



June 3, 2019

JDE Project 17124

Aalto Developments Inc.
190 Dunlop Street East
Barrie, ON L4M 1B3

**RE: Traffic Impact Study - Addendum
185 Dunlop Street, City of Barrie**

This letter was prepared by **JD Northcote Engineering Inc.** [JD Engineering] for the account of the **AALTO Developments Inc.** [The Developer].

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1.0 BACKGROUND

JD Engineering prepared a traffic impact study for the proposed 185 Dunlop Street mixed-use development [Subject Site], located in the City of Barrie [City] (dated December 21, 2017) [TIS]. The above noted TIS assessed the traffic-related impact of the proposed development on the adjacent roadway and provided recommendations to accommodate this traffic in a safe and efficient manner.

A development proposal is now underway for the property located directly west of the Subject Site [New Adjacent Development]. The New Adjacent Development extends from Dunlop Street East to the lake, between Mulcaster Street and the Subject Site. The New Adjacent Development will include one access onto Mulcaster Street [Mulcaster Access] and one access onto a proposed extension of Poyntz Street, south of Dunlop Street East [Adjacent Development Access], directly across from the proposed access for the Subject Site [West P1 Access]. To accommodate the New Adjacent Development, the proposed extension of Poyntz Street has been redesigned to accommodate traffic from the New Adjacent Development. The City has requested an update letter to the TIS to review the impact of the additional traffic volumes from the New Adjacent Development at the future Poyntz Street / Dunlop Street East intersection.

Furthermore, following the completion of the TIS, the Site Plan for the Subject Site has been revised to include 178 residential units and approximately 1,764 sq.m. commercial space (site plan provided in the **Appendix**). Included in the 1,764 sq.m. of commercial space will be a 5,600 sq.ft. health and fitness club.



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2.0 PROPOSED DEVELOPMENT – REVISED TRAFFIC GENERATION

The revised traffic generation for the Subject Site has been based on the Institute of Transportation Engineers [ITE] *Trip Generation Manual* (10th Edition) [ITE Trip Generation Manual]. The following ITE land use has been applied to estimate the revised traffic from the proposed development:

- ITE land use 231 (Mid-Rise Residential with 1st-Floor Commercial)
 - Dense Multi-Use Urban Setting
- ITE land use 492 (Health/Fitness Club)
 - General Urban / Suburban Setting

The estimated trip generation for the proposed development is illustrated below in **Table 1**. The AM and PM peak traffic generation for the proposed development is not anticipated 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 1 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Mid-Rise Residential with 1 st -Floor Commercial ITE Land Use: 231	178 units	23	32	55	37	47	84
Health/Fitness Club ITE Land Use: 492	5,600 sq.ft.	4	3	7	11	8	19
TOTAL TRIP GENERATION		27	35	62	48	55	103
Internal Capture		0	0	0	-3	-3	-6
NET TRIP GENERATION		27	35	62	45	52	97

It is noted that ITE land use 231 accounts for commercial space within a mixed-use building; however, we have accounted for additional traffic for the Health and Fitness Club as the commercial space in ITE land use 231 is typically considered to be retail.

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

3.0 PROPOSED DEVELOPMENT – REVISED TRAFFIC ASSIGNMENT

The distribution of residential traffic for the proposed development is assumed to follow the trip distribution calculated for residential traffic as illustrated in Table 10 in Section 4.2 in the TIS.

The distribution of health and fitness club traffic for the proposed development is assumed to follow the existing trip distribution in the study area as illustrated in Table 11 in Section 4.2 in the TIS.

The distribution of traffic entering at each site access driveway is based on our review of the internal parking and building layout, in conjunction with the external traffic distribution.

Using the traffic distribution patterns noted above, the residential and health and fitness club traffic assignments for the proposed development was calculated for the AM and PM peak hour and is illustrated in **Figures 1 and 2**, respectively.

Figure 1 – Proposed Development – Residential Traffic Assignment

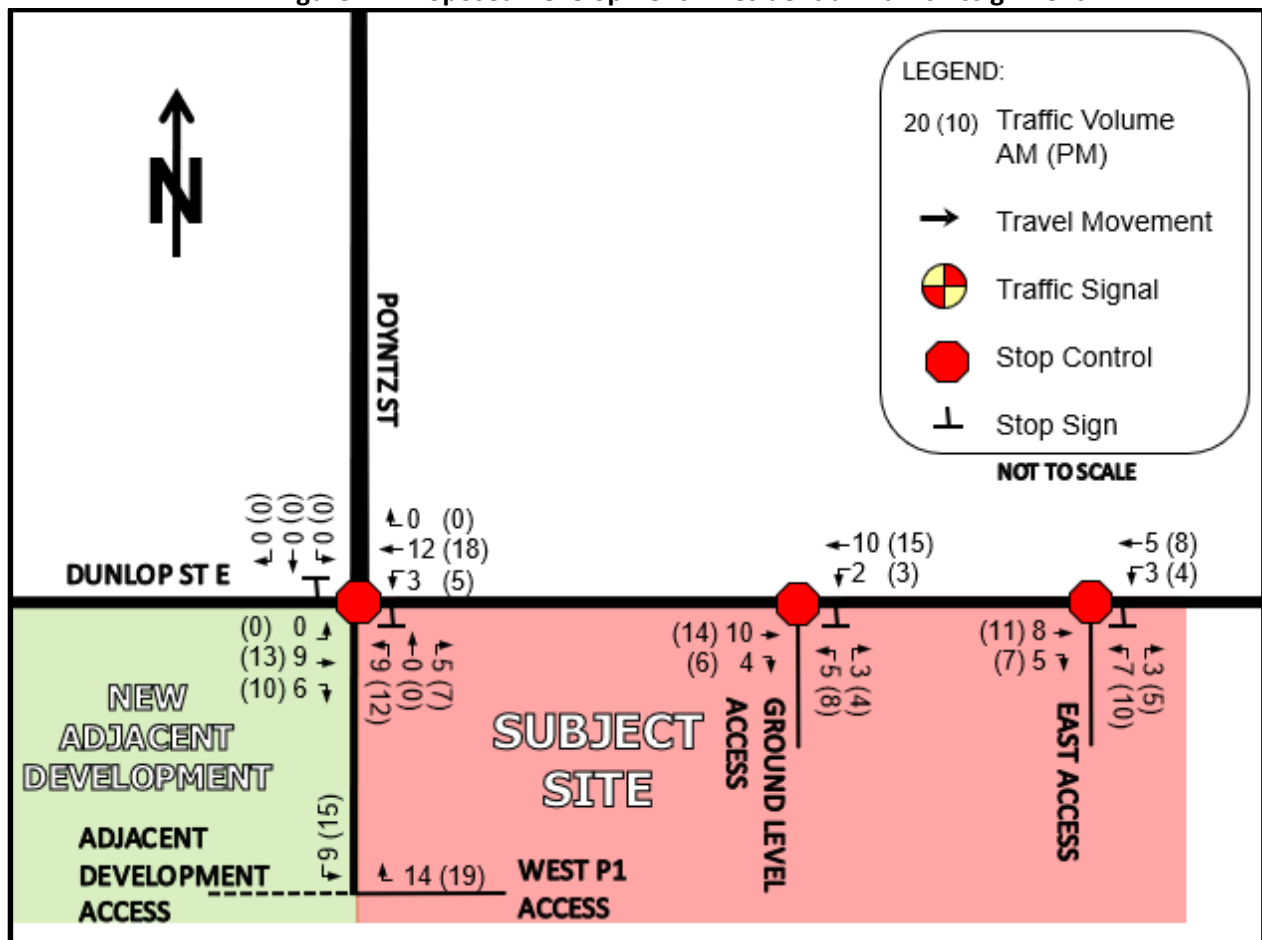
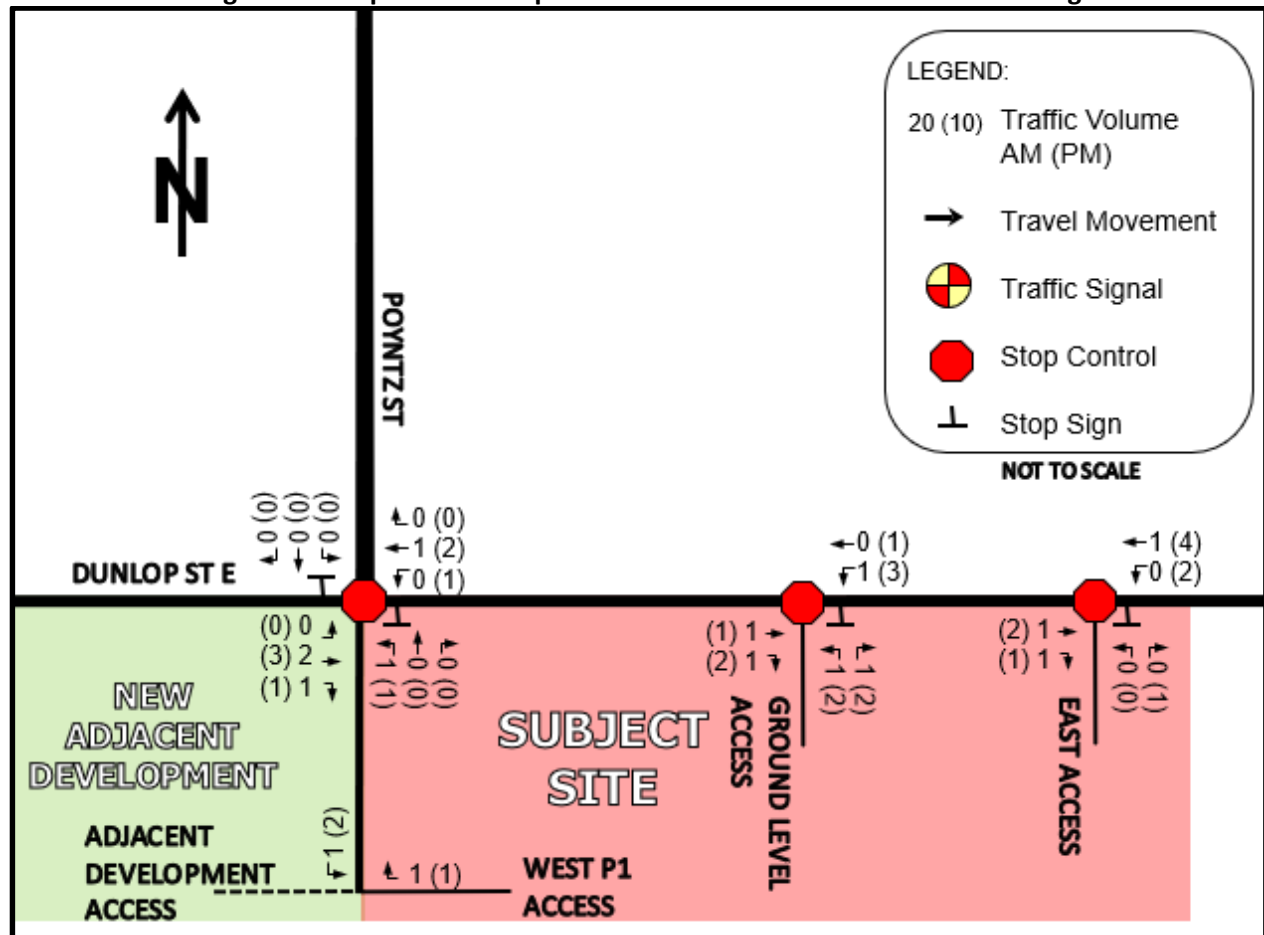


Figure 2 – Proposed Development – Health and Fitness Club Traffic Assignment



4.0 NEW ADJACENT DEVELOPMENT TRAFFIC GENERATION

The New Adjacent Development includes 130 hotel rooms, 136 condominium units and 500 sq.m. of commercial space. It has been assumed that this development will be occupied prior to the 2027 horizon year.

A traffic impact study is not available for the New Adjacent Development. The traffic generation for the New Adjacent Development has been calculated based on the data provided in the ITE Trip Generation Manual. The following ITE land uses have been applied to estimate the traffic from the New Adjacent Development:

- ITE land use 231 (Mid-Rise Residential with 1st-Floor Commercial) –
 - Dense Multi-Use Urban Setting
- ITE land use 310 (Hotel) – General Urban/Suburban Setting

The AM and PM peak hour traffic generation for the New Adjacent Development does not 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.

The estimated trip generation of the New Adjacent Development is illustrated below in **Table 2**.

Table 2 – Estimated Traffic Generation for the New Adjacent Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Mid-Rise Residential with 1 st -Floor Commercial ITE Land Use: 231	136 units	17	25	42	28	36	64
Hotel ITE Land Use: 310	130 units	36	25	61	40	38	78
TOTAL TRIP GENERATION		53	50	103	68	74	142

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

5.0 NEW ADJACENT DEVELOPMENT TRAFFIC ASSIGNMENT

The distribution of residential traffic for the New Adjacent Development is assumed to follow the trip distribution calculated for residential traffic as illustrated in Table 10 in Section 4.2 in the TIS.

The distribution of hotel traffic for the New Adjacent Development is assumed to follow the existing trip distribution in the study area traffic as illustrated in Table 11 in Section 4.2 in the TIS.

The distribution of traffic entering at each access driveway for the New Adjacent Development is based on our review of the internal parking and building layout, in conjunction with the external traffic distribution.

Using the traffic distribution patterns noted above, the residential and hotel traffic assignments for the New Adjacent Development was calculated for the AM and PM peak hour within the study area and is illustrated in **Figures 3** and **4**, respectively. It is noted that some of the New Adjacent Development traffic will not be within the study area due to the use of the Mulcaster Access.

Figure 3 – New Adjacent Development – Residential Traffic Assignment

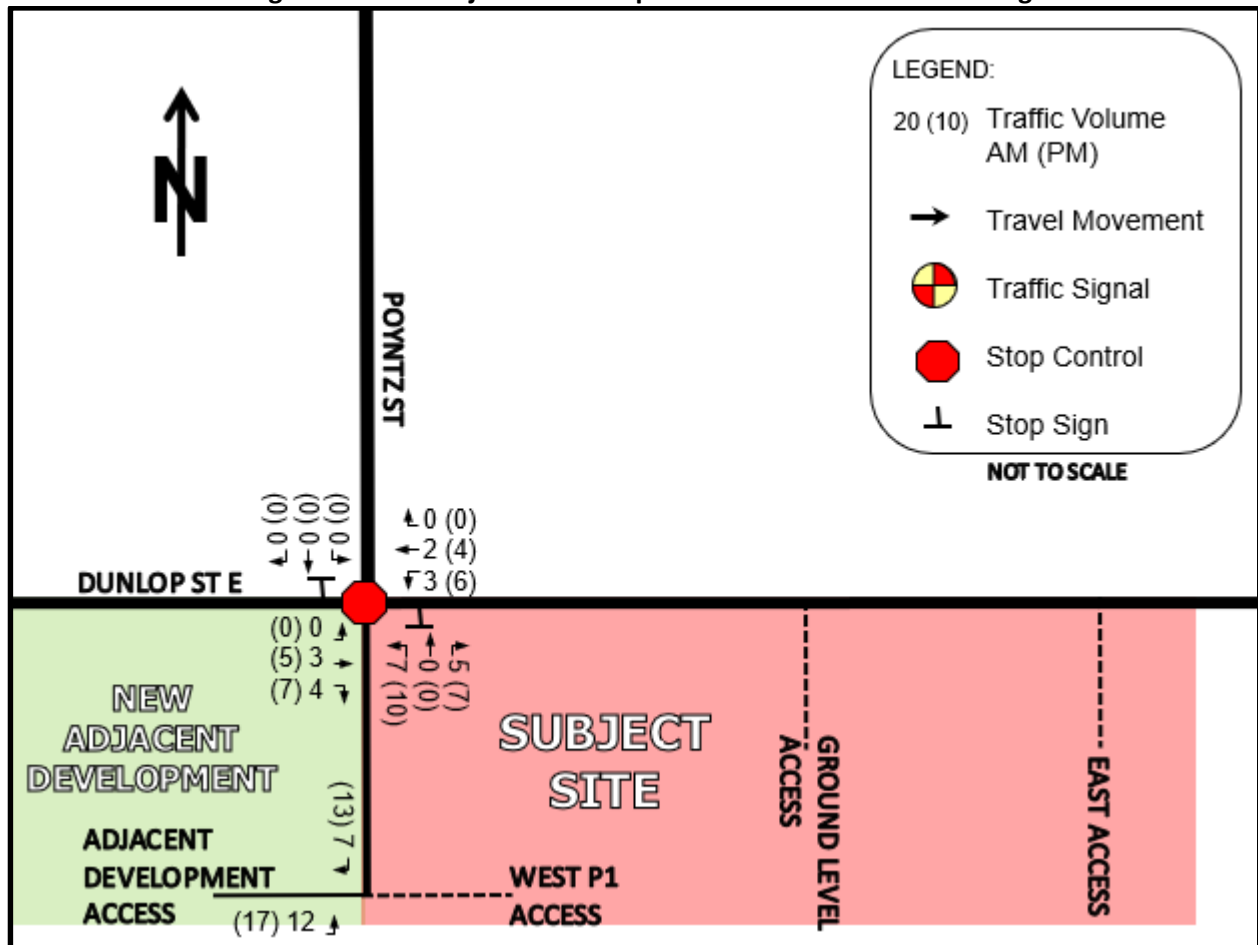
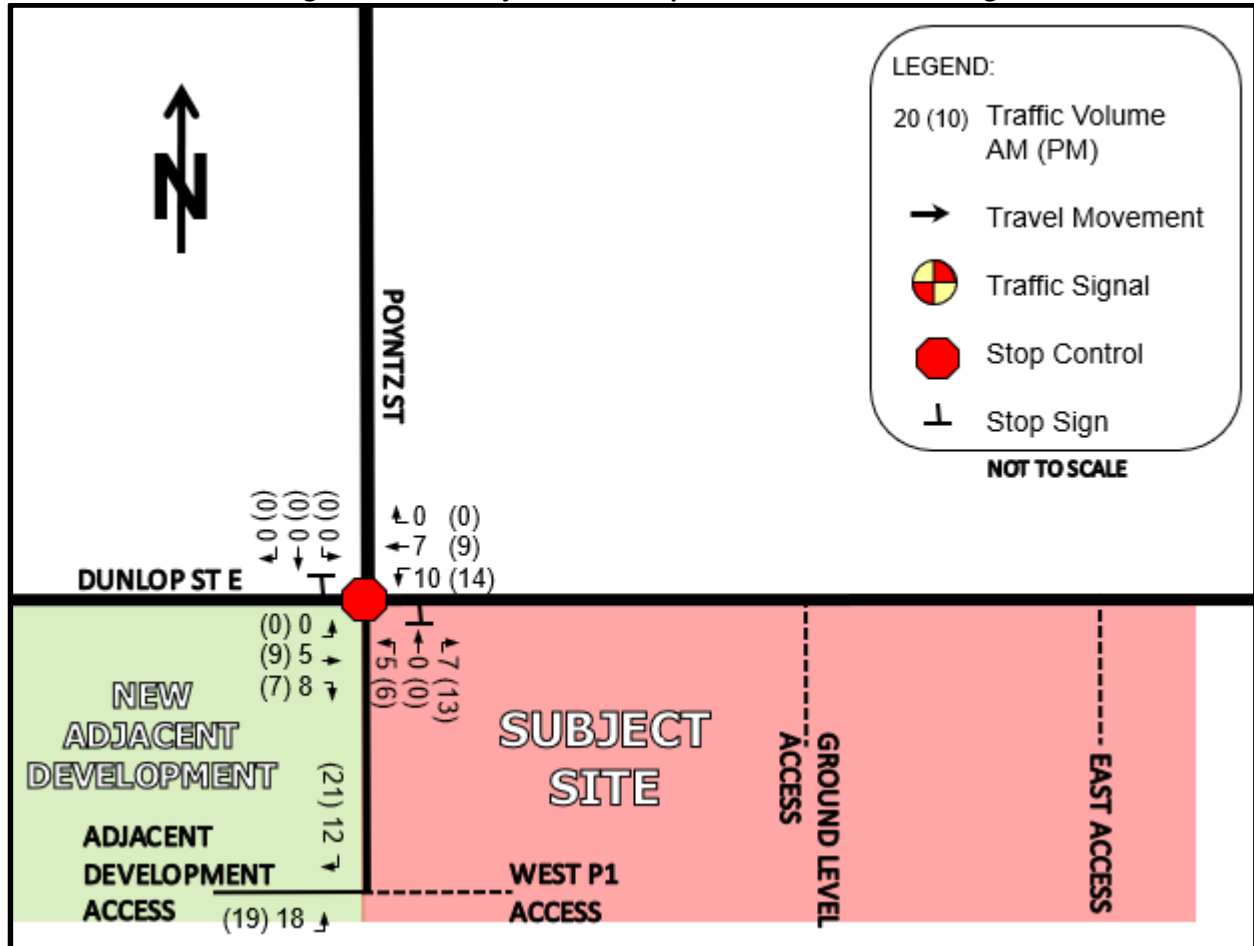


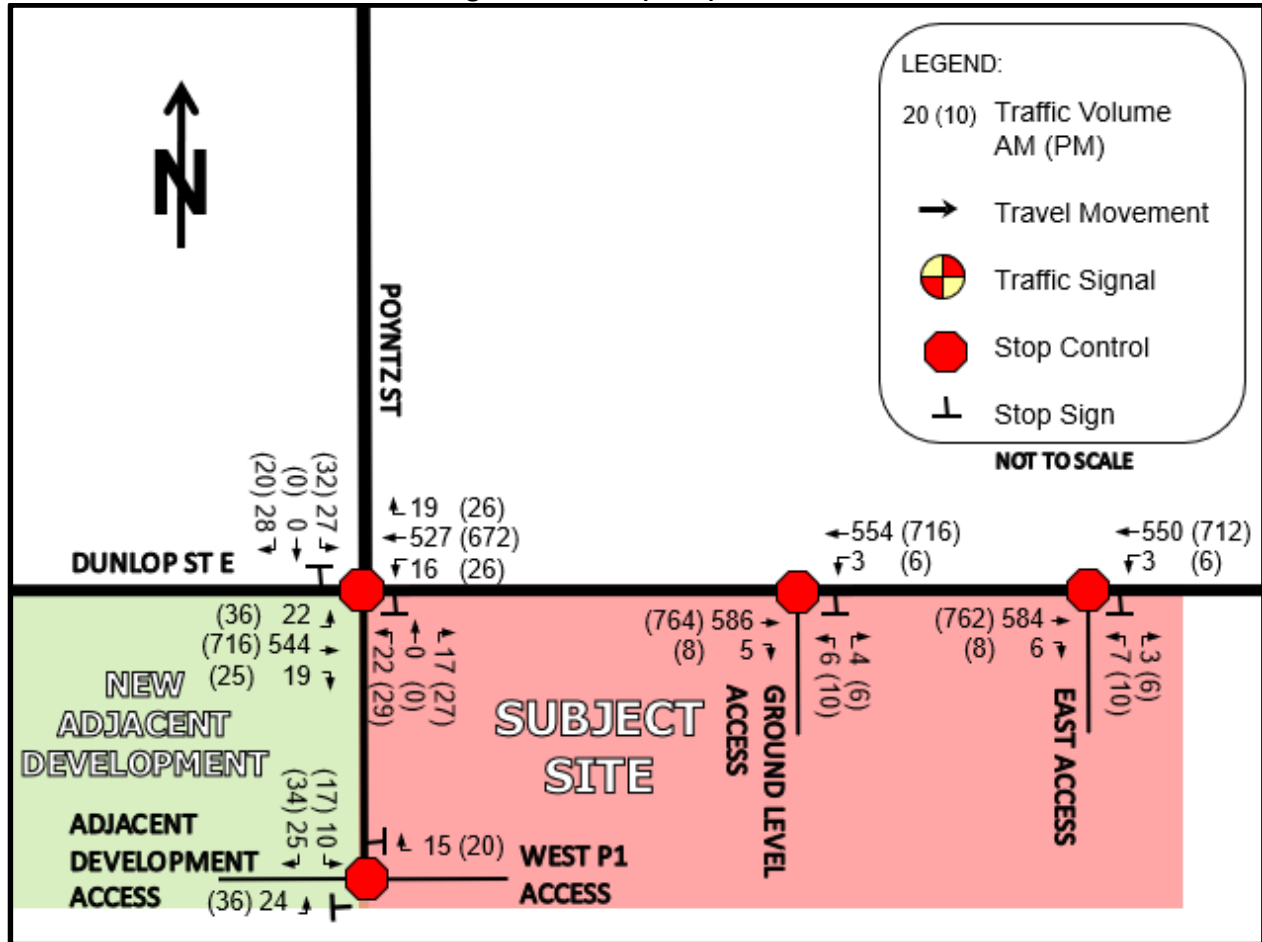
Figure 4 – New Adjacent Development – Hotel Traffic Assignment



6.0 TOTAL HORIZON YEAR TRAFFIC VOLUMES WITH THE PROPOSED DEVELOPMENT

For the revised total (2027) horizon year traffic volumes, the revised proposed development traffic and New Adjacent Development traffic was added to the background (2027) traffic volumes from the TIS. The resulting total (2027) horizon year traffic volumes for the AM and PM peak hour are illustrated in **Figure 5**.

Figure 5 – Total (2027) Traffic Volumes



7.0 TOTAL (2027) INTERSECTION OPERATION

The results of the LOS analysis under total (2027) traffic volumes during the AM and PM peak hour can be found below in **Table 3**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in the **Appendix**.

Table 3 – Total (2027) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour			Weekday PM Peak Hour		
	V/C	Delay (s)	LOS	V/C	Delay (s)	LOS
Poyntz Street / Dunlop Street East (unsignalized)	-	2.9	A	-	5.1	C
NB	0.25	32.4	D	0.46	56.3	F
SB	0.31	30.9	D	0.50	67.0	F
Ground Level Access / Dunlop Street East (unsignalized)	-	0.2	A	-	0.4	A
NB	0.05	21.3	C	0.09	28.6	D
East Access / Dunlop Street East (unsignalized)	-	0.2	A	-	0.4	A
NB	0.05	22.4	C	0.09	28.4	D

The results of the LOS analysis indicate that the northbound and southbound movements of the Poyntz Street / Dunlop Street East intersection are operating marginally outside the typical design limits noted in Section 3.1 of the TIS, during the PM peak hour; however, no infrastructure improvements are recommended as the delay is not significantly outside the design limits. Furthermore, the northbound movements are exclusively from the proposed development and the adjacent new development, both of which have alternate accesses, and the southbound movements onto Dunlop Street also have various alternate routes (eg. Mulcaster Street, Owen Street, Simpson Street). It is our expectation that some drivers will utilize the alternate routes available as the delay for the northbound and southbound movements of the Poyntz Street / Dunlop Street East intersection increases.

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

A review of the need for additional auxiliary right turn lanes at all unsignalized intersections was completed as part of our analysis. The results of the Synchro analysis indicate that there is excess capacity for all movements; consequently, additional auxiliary right turn lanes are not recommended.

An analysis was completed for left turn movements at unsignalized intersections within the study area, based on the criteria outlined in Appendix 9A of the MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads [MTO DS]. Based on the low volume of left turn movements from Dunlop Street East at the Ground Level Access and East Access, a left turn lane is not recommended at these locations. Based on the above noted criteria, a left turn lane is warranted for the westbound and eastbound movements at the Poyntz Street / Dunlop Street East intersection (results are provided in the **Appendix**); however, a left turn lane is not recommended as the left turn traffic volume accounts for less than 5% of the advancing traffic volume.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at any of the unsignalized study area intersections (results are provided in the **Appendix**).

No additional improvements are recommended within the study area.

8.0 SITE ACCESS

The Ground Level Access and East Access will operate efficiently as a full-movement access, with one-way stop control for the northbound movements. No lane improvements are recommended on Dunlop Street East at the Ground Level Access and East Access. A single northbound and southbound lane at the Ground Level Access and East Access driveways will provide the necessary capacity to service the proposed development.

The Poyntz Street extension will operate efficiently as a full-movement intersection, with two-way stop control for the northbound and southbound movements. . A single northbound and southbound lane on the Pointz Street extension will provide the necessary capacity to service the proposed developments. No lane improvements are recommended on Dunlop Street East at Poyntz Street.

The West P1 Access driveway and New Development Access driveway will operate efficiently as full-movement access driveways, with one-way stop control for the westbound and eastbound movements, respectively. A single eastbound and westbound lane for the West P1 Access driveway and New Development Access driveway will provide the necessary capacity to service the proposed developments.

9.0 PARKING REVIEW

The revised parking supply for the subject site meets the parking requirements specified in the City Zoning By-law 2009-141. Accessible parking for the subject site is provided according to the City Zoning By-law 2009-141. The proposed parking breakdown is provided in **Table 4**.

Table 4 – Parking Statistics

Category	Zoning By-Law Section	Parking Standard	Parking	
			Required	Provided
Residential	4.6.1	1 space per dwelling unit	178 Spaces	247 spaces
Commercial	4.6.3.1	No parking required within C1 Zone	0 Spaces	
Total			178 spaces	287 spaces
Barrier Free Parking	4.64	3% of required parking	6 Spaces	6 Spaces

We trust that you find this letter satisfies your requirements.

185 Dunlop Street
City of Barrie

Traffic Impact Study
Addendum

Date: 06/03/19
Project No.: 17124

Yours truly,
JD Northcote Engineering Inc.



John Northcote, P.Eng.
President

Appendix

Revised Site Plan

1 SITE PLAN
1 : 250



ZONING BY-LAW 2009-141
ZONED C14

	REQUIRED	PROVIDED
LOT AREA (M ²)	-	4795 m ²
LOT FRONTAGE (M)	-	164.6 m
FRONT YARD (M)	-	6.0 m
SIDE YARD (M)	-	3.1 m
REAR YARD (M)	-	1.9 m
REAR YARD (LANDSCAPED) (M)	3.0 m	1.9 m
REAR YARD (LANDSCAPED) (%)	100%	93.7%
REAR YARD (LANDSCAPED) (M ²)	60%	72.4%
REAR YARD (LANDSCAPED) (M ²)	60%	60%
PARKING SPACES	1/ANT - 7/8	241
REAR YARD (LANDSCAPED) (M ²)	3x1 m ² - 524	6

LEVEL	Description	Area
LEVEL 1	2,702 m ²	9
LEVEL 2	1,237 m ²	13
LEVEL 3	1,288 m ²	13
LEVEL 4, 5, 6, 7 & 8	15,767 m ²	132
LEVEL 9	239 m ²	22
LEVEL 10 (RENTAL HOUSE)	1,231 m ²	11
TOTAL	22,554 m ²	178

SEARCH
STAIRS
ELEVATORS
33 CORE
4-3H LIFE
CONCRETE

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No.	Description	Date
1	REVISION	2018
2	REVISION	2018
3	REV. REVISION	2018
4	REV. REVISION	2018
5	REV. REVISION	2018
6	REV. REVISION	2018
7	REV. REVISION	2018
8	REV. REVISION	2018
9	REV. REVISION	2018
10	REV. REVISION	2018
11	REV. REVISION	2018

















Ontario Assoc. of Architects
Stamp: **ISM ARCHITECTS INC.**
Professional License No. 2853

Client Information: **ALTO DEVELOPMENT INC.**
Project: **WATERFRONT CONDO**
Address: **185 DUNLOP STREET BARRE, ONT**
Project Information: 1538334
Drawn By: **ISM**
Checked By: **ISM**
Date: **DEC 13, 2018**
Scale: **As Indicated**
Drawing: **SITE PLAN**
Sheet No.: **A100**

Synchro Analysis Output – Total (2027) Traffic Volumes

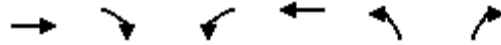
185 Dunlop Street East
1: Poyntz St & Dunlop St E

HCM Unsignalized Intersection Capacity Analysis
Total (2027) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	544	19	16	527	19	22	0	17	27	0	28
Future Volume (Veh/h)	22	544	19	16	527	19	22	0	17	27	0	28
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	25	611	21	18	592	21	25	0	19	30	0	31
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	613			632			1341	1320	622	1329	1320	602
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	613			632			1341	1320	622	1329	1320	602
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			79	100	96	76	100	94
cM capacity (veh/h)	966			951			117	150	487	123	150	499
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	657	631	44	61								
Volume Left	25	18	25	30								
Volume Right	21	21	19	31								
cSH	966	951	175	199								
Volume to Capacity	0.03	0.02	0.25	0.31								
Queue Length 95th (m)	0.6	0.5	7.6	9.9								
Control Delay (s)	0.7	0.5	32.4	30.9								
Lane LOS	A	A	D	D								
Approach Delay (s)	0.7	0.5	32.4	30.9								
Approach LOS			D	D								
Intersection Summary												
Average Delay			2.9									
Intersection Capacity Utilization			50.0%		ICU Level of Service				A			
Analysis Period (min)			15									

185 Dunlop Street East
2: Ground Level Access & Dunlop St E

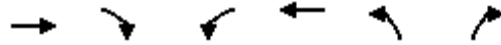
HCM Unsignalized Intersection Capacity Analysis
Total (2027) AM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	←
Traffic Volume (veh/h)	586	5	3	554	6	4
Future Volume (Veh/h)	586	5	3	554	6	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	658	6	3	622	7	4
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			664	1289		661
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			664	1289		661
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			100	96		99
cM capacity (veh/h)			925	180		462
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	664	625	11			
Volume Left	0	3	7			
Volume Right	6	0	4			
cSH	1700	925	231			
Volume to Capacity	0.39	0.00	0.05			
Queue Length 95th (m)	0.0	0.1	1.2			
Control Delay (s)	0.0	0.1	21.3			
Lane LOS			A	C		
Approach Delay (s)	0.0	0.1	21.3			
Approach LOS			C			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			41.5%	ICU Level of Service		A
Analysis Period (min)			15			

185 Dunlop Street East
3: East P1 Accss & Dunlop St E

HCM Unsignalized Intersection Capacity Analysis
Total (2027) AM Peak Hour



















Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	←
Traffic Volume (veh/h)	584	6	3	550	7	3
Future Volume (Veh/h)	584	6	3	550	7	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	656	7	3	618	8	3
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			663	1284		660
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			663	1284		660
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			100	96		99
cM capacity (veh/h)			926	181		463
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	663	621	11			
Volume Left	0	3	8			
Volume Right	7	0	3			
cSH	1700	926	218			
Volume to Capacity	0.39	0.00	0.05			
Queue Length 95th (m)	0.0	0.1	1.3			
Control Delay (s)	0.0	0.1	22.4			
Lane LOS			A	C		
Approach Delay (s)	0.0	0.1	22.4			
Approach LOS			C			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			41.3%	ICU Level of Service		A
Analysis Period (min)			15			

185 Dunlop Street East
1: Poyntz St & Dunlop St E

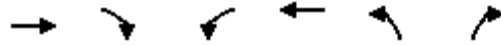
HCM Unsignalized Intersection Capacity Analysis

Total (2027) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	36	716	25	26	672	26	29	0	27	32	0	20
Future Volume (Veh/h)	36	716	25	26	672	26	29	0	27	32	0	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	37	738	26	27	693	27	30	0	28	33	0	21
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	720			764			1606	1599	751	1614	1598	706
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	720			764			1606	1599	751	1614	1598	706
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			97			61	100	93	55	100	95
cM capacity (veh/h)	882			849			76	98	411	74	99	436
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	801	747	58	54								
Volume Left	37	27	30	33								
Volume Right	26	27	28	21								
cSH	882	849	125	109								
Volume to Capacity	0.04	0.03	0.46	0.50								
Queue Length 95th (m)	1.1	0.8	16.6	17.8								
Control Delay (s)	1.1	0.8	56.3	67.0								
Lane LOS	A	A	F	F								
Approach Delay (s)	1.1	0.8	56.3	67.0								
Approach LOS			F	F								
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			64.4%		ICU Level of Service				C			
Analysis Period (min)			15									

185 Dunlop Street East
2: Ground Level Access & Dunlop St E

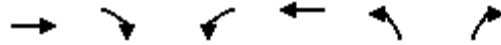
HCM Unsignalized Intersection Capacity Analysis
Total (2027) PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	←
Traffic Volume (veh/h)	764	8	6	716	10	6
Future Volume (Veh/h)	764	8	6	716	10	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	788	8	6	738	10	6
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			796	1542		792
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			796	1542		792
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			99	92		98
cM capacity (veh/h)			826	126		389
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	796	744	16			
Volume Left	0	6	10			
Volume Right	8	0	6			
cSH	1700	826	169			
Volume to Capacity	0.47	0.01	0.09			
Queue Length 95th (m)	0.0	0.2	2.5			
Control Delay (s)	0.0	0.2	28.6			
Lane LOS	A		D			
Approach Delay (s)	0.0	0.2	28.6			
Approach LOS	D					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			52.5%	ICU Level of Service	A	
Analysis Period (min)			15			

185 Dunlop Street East
3: East P1 Accss & Dunlop St E

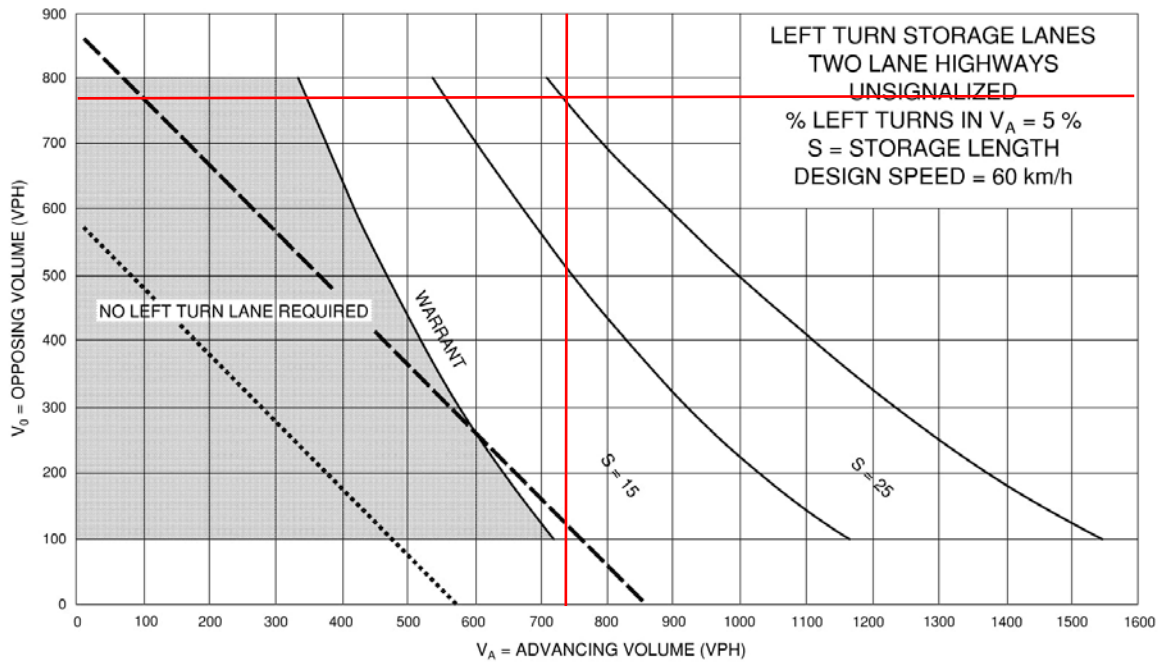
HCM Unsignalized Intersection Capacity Analysis
Total (2027) PM Peak Hour



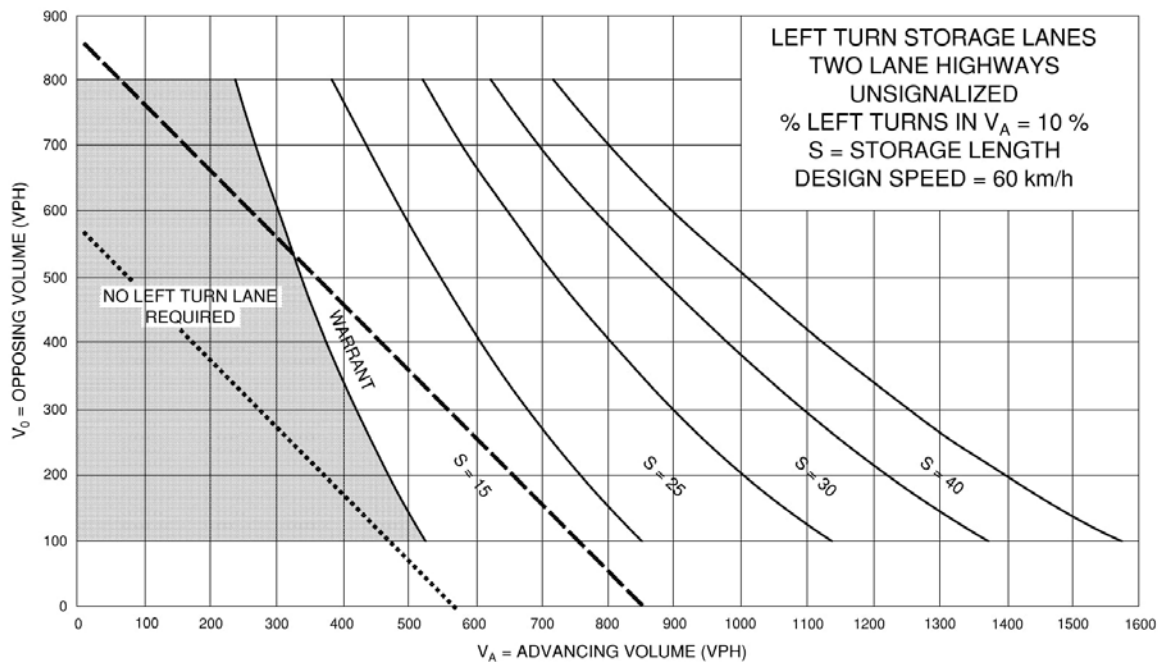
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	←	↗
Traffic Volume (veh/h)	762	8	6	712	10	6
Future Volume (Veh/h)	762	8	6	712	10	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	786	8	6	734	10	6
Pedestrians						
Lane 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			794	1536		790
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			794	1536		790
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			99	92		98
cM capacity (veh/h)			827	127		390
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	794	740	16			
Volume Left	0	6	10			
Volume Right	8	0	6			
cSH	1700	827	170			
Volume to Capacity	0.47	0.01	0.09			
Queue Length 95th (m)	0.0	0.2	2.5			
Control Delay (s)	0.0	0.2	28.4			
Lane LOS			A	D		
Approach Delay (s)	0.0	0.2	28.4			
Approach LOS			D			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			52.3%	ICU Level of Service		A
Analysis Period (min)			15			

MTO Left Turn Warrant Analysis

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

Justification No. 7 - 2027 Total Traffic (Critical Case)

Dunlop St E / Poyntz St

Justification	Description	Compliance			Signal Warrant	Underground Provisions Warrant
		Rest. Flow	Sectional			
			Numerical	%		
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	720	712	99%	25%	NO
	B. Vehicle volume, along minor streets (average hour)	170	51	30%		NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	640	89%	31%	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	27	37%		NO