffic distribution at the Harbourview Drive / Marina Park Avenue intersection.

Table 9 illustrates the traffic distribution of the subject site.

Table 9 – Proposed Development Traffic Distribution

Scenario	Ingress Traffic (From)		Egress Traffic (To)	
	Northbound via Harbourview Drive	**Southbound** via Harbourview Drive	**Southbound** via Harbourview Drive	**Northbound** via Harbourview Drive
AM Peak Hour	39%	61%	62%	38%
PM Peak Hour	47%	53%	54%	46%

Using the traffic distribution patterns noted above, the proposed development pass-by and primary traffic assignment was calculated for the AM and PM peak hour and is illustrated in **Figures 15** and **16** respectively**.**

Bayport TIS Excerpts

Bayport Boulevard

Town of Midland
County of Simcoe

Traffic Impact Study for

Lanarose Midland Ltd.

Type of Document:
Final Report

Project Number:
JDE – 18088

Date Submitted:
December 13th, 2018
Revised: May 8th, 2019

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Professional License #: 100124071

ENGINEERING

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As noted in Section 1.1, there are currently 63 single-detached units constructed and occupied and 51 townhouse units currently constructed and unoccupied. The traffic generated by the occupied units have been accounted for in the traffic counts completed. The traffic generated by the unoccupied units will be included in the traffic generation for the next phase of the proposed development.

Table 8 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Multifamily Housing (Multifamily Housing (Low-Rise)) ITE Land Use: 220	232 units*	25	82	107	82	48	130
Multifamily Housing (Multifamily Housing (Mid-Rise)) ITE Land Use: 221	291 units	27	78	105	79	50	129
TOTAL TRIP GENERATION		**52**	**160**	**212**	**161**	**98**	**259**

*Includes the 51 constructed unoccupied units and 181 proposed townhouse units

No transportation modal split reduction has been applied to the above-noted traffic generation calculation.

4.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the proposed development will be new traffic and would not be in the study area if the development was not constructed.

The ITE data provides the anticipated percentage of new traffic entering and exiting during the peak hour. Beyond the local area the distribution of traffic from the residential component of the proposed development have been estimated based on the 2016 TTS data for traffic zone 8575 (excerpt attached as **Appendix F**). TTS data provides historical origin and destination work trip percentages for specific areas within southern Ontario.

Traffic distribution for the trips generated by the proposed development is expected to generally follow commuter travel patterns. Our analysis is based on egress traffic during the AM peak hour. Logically, the distribution of ingress traffic will follow the inverse of the exiting traffic distribution. For each of the individual areas identified in the TTS data, we have selected the probable route of travel, assuming that people will select their route primarily based on travel time.

The estimated distribution of trips generated by the proposed development is illustrated in **Table 9**, which was calculated using the methodology outlined above.

Table 9 – Residential Component of Proposed Development Traffic Distribution

Travel Direction (to/from)	Percentage of Total Traffic Generation
South via Harbourview Drive	81%
East via Harbourview Drive	19%
Total	**100%**

Using the above-noted traffic distribution patterns, the traffic assignment for the proposed development was calculated for the AM and PM peak hour and is illustrated in **Figure 8.**

Synchro Analysis Output – Existing Traffic Volumes

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	9	307	14	9	487
Future Volume (Veh/h)	21	9	307	14	9	487
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	10	341	16	10	541
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	910	349			357	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	910	349			357	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	99			99	
cM capacity (veh/h)	302	694			1202	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	33	357	551
Volume Left	23	0	10
Volume Right	10	16	0
cSH	365	1700	1202
Volume to Capacity	0.09	0.21	0.01
Queue Length 95th (m)	2.4	0.0	0.2
Control Delay (s)	15.9	0.0	0.2
Lane LOS	C		A
Approach Delay (s)	15.9	0.0	0.2
Approach LOS	C		

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		42.8%	ICU Level of Service A
Analysis Period (min)		15	

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	41	20	452	38	26	519
Future Volume (Veh/h)	41	20	452	38	26	519
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	43	21	476	40	27	546
Pedestrians	8					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1104	506			524	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1104	506			524	
tC, single (s)	6.4	6.2			4.4	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	81	96			97	
cM capacity (veh/h)	225	562			896	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	64	516	573
Volume Left	43	0	27
Volume Right	21	40	0
cSH	280	1700	896
Volume to Capacity	0.23	0.30	0.03
Queue Length 95th (m)	6.9	0.0	0.7
Control Delay (s)	21.6	0.0	0.8
Lane LOS	C		A
Approach Delay (s)	21.6	0.0	0.8
Approach LOS	C		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

Synchro Analysis Output – Background Traffic Volumes

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	9	435	14	9	767
Future Volume (Veh/h)	21	9	435	14	9	767
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	10	483	16	10	852
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1363	491			499	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1363	491			499	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	86	98			99	
cM capacity (veh/h)	161	578			1065	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	33	499	10	852
Volume Left	23	0	10	0
Volume Right	10	16	0	0
cSH	206	1700	1065	1700
Volume to Capacity	0.16	0.29	0.01	0.50
Queue Length 95th (m)	4.5	0.0	0.2	0.0
Control Delay (s)	25.7	0.0	8.4	0.0
Lane LOS	D		A	
Approach Delay (s)	25.7	0.0	0.1	
Approach LOS	D			

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	41	20	706	38	26	744
Future Volume (Veh/h)	41	20	706	38	26	744
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	43	21	743	40	27	783
Pedestrians	8					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1608	773			791	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1608	773			791	
tC, single (s)	6.4	6.2			4.4	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	61	95			96	
cM capacity (veh/h)	110	396			703	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	64	783	27	783
Volume Left	43	0	27	0
Volume Right	21	40	0	0
cSH	144	1700	703	1700
Volume to Capacity	0.44	0.46	0.04	0.46
Queue Length 95th (m)	15.9	0.0	1.0	0.0
Control Delay (s)	48.4	0.0	10.3	0.0
Lane LOS	E		B	
Approach Delay (s)	48.4	0.0	0.3	
Approach LOS	E			

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	9	470	14	9	823
Future Volume (Veh/h)	21	9	470	14	9	823
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	23	10	522	16	10	914
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1464	530			538	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1464	530			538	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	98			99	
cM capacity (veh/h)	140	549			1030	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	33	538	10	914
Volume Left	23	0	10	0
Volume Right	10	16	0	0
cSH	181	1700	1030	1700
Volume to Capacity	0.18	0.32	0.01	0.54
Queue Length 95th (m)	5.2	0.0	0.2	0.0
Control Delay (s)	29.3	0.0	8.5	0.0
Lane LOS	D		A	
Approach Delay (s)	29.3	0.0	0.1	
Approach LOS	D			

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	41	20	758	38	26	804
Future Volume (Veh/h)	41	20	758	38	26	804
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	43	21	798	40	27	846
Pedestrians	8					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1726	828			846	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1726	828			846	
tC, single (s)	6.4	6.2			4.4	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	54	94			96	
cM capacity (veh/h)	93	368			668	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	64	838	27	846
Volume Left	43	0	27	0
Volume Right	21	40	0	0
cSH	123	1700	668	1700
Volume to Capacity	0.52	0.49	0.04	0.50
Queue Length 95th (m)	19.5	0.0	1.0	0.0
Control Delay (s)	62.2	0.0	10.6	0.0
Lane LOS	F		B	
Approach Delay (s)	62.2	0.0	0.3	
Approach LOS	F			

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

Synchro Analysis Output – Total Traffic Volumes

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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	101	14	461	22	30	767
Future Volume (Veh/h)	101	14	461	22	30	767
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	112	16	512	24	33	852
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1442	524			536	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1442	524			536	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	21	97			97	
cM capacity (veh/h)	141	553			1032	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	128	536	33	852
Volume Left	112	0	33	0
Volume Right	16	24	0	0
cSH	156	1700	1032	1700
Volume to Capacity	0.82	0.32	0.03	0.50
Queue Length 95th (m)	43.3	0.0	0.8	0.0
Control Delay (s)	88.9	0.0	8.6	0.0
Lane LOS	F		A	
Approach Delay (s)	88.9	0.0	0.3	
Approach LOS	F			

Intersection Summary			
Average Delay	7.5		
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	449	26	0	797
Future Volume (Veh/h)	0	19	449	26	0	797
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	488	28	0	866
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1368	502			516	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1368	502			516	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	162	569			1050	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	21	516	866
Volume Left	0	0	0
Volume Right	21	28	0
cSH	569	1700	1700
Volume to Capacity	0.04	0.30	0.51
Queue Length 95th (m)	0.9	0.0	0.0
Control Delay (s)	11.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	96	26	769	56	57	743
Future Volume (Veh/h)	96	26	769	56	57	743
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	101	27	809	59	60	782
Pedestrians	8					2
Lane Width (m)	3.6					3.6
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1748	848			876	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1748	848			876	
tC, single (s)	6.4	6.2			4.4	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.5	
p0 queue free %	0	92			91	
cM capacity (veh/h)	85	358			650	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	128	868	60	782
Volume Left	101	0	60	0
Volume Right	27	59	0	0
cSH	101	1700	650	1700
Volume to Capacity	1.26	0.51	0.09	0.46
Queue Length 95th (m)	70.2	0.0	2.4	0.0
Control Delay (s)	252.8	0.0	11.1	0.0
Lane LOS	F		B	
Approach Delay (s)	252.8	0.0	0.8	
Approach LOS	F			

Intersection Summary			
Average Delay	18.0		
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	18	731	65	0	800
Future Volume (Veh/h)	0	18	731	65	0	800
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	20	795	71	0	870
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1700	830			866	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1700	830			866	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	101	370			777	

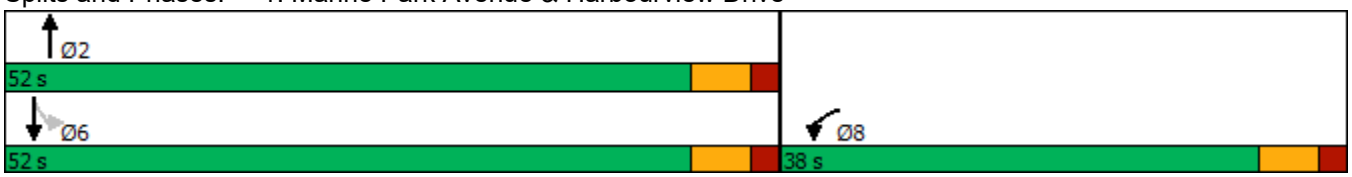
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	20	866	870
Volume Left	0	0	0
Volume Right	20	71	0
cSH	370	1700	1700
Volume to Capacity	0.05	0.51	0.51
Queue Length 95th (m)	1.4	0.0	0.0
Control Delay (s)	15.3	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.3	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	101	461	30	767
Future Volume (vph)	101	461	30	767
Lane Group Flow (vph)	128	536	33	852
Turn Type	Prot	NA	Perm	NA
Protected Phases	8	2		6
Permitted Phases			6	
Detector Phase	8	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	34.0	28.0	28.0	28.0
Total Split (s)	38.0	52.0	52.0	52.0
Total Split (%)	42.2%	57.8%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
v/c Ratio	0.50	0.40	0.05	0.63
Control Delay	32.5	6.1	4.6	9.5
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.5	6.1	4.6	9.5
Queue Length 50th (m)	15.4	27.0	1.2	57.5
Queue Length 95th (m)	29.9	53.4	4.5	116.2
Internal Link Dist (m)	138.9	167.0		191.3
Turn Bay Length (m)			25.0	
Base Capacity (vph)	795	1329	610	1346
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.40	0.05	0.63

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 71.2
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Marine Park Avenue & Harbourview Drive



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	101	14	461	22	30	767
Future Volume (vph)	101	14	461	22	30	767
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1755		1785		1770	1810
Flt Permitted	0.96		1.00		0.44	1.00
Satd. Flow (perm)	1755		1785		819	1810
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	112	16	512	24	33	852
RTOR Reduction (vph)	8	0	1	0	0	0
Lane Group Flow (vph)	120	0	535	0	33	852
Heavy Vehicles (%)	2%	2%	6%	2%	2%	5%
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.7		51.7		51.7	51.7
Effective Green, g (s)	8.7		51.7		51.7	51.7
Actuated g/C Ratio	0.12		0.71		0.71	0.71
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	210		1274		584	1292
v/s Ratio Prot	c0.07		0.30			c0.47
v/s Ratio Perm					0.04	
v/c Ratio	0.57		0.42		0.06	0.66
Uniform Delay, d1	30.1		4.2		3.1	5.6
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	3.7		1.0		0.2	2.7
Delay (s)	33.8		5.2		3.3	8.2
Level of Service	C		A		A	A
Approach Delay (s)	33.8		5.2			8.1
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	449	26	0	797
Future Volume (Veh/h)	0	19	449	26	0	797
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	488	28	0	866
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			215			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1368	502			516	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1353	391			407	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	149	592			1037	

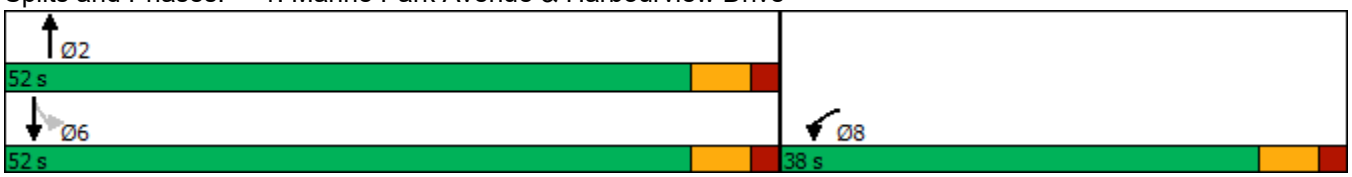
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	21	516	866
Volume Left	0	0	0
Volume Right	21	28	0
cSH	592	1700	1700
Volume to Capacity	0.04	0.30	0.51
Queue Length 95th (m)	0.9	0.0	0.0
Control Delay (s)	11.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.3	0.0	0.0
Approach LOS	B		

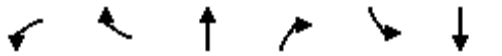
Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	45.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	96	769	57	743
Future Volume (vph)	96	769	57	743
Lane Group Flow (vph)	128	868	60	782
Turn Type	Prot	NA	Perm	NA
Protected Phases	8	2		6
Permitted Phases			6	
Detector Phase	8	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	34.0	28.0	28.0	28.0
Total Split (s)	38.0	52.0	52.0	52.0
Total Split (%)	42.2%	57.8%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
v/c Ratio	0.50	0.64	0.22	0.57
Control Delay	30.8	9.4	7.4	8.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	30.8	9.4	7.4	8.2
Queue Length 50th (m)	14.3	57.7	2.5	48.2
Queue Length 95th (m)	28.7	117.4	9.4	95.8
Internal Link Dist (m)	138.9	167.0		191.3
Turn Bay Length (m)			25.0	
Base Capacity (vph)	792	1362	271	1362
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.64	0.22	0.57

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 71
Natural Cycle: 80
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Marine Park Avenue & Harbourview Drive





Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	96	26	769	56	57	743
Future Volume (vph)	96	26	769	56	57	743
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	1.00		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.97		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1733		1825		1353	1827
Flt Permitted	0.96		1.00		0.25	1.00
Satd. Flow (perm)	1733		1825		362	1827
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	101	27	809	59	60	782
RTOR Reduction (vph)	15	0	2	0	0	0
Lane Group Flow (vph)	113	0	866	0	60	782
Confl. Peds. (#/hr)		2		8	8	
Heavy Vehicles (%)	2%	2%	3%	2%	33%	4%
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.6		51.7		51.7	51.7
Effective Green, g (s)	8.6		51.7		51.7	51.7
Actuated g/C Ratio	0.12		0.72		0.72	0.72
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	206		1305		258	1306
v/s Ratio Prot	c0.07		c0.47			0.43
v/s Ratio Perm					0.17	
v/c Ratio	0.55		0.66		0.23	0.60
Uniform Delay, d1	30.0		5.6		3.5	5.1
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	3.0		2.7		2.1	2.0
Delay (s)	33.0		8.3		5.6	7.2
Level of Service	C		A		A	A
Approach Delay (s)	33.0		8.3			7.1
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	18	731	65	0	800
Future Volume (Veh/h)	0	18	731	65	0	800
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	20	795	71	0	870
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			215			
pX, platoon unblocked	0.70	0.70			0.70	
vC, conflicting volume	1700	830			866	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1786	544			594	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	95			100	
cM capacity (veh/h)	63	377			687	

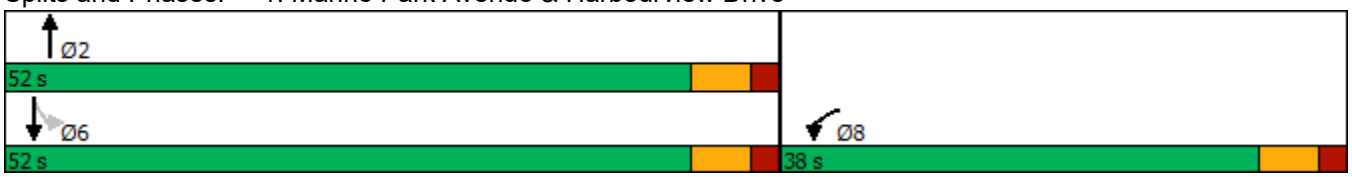
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	20	866	870
Volume Left	0	0	0
Volume Right	20	71	0
cSH	377	1700	1700
Volume to Capacity	0.05	0.51	0.51
Queue Length 95th (m)	1.3	0.0	0.0
Control Delay (s)	15.1	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.1	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay		0.2	
Intersection Capacity Utilization		52.4%	ICU Level of Service A
Analysis Period (min)		15	

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	101	496	30	823
Future Volume (vph)	101	496	30	823
Lane Group Flow (vph)	128	575	33	914
Turn Type	Prot	NA	Perm	NA
Protected Phases	8	2		6
Permitted Phases			6	
Detector Phase	8	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	34.0	28.0	28.0	28.0
Total Split (s)	38.0	52.0	52.0	52.0
Total Split (%)	42.2%	57.8%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
v/c Ratio	0.50	0.43	0.06	0.68
Control Delay	32.5	6.4	4.7	10.8
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	32.5	6.4	4.7	10.8
Queue Length 50th (m)	15.4	29.9	1.2	65.7
Queue Length 95th (m)	29.9	59.2	4.5	135.6
Internal Link Dist (m)	138.9	167.0		191.3
Turn Bay Length (m)			25.0	
Base Capacity (vph)	795	1329	576	1346
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.43	0.06	0.68

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 71.2
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Marine Park Avenue & Harbourview Drive



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	101	14	496	22	30	823
Future Volume (vph)	101	14	496	22	30	823
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frt	0.98		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1755		1785		1770	1810
Flt Permitted	0.96		1.00		0.42	1.00
Satd. Flow (perm)	1755		1785		775	1810
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	112	16	551	24	33	914
RTOR Reduction (vph)	8	0	1	0	0	0
Lane Group Flow (vph)	120	0	574	0	33	914
Heavy Vehicles (%)	2%	2%	6%	2%	2%	5%
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.7		51.7		51.7	51.7
Effective Green, g (s)	8.7		51.7		51.7	51.7
Actuated g/C Ratio	0.12		0.71		0.71	0.71
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	210		1274		553	1292
v/s Ratio Prot	c0.07		0.32			c0.51
v/s Ratio Perm					0.04	
v/c Ratio	0.57		0.45		0.06	0.71
Uniform Delay, d1	30.1		4.4		3.1	6.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	3.7		1.2		0.2	3.3
Delay (s)	33.8		5.5		3.3	9.3
Level of Service	C		A		A	A
Approach Delay (s)	33.8		5.5			9.1
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	9.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	72.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	19	485	26	0	854
Future Volume (Veh/h)	0	19	485	26	0	854
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	21	527	28	0	928
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			215			
pX, platoon unblocked	0.88	0.88			0.88	
vC, conflicting volume	1469	541			555	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1465	410			426	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	96			100	
cM capacity (veh/h)	124	565			997	

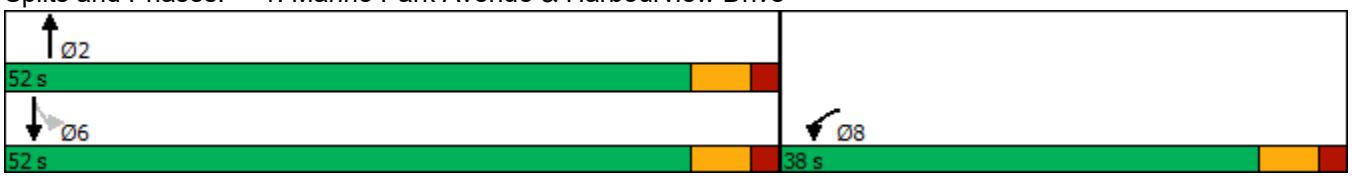
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	21	555	928
Volume Left	0	0	0
Volume Right	21	28	0
cSH	565	1700	1700
Volume to Capacity	0.04	0.33	0.55
Queue Length 95th (m)	0.9	0.0	0.0
Control Delay (s)	11.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	NBT	SBL	SBT
Lane Configurations				
Traffic Volume (vph)	96	821	57	803
Future Volume (vph)	96	821	57	803
Lane Group Flow (vph)	128	923	60	845
Turn Type	Prot	NA	Perm	NA
Protected Phases	8	2		6
Permitted Phases			6	
Detector Phase	8	2	6	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	34.0	28.0	28.0	28.0
Total Split (s)	38.0	52.0	52.0	52.0
Total Split (%)	42.2%	57.8%	57.8%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	Max	Max	Max
v/c Ratio	0.50	0.68	0.25	0.62
Control Delay	30.8	10.5	8.3	9.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	30.8	10.5	8.3	9.1
Queue Length 50th (m)	14.3	65.3	2.6	55.3
Queue Length 95th (m)	28.7	134.3	10.1	111.7
Internal Link Dist (m)	138.9	167.0		191.3
Turn Bay Length (m)			25.0	
Base Capacity (vph)	792	1362	240	1362
Starvation Cap Reductn	0	0	0	0
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.16	0.68	0.25	0.62

Intersection Summary
Cycle Length: 90
Actuated Cycle Length: 71
Natural Cycle: 90
Control Type: Semi Act-Uncoord

Splits and Phases: 1: Marine Park Avenue & Harbourview Drive



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	96	26	821	56	57	803
Future Volume (vph)	96	26	821	56	57	803
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0		6.0	6.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	1.00		1.00		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.97		0.99		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	1733		1826		1354	1827
Flt Permitted	0.96		1.00		0.23	1.00
Satd. Flow (perm)	1733		1826		322	1827
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	101	27	864	59	60	845
RTOR Reduction (vph)	15	0	2	0	0	0
Lane Group Flow (vph)	113	0	921	0	60	845
Confl. Peds. (#/hr)		2		8	8	
Heavy Vehicles (%)	2%	2%	3%	2%	33%	4%
Turn Type	Prot		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.6		51.7		51.7	51.7
Effective Green, g (s)	8.6		51.7		51.7	51.7
Actuated g/C Ratio	0.12		0.72		0.72	0.72
Clearance Time (s)	6.0		6.0		6.0	6.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	206		1305		230	1306
v/s Ratio Prot	c0.07		c0.50			0.46
v/s Ratio Perm					0.19	
v/c Ratio	0.55		0.71		0.26	0.65
Uniform Delay, d1	30.0		5.9		3.6	5.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	3.0		3.2		2.7	2.5
Delay (s)	33.0		9.2		6.3	7.9
Level of Service	C		A		A	A
Approach Delay (s)	33.0		9.2			7.8
Approach LOS	C		A			A

Intersection Summary			
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	0	18	784	65	0	860
Future Volume (Veh/h)	0	18	784	65	0	860
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	20	852	71	0	935
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			215			
pX, platoon unblocked	0.65	0.65			0.65	
vC, conflicting volume	1822	888			923	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1999	552			607	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	94			100	
cM capacity (veh/h)	43	345			628	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	20	923	935
Volume Left	0	0	0
Volume Right	20	71	0
cSH	345	1700	1700
Volume to Capacity	0.06	0.54	0.55
Queue Length 95th (m)	1.5	0.0	0.0
Control Delay (s)	16.1	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.1	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

MTO Left-Turn Analysis

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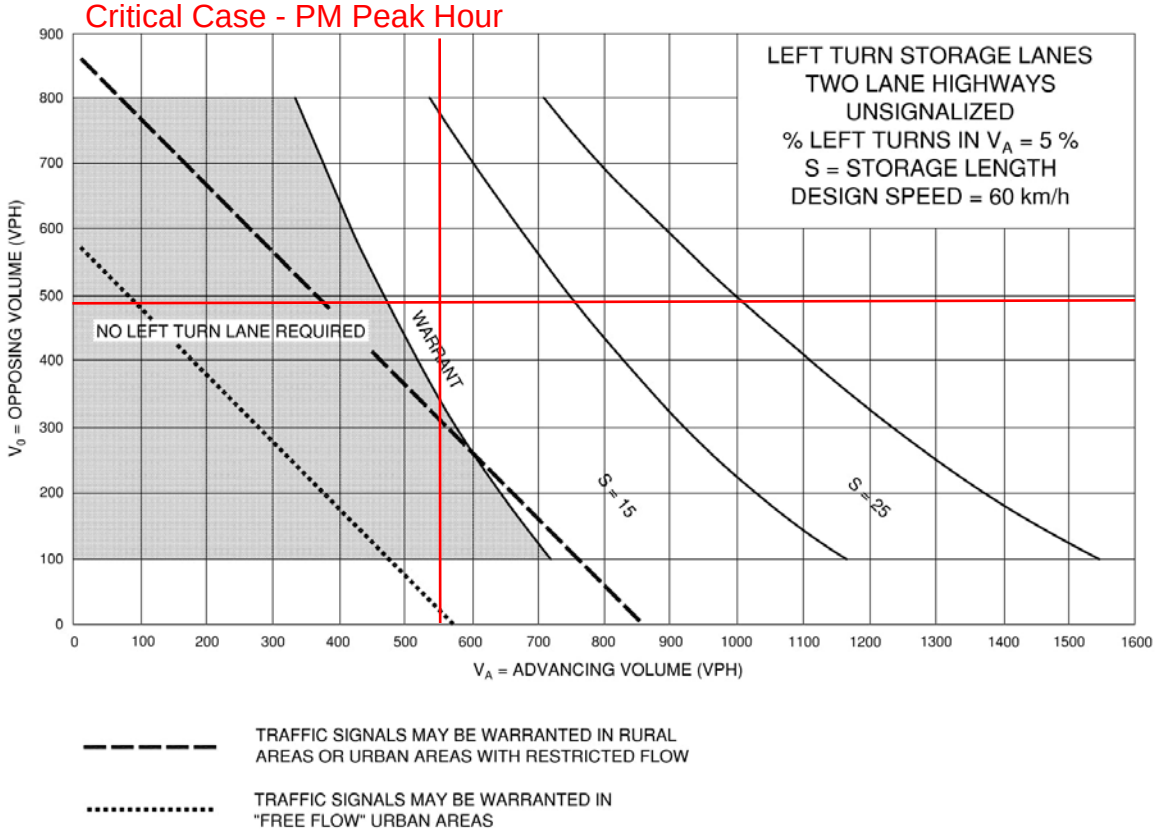
Harbourview Drive / Marine Park Avenue

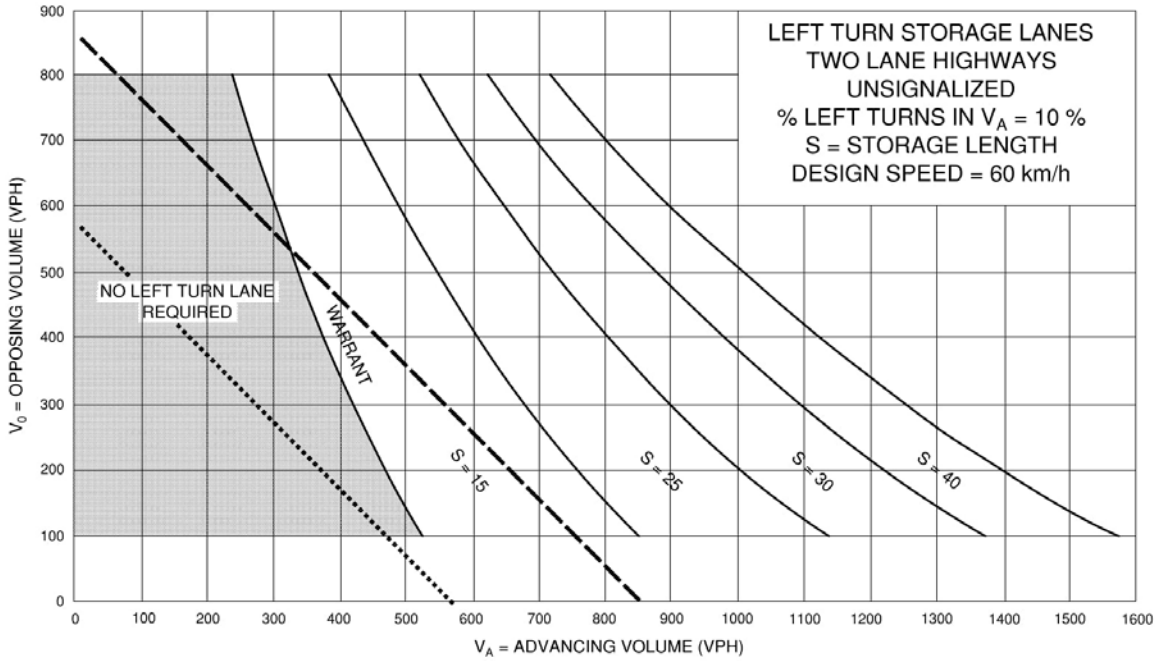
2019 Existing - Southbound **Exhibit 9A-6**

Critical Case - PM Peak Hour



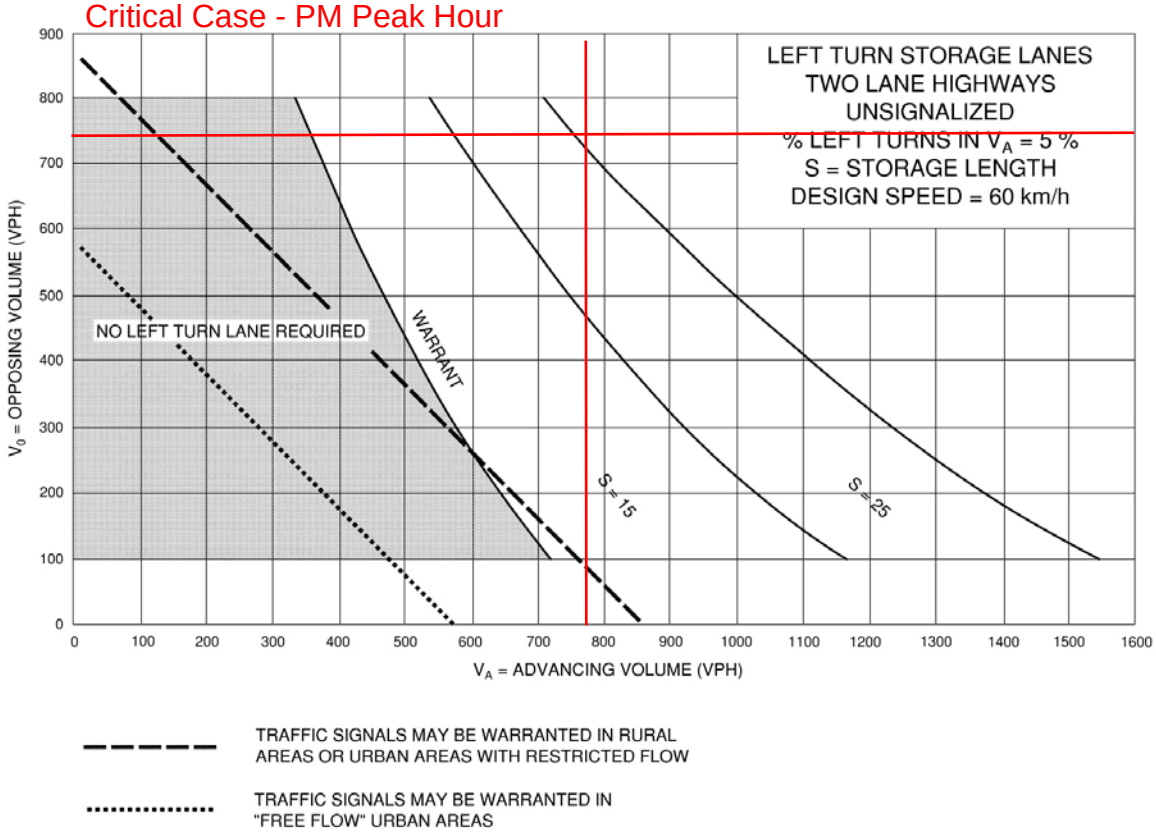
TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



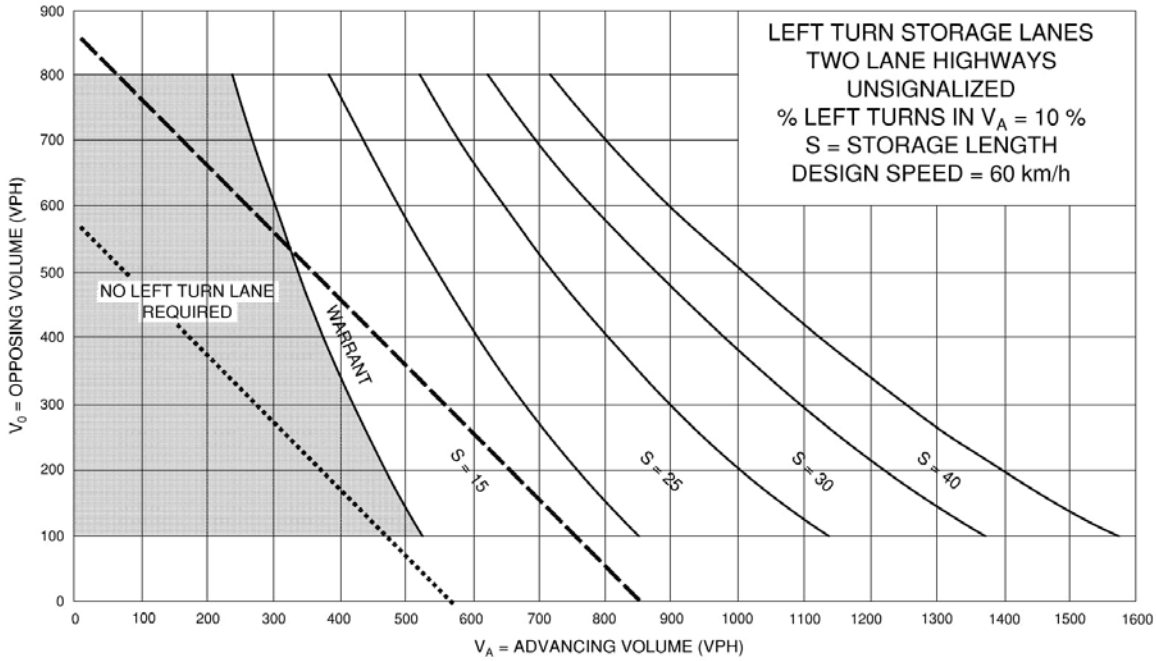
Harbourview Drive / Marine Park Avenue
2024 Background - Southbound
Critical Case - PM Peak Hour

Exhibit 9A-6



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS



OTM Signal Justification Sheets

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Justification No. 7 - 2024 Total Traffic

Harbourview Drive / Marine Park Avenue

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Rest. Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	720	785	109%	19%	NO	YES
	B. Vehicle volume, along minor streets (average hour)	255	59	23%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	707	98%	55%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	49	66%		NO	NO

Justification No. 7 - 2029 Total Traffic (Critical Case)

Harbourview Drive / Marine Park Avenue

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Rest. Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	720	836	116%	19%	NO	YES
	B. Vehicle volume, along minor streets (average hour)	255	59	23%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	757	105%	55%	NO	YES
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	49	66%		NO	NO

Justification No. 7 - 2029 Total Traffic (Critical Case)

Harbourview Drive / North Access

Justification	Description		Compliance			Signal Warrant	Underground Provisions Warrant
			Sectional		Entire %		
		Rest. Flow	Numerical	%			
1. Minimum Vehicluar Volume	A. Vehicle volume, all aproaches (average hour)	720	778	108%	2%	NO	YES
	B. Vehicle volume, along minor streets (average hour)	255	9	4%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	746	104%	0%	NO	YES
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	0	0%		NO	NO

NCHRP Internal Capture Reports

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NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	1191 Habourview Drive	**Organization:**	JD Engineering
Project Location:	1191 Habourview Drive, Midland, ON	**Performed By:**	Allister Aresta
Scenario Description:		**Date:**	November 13th, 2024
Analysis Year:		**Checked By:**	John Northcote
Analysis Period:	**AM Street Peak Hour**	**Date:**	November 13th, 2024

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				7	4	3
Restaurant				0		
Cinema/Entertainment				0		
Residential				113	29	84
Hotel				41	23	18
All Other Land Uses[2]				0		
				161	56	105

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant						
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses[2]						

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	161	56	105
Internal Capture Percentage	1%	2%	1%
External Vehicle-Trips[5]	159	55	104
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	25%	0%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	0%	1%
Hotel	0%	0%

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	1191 Habourview Drive
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	4	4	1.00	3	3
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	29	29	1.00	84	84
Hotel	1.00	23	23	1.00	18	18

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		0	0	0	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	1	17	0		0
Hotel	14	3	2	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	0	0
Retail	0		0	0	1	0
Restaurant	0	0		0	1	1
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		0
Hotel	0	0	0	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	3	4	3	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	0	29	29	29	0	0
Hotel	0	23	23	23	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	3	3	3	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	83	84	83	0	0
Hotel	0	18	18	18	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	1191 Habourview Drive	**Organization:**	JD Engineering
Project Location:	1191 Habourview Drive, Midland, ON	**Performed By:**	Allister Aresta
Scenario Description:		**Date:**	November 13th, 2024
Analysis Year:		**Checked By:**	John Northcote
Analysis Period:	**PM Street Peak Hour**	**Date:**	November 13th, 2024

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0		
Retail				17	9	8
Restaurant				0		
Cinema/Entertainment				0		
Residential				134	83	51
Hotel				52	27	25
All Other Land Uses[2]				0		
				203	119	84

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office						
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant						
Cinema/Entertainment						
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses[2]						

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	2	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	0	0		2
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	203	119	84
Internal Capture Percentage	5%	4%	6%
External Vehicle-Trips[5]	193	114	79
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	11%	25%
Restaurant	N/A	N/A
Cinema/Entertainment	N/A	N/A
Residential	2%	6%
Hotel	7%	0%

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	1191 Habourview Drive
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	9	9	1.00	8	8
Restaurant	1.00	0	0	1.00	0	0
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	83	83	1.00	51	51
Hotel	1.00	27	27	1.00	25	25

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		2	0	2	0
Restaurant	0	0		0	0	0
Cinema/Entertainment	0	0	0		0	0
Residential	2	21	11	0		2
Hotel	0	4	17	0	1	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	0	0	3	0
Retail	0		0	0	38	5
Restaurant	0	5		0	13	19
Cinema/Entertainment	0	0	0		3	0
Residential	0	1	0	0		3
Hotel	0	0	0	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	1	8	9	8	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	2	81	83	81	0	0
Hotel	2	25	27	25	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	2	6	8	6	0	0
Restaurant	0	0	0	0	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	3	48	51	48	0	0
Hotel	0	25	25	25	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.