

FEBRUARY 27, 2017

REFER TO FILE: 1286-4485

SENT BY EMAIL:

NBOUTIN@VALOURCAPITAL.COM

Pine-Ontario Development Ltd.
3410 South Service Road, Suite G5
Burlington, ON L7N 3T2

**Attention: Nicole Boutin
President**

**RE: TRAFFIC OPINION LETTER
70 PINE STREET
TOWN OF MILTON**

Dear Nicole,

Pursuant to your request for a transportation analysis regarding the proposed residential development located at 70 Pine Street, in the Town of Milton, this Traffic Opinion Letter (TOL) has been composed to support the Zoning By-Law Amendment and Site Plan Applications.

This letter reviews the development plan from a transportation engineering perspective. The main aspects reviewed in this letter are:

- The existing traffic operations at the study intersection of Pine Street at Ontario Street South during the weekday p.m. and Saturday peak hours.
- The trips generated by the proposed development.
- Queuing analysis using Simtraffic to review if the proposed site access is consistently blocked by queued vehicles from the intersection of Pine Street at Ontario Street South.
- The traffic operations at the study intersection when considering site generated traffic and background developments for a five year study horizon to 2022.
- Safety at the site access.

Correspondence between Nawfal Kammah (Crozier & Associates) and Michael Turco (Town of Milton) confirmed the scope of work used in this Traffic Opinion Letter and has been included in the attachments.



1.0 PROJECT PROPOSAL

Due to the skewed directions, Pine Street has been given an east-west alignment and Ontario Street South has been given a north-south alignment, to help provide clarity throughout the letter.

The subject property (70 Pine Street) is located on the south side of Pine Street, in the south-west corner of the Pine Street at Ontario Street South intersection, in the Town of Milton. The subject lands are categorized as a "Low Density Residential- RLD" zone by the Town of Milton Zoning By-Law 016-2014.

The subject lands currently contain a single-family detached house. The subject lands are bounded by Ontario Street South to the east, Pine Street to the north and residential development to the south and west. The site location and surrounding area are illustrated in **Figure 1**.

The project proposal is for a three-storey apartment building with a total of 19 dwelling units. A total of 30 parking spaces are proposed on-site, including 25 resident parking spaces and five visitor parking spaces. Two barrier-free parking are included. The proposed development has a full-moves access to Pine Street. Refer to **Figure 2** for the Site Plan Exterior Elevations prepared by GB Architect Inc. dated January, 2017.

2.0 EXISTING CONDITIONS

2.1 Boundary Road Network

Pine Street is an east-west roadway with a two-lane cross-section, one lane in each direction. Pine Street is under the jurisdiction of the Town of Milton and is defined as a collector per the Town of Milton Official Plan Schedule F, with a posted speed limit of 40 km/h at the site frontage. Concrete sidewalks are located on both sides of the roadway, separated from the roadway by a boulevard strip.

Ontario Street South is a north-south roadway with a four-lane cross-section, two lanes in each direction. Ontario Street South is under the jurisdiction of the Town of Milton and is defined as a multi-purpose arterial per the Town of Milton Official Plan Schedule F, with a posted speed limit of 50 km/h at the site frontage. Concrete sidewalks are located on both sides of the roadway, separated from the roadway by a boulevard strip.

The four-legged intersection of Pine Street at Ontario Street South is signalized. The northbound and southbound approaches (Ontario Street South) both consist of an exclusive left-turn lane, one through lane and a shared through/right-turn lane. The eastbound approach (Pine Street) consists of an exclusive left-turn lane and a shared through/right-turn lane. The westbound approach (Shopping Centre access) consists of an exclusive left-turn lane and a shared through/right-turn lane.

2.3 Cycling Facilities

There are currently no cycling facilities at the site frontage. However, the Town of Milton Trails and Cycling MasterPlan Update Map 3.2 proposes a Multi-Use Trail along Ontario Street South and an On-Route Signed Route along Pine Street. Relevant maps are attached to this letter.

2.4 Public Transit

Multiple Milton Transit Bus routes service the immediate surroundings of the site. Routes 1A and 1B – Industrial, Route 2 – Main, Route 5 – Yates, Route 6 – Scott and Route 8 – Willmott all have a stop near the intersection of Main Street at Ontario Street, located approximately 180 metres north of the site along Ontario Street South. Relevant maps are attached to this letter.

2.5 Traffic Data

Turning movement counts at the intersection of Pine Street at Ontario Street South were surveyed by Ontario Traffic Inc. on Tuesday December 13th, 2016, between 4 p.m. and 7 p.m., and on Saturday December 10th, 2016, between 10 a.m. and 3 p.m. The peak hours of the turning movement counts occurred between 4:30 p.m. and 5:30 p.m. on Tuesday December 13th, and between 12 p.m. and 13 p.m. on Saturday December 10th. Summary of the turning movement counts have been attached to this letter.

2.6 Traffic Modelling

The assessment of intersections is based on the method outlined in the "Highway Capacity Manual, 2010" using Synchro 8 modeling software. Intersections are assessed using a Level of Service metric, with ranges of delay assigned a letter from "A" to "F". For stop-controlled intersections, a Level of Service "A" or "B" would typically be measured during off-peak hours when lesser traffic volumes are on the roadways. Levels of Service "C" through "F" would typically be measured in the commuter peak hours when greater vehicle volumes cause longer travel times. The Level of Service (LOS) definitions for signalized intersections are attached.

2.7 Intersection Operations

The 2016 existing traffic operations at the intersection of Pine Street at Ontario Street South were analyzed on the basis of the traffic volumes recorded. Detailed capacity analyses are attached to this Traffic Opinion Letter. Signal timing plans for the study intersection were provided by the Town of Milton.

The operations of the critical intersection were analyzed on the basis of the traffic volumes illustrated in **Figure 3. Table 1** outlines the existing traffic levels of service.

Table 1: 2016 Existing Levels of Service

Intersection	Control	Peak Hour	Level of Service	Average Delay per Vehicle(s)	Max V/C Ratio (Approach)	V/C Ratio(s) > 0.85 (Approach)	95 th %ile Queues > Storage Length
Pine Street at Ontario Street South	Signal	P.M.	A	8.0	0.41 (SBT/R)	None	None
		Saturday	A	9.6	0.47 (WBT/R)	None	23.5 m (EBL) 26.0 m (NBL)

Note: The Level of Service of a signalized intersection is based on the average control delay per vehicle. 95th percentile queue analysis was completed using SimTraffic with 60 minutes recording time, 10 minutes seeding time, and an average of three runs.

As illustrated in **Table 1**, the intersection of Pine Street at Ontario Street South operates at a Level of Service "A" during the weekday p.m. and Saturday peak hours. The maximum average delay per vehicle is 9.6 seconds during the Saturday peak hour, with a maximum volume-to-capacity ratio of 0.47 for the westbound through/right-turn movement. 95th percentile queue lengths exceed the storage capacity during the Saturday peak hour by 3.5 metres for the eastbound left-turn movement and by one metre for the northbound left-turn movement. Therefore, queue lengths are expected to occasionally extend into the tapers and adjacent through lanes. Significant reserve capacity is available for future traffic volume growth.

3.0 LOCAL BACKGROUND DEVELOPMENTS

In order to complete a conservative analysis, local background developments were included to assess the full impact of the proposed development on the boundary road network. The various local background developments that impact the intersection of Pine Street at Ontario Street South are detailed below.

3.1 Hallawest Developments

The Hallawest Development project is located on the east side of Ontario Street South, between Centennial Forest Drive and Laurier Avenue. This development consists of 151 townhouse dwelling units. Tables 4.2 and 4.3 of the *Hallawest Developments Traffic Impact Study*, prepared by Paradigm Transportation Solutions Limited (Paradigm) dated November 24th, 2016, were used to assess the impacts of the Hallawest Development on the boundary road network.

According to Table 4.2 of the Paradigm report, a total 79 trips are expected to be generated by the Hallawest Development during the weekday p.m. peak hour, 53 trips entering the site and 26 trips exiting the site. The Paradigm report did not take into consideration a Saturday peak hour. Therefore, using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th edition, Land Use Category 230 "Residential Condominium/Townhouse", it was estimated that a total of 71 trips would be generated by the Hallawest Development during the Saturday peak hour with 38 trips entering the site and 33 trips exiting the site. Using the trip distribution outlined in Table 4.3 of the Paradigm report the trips were distributed north of the intersection of Ontario Street South at Parkway Drive East/Centennial Forest Drive.

The impact of the Hallawest Development site generated traffic on the intersection of Ontario Street South at Pine Street is illustrated in **Figure 4**.

3.2 80 Ontario Street North Redevelopment

The proposed redevelopment at 80 Ontario Street North is for an expansion of the existing residential development. The proposed redevelopment consists of the addition of a four-storey residential building containing 83 dwelling units. This proposed building will be connected to the existing nine-storey building by a one-storey atrium. The *80 Ontario Street North Traffic Impact Study*, prepared by Paradigm dated August, 2016, was used to assess the impact of the 80 Ontario Street North redevelopment on the boundary road network.

According to Table 3.2 of the Paradigm report, a total of 36 trips are expected to be generated by the 80 Ontario Street North redevelopment during the weekday p.m. peak hour, 26 trips entering the site and 10 trips exiting the site. The Paradigm report did not take into consideration a Saturday peak hour. Therefore, using the ITE Trip Generation Manual, 9th edition, Land Use Category 220 "Apartment", it was estimated

that a total of 44 trips would be generated during the Saturday peak hour with 29 trips entering the site and 15 trips exiting the site (the directional distribution from the ITE's weekday p.m. peak hour generation was used as it is not available for the Saturday peak hour). Using the weekday p.m. trip distribution outlined in Table 3.3 of the Paradigm report the trips were distributed travel along Ontario Street south of Main Street for both study peak hours.

The impact of the 80 Ontario Street North redevelopment site generated traffic on the intersection of Ontario Street South at Pine Street is illustrated in **Figure 5**.

3.3 Lowe's (Milton Mall) Development

The Lowe's development, located within the Milton Mall at 55 Ontario Street, is replacing the previously existing Target store. The Lowe's Development is currently under construction. Based on the *Lowe's of Milton Traffic/Parking Review*, prepared by Dillon Consulting (Dillon) dated February 4th, 2016, the Lowe's development will have a total area of 9,689 square metres (104,290 square feet). This information will be used to assess the impacts of the Lowe's development on the intersection of Ontario Street South at Pine Street.

The Dillon report did not provide information regarding the number of trips generated by the Lowe's development or their assignment to the boundary road network. Therefore, the trips generated by the proposed Lowe's development were calculated using ITE data, and their distribution to the boundary road network was completed using existing conditions and best practices.

It is assumed that the ITE Trip Generation Manual, 9th edition, Land Use Category 820 "Home Improvement Superstore" is adequate to represent the Lowe's development. According to the ITE Trip Generation Manual, the Lowe's development is expected to generate a total of 243 trips during the weekday p.m. peak hour with 119 trips entering the site and 124 trips exiting the site. During the Saturday peak hour it is expected to generate a total of 471 trips with 240 trips entering the site and 231 trips exiting the site. As the Milton Mall entrance via Ontario Street South is one of four and does not allow customers direct access to the Lowe's development, it is assumed that a total of 30% of the trips generated by the Lowe's development will use the Ontario Street South entrance. The directional distribution of said trips within the intersection of Pine Street at Ontario Street South is based on existing traffic patterns.

The impact of the Lowe's development site generated traffic on the intersection of Ontario Street South at Pine Street is illustrated in **Figure 6**.

4.0 SITE GENERATED TRAFFIC AND TRIP DISTRIBUTION

Site generated traffic for the proposed development was calculated using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition, Land Use Category 220 "Apartment". **Table 2** below summarizes the total amount of trips generated.

Table 2: Site Generated Trips

Type of Use	Number of Dwellings	Peak Hour	Trips per Dwelling	In (%)	Out (%)	Total
Apartment (Category 220)	19	Weekday P.M.	0.62	8 (65%)	4 (35%)	12
		Saturday*	0.52	6 (65%)	4 (35%)	10

*Note: No directional distribution was available for the Saturday Peak Hour Generator. Therefore the weekday p.m. Peak Hour directional distribution was used for the Saturday Peak Hour.

Vehicles entering and exiting the site were distributed based on existing travel patterns at the study intersection. The site trip distribution and trip assignment volumes are illustrated in **Figure 7 and 8**, respectively.

5.0 TOTAL TRAFFIC OPERATIONS

Traffic operations at the intersections of Pine Street at Ontario Street South and Pine Street at the Site Access were assessed under future total traffic conditions. Existing traffic volumes were grown using an industry standard of two percent and a five year study horizon to 2022. The local background development traffic volumes and site generated traffic were then added to the grown traffic volumes to create the future total traffic volumes, illustrated in **Figure 9**. Detailed capacity analyses are attached to this Traffic Opinion Letter. **Table 3** outlines the future total traffic Levels of Service.

Table 3: 2022 Total Traffic Levels of Service

Intersection	Control	Peak Hour	Level of Service	Average Delay per Vehicle(s)	Max V/C Ratio (Approach)	V/C Ratio(s) > 0.85 (Approach)	95 th %ile Queues > Storage Length
Ontario Street South at Pine Street	Signal	P.M.	A	9.3	0.49 (NBT/R)	None	22.2 m (EBL) 26.2 m (NBL)
		Saturday	B	11.9	0.59 (WBT/R)	None	22.8 m (EBL) 30.7 m (NBL)
Pine Street at Site Access	One-Way Stop	P.M.	A (NB)	9.6	0.01 (NB)	None	None
		Saturday	A (NB)	9.7	0.01 (NB)	None	None

Note: The Level of Service of a signalized intersection is based on the average control delay per vehicle. Signal Timing Plans were optimized using the "Optimize Splits" function in Synchro 8. The Level of Service of a Stop-Controlled intersection is based on the delay associated with the critical minor approach. 95th percentile queue analysis was completed using SimTraffic with 60 minutes recording time, 10 minutes seeding time, and an average of three runs.

As illustrated in **Table 3**, the intersection of Pine Street at Ontario Street South is projected to operate at a Level of Service "A" and "B" during the weekday p.m. and Saturday peak hours, respectively. The maximum average delay per vehicle is projected to be 11.9 seconds during the Saturday peak hour, an increase of 2.3 seconds compared to existing conditions. A maximum volume-to-capacity ratio of 0.59 is projected for the westbound through/right-turn movement during the Saturday peak hour. 95th percentile queue lengths are projected to exceed the storage capacity during the weekday p.m. peak hour by 2.2 metres for the eastbound left-turn movement and by 1.2 metres for the northbound left-turn movement. 95th percentile

queue lengths are projected to exceed the storage capacity during the Saturday peak hour by 2.8 metres for the eastbound left-turn movement and by 5.7 metres for the northbound left-turn movement. Therefore, queue lengths are expected to occasionally extend into the tapers and adjacent through lanes.

The intersection of Pine Street at the Site Access is projected to operate at a Level of Service "A" during the weekday p.m. and Saturday peak hour. A maximum average delay per vehicle of 9.7 seconds is projected for the Saturday peak hour, with a maximum volume-to-capacity ratio of 0.01 for the northbound movement.

The Site Access is located approximately 35.6 metres west of the intersection of Pine Street at Ontario Street South. During the weekday p.m. peak hour the average 95th percentile queue length for the eastbound through/right-turn movement is approximately 29.4 metres, based on SimTraffic results. During the Saturday peak hour the average 95th percentile queue length is approximately 31.8 metres. Therefore, the queue at the intersection will not obstruct the proposed site access during either peak hours.

6.0 SITE ACCESS GEOMETRICS

A sight line review of the site access was undertaken using the Transportation Association of Canada's Geometric Design Manual for Canadian Roads (TAC Manual). Minimum required turning sight distances were derived using a design speed of 50 km/h, corresponding to the posted 40 km/h speed limit on Pine Street. Figure 2.3.3.4a and Figure 2.3.3.4b of the TAC Manual are attached to this letter.

For Pine Street, the minimum Turning Sight Distance required is 107 metres as per Figure 2.3.3.4b of the TAC Manual. This represents the "sight distance for a passenger vehicle to turn left onto a two-lane roadway without being overtaken by a vehicle approaching from the right".

Pine Street is a straight, flat, roadway. Therefore the sight distances available exceed 107 metres and are above the acceptable ranges outlined in Figure 2.3.3.4a and Figure 2.3.3.4b of the TAC Manual. Therefore, no sight line issues exist. Additionally, no issues related with corner clearances, access conflicts, heavy truck movements and transit operational conflicts were identified.

7.0 CONCLUSION

Under 2016 existing traffic conditions, the intersection of Pine Street at Ontario Street South operates at a Level of Service "A" during the weekday p.m. and Saturday peak hours. The maximum average delay per vehicle is 9.6 seconds during the Saturday peak hour, with a maximum volume-to-capacity ratio of 0.47 for the westbound through/right-turn movement. 95th percentile queue lengths exceed the storage capacity during the Saturday peak hour by 3.5 metres for the eastbound left-turn movement and by one metres for the northbound left-turn movement. Therefore, queue lengths are expected to occasionally extend into the tapers and adjacent through lanes.

The proposed development is projected to generate a total of 12 trips during the weekday p.m. peak hour, and 10 trips during the Saturday peak hour.

Under 2022 total traffic conditions, the intersection of Pine Street at Ontario Street South is projected to operate at a Level of Service "A" and "B" during the weekday p.m. and Saturday peak hours, respectively. The maximum average delay per vehicle is projected to be 11.9 seconds during the Saturday peak hour, an

increase of 2.3 seconds compared to existing conditions. A maximum volume-to-capacity ratio of 0.59 is projected for the westbound through/right-turn movement during the Saturday peak hour. 95th percentile queue lengths are projected to exceed the storage capacity during the weekday p.m. peak hour by 2.2 metres for the eastbound left-turn movement and by 1.2 metres for the northbound left-turn movement. 95th percentile queue lengths are projected to exceed the storage capacity during the Saturday peak hour by 2.8 metres for the eastbound left-turn movement and by 5.7 metres for the northbound left-turn movement. Therefore, queue lengths are expected to occasionally extend into the tapers and adjacent through lanes.

The intersection of Pine Street at the Site Access is projected to operate at a Level of Service "A" during the weekday p.m. and Saturday peak hour. A maximum average delay per vehicle of 9.7 seconds is projected for the Saturday peak hour, with a maximum volume-to-capacity ratio of 0.01 for the northbound movement.

The Site Access is located approximately 35.6 metres west of the intersection of Pine Street at Ontario Street South. During the weekday p.m. peak hour the average 95th percentile queue length for the eastbound through/right-turn movement is approximately 29.4 metres, based on SimTraffic results. During the Saturday peak hour the average 95th percentile queue length is approximately 31.8 metres. Therefore, the queue at the intersection will not obstruct the proposed site access during either peak hours.

The proposed site will be accessible via Pine Street. No sightline issues are anticipated at the site access. Additionally, no issues related to corner clearances, access conflicts, heavy truck movements and transit operational conflicts were identified.

The Zoning By-Law Amendment and Site Plan Approval for the proposed development can be supported from a traffic operations perspective. We trust that this review satisfies any transportation concerns associated with this development. Please feel free to contact the undersigned for any further information required.

Respectfully submitted by,

C.F. CROZIER & ASSOCIATES INC.



Nawfal Kammah, B.Eng., E.I.T.
Transportation

C.F. CROZIER & ASSOCIATES INC.



R. Aaron Wignall
Senior Transportation Technologist

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ATTACHMENTS

Nawfal Kammah

From: Michael.Turco@milton.ca
Sent: Thursday, December 08, 2016 11:35 AM
To: Nawfal Kammah
Cc: Aaron Wignall
Subject: RE: 70 Pine Street Development Terms of Reference (1286-4485)

Hello Nawfal,

A Traffic Brief as opposed to a full Transportation Impact Study is acceptable.

- Analysis will include the intersection of Pine Street at Ontario Street. Acceptable
- To reflect the residential use of the site, the weekday AM and PM peak hours will be analyzed. Please analyze weekday PM and Saturday peak hours due to the close proximity of the shopping centre.
- Trip distribution will be based on Existing Travel Patterns. Acceptable.
- Existing traffic volumes and total traffic volumes (which includes existing volumes and site generated traffic) will be analyzed. Existing conditions and a 5-year post build-out future total horizon are to be analyzed. Please include the following other area developments in the future total volumes:
 - Hallawest Developments East side of Ontario Street b/w Laurier Ave & Centennial Forest Drive– TIS conducted by Paradigm Transportation Solutions in 2014
 - Lowes in Milton Mall – TIS conducted by Dillon Consulting in 2014
 - 80 Ontario Street North – TIS conducted by Paradigm Transportation Solutions in 2016
- The safety at the site access will be analyzed. As part of the site access review, please ensure that the site access conforms to all TAC and OPSD 350.010 standards.
- Please conduct a SimTraffic queuing analysis to ensure that the site driveway is not consistently blocked.
- In support of the minor variance, a parking justification study is required. Please conduct parking surveys at two to three similar sites within the Town of Milton. Please also compare the Zoning by-law requirements to the ITE Parking Generation Manual 4th Edition. Additionally, a TDM component must also be included with detailed recommendations to justify the reduction in parking requirements.

If you have any questions or concerns, please feel free to contact me.

Regards,

Michael Turco, C.E.T., MITE
Transportation Planning Technologist

From: Nawfal Kammah [<mailto:nkammah@cfcrozier.ca>]
Sent: Monday, December 05, 2016 1:28 PM
To: Michael Turco
Cc: Aaron Wignall
Subject: 70 Pine Street Development Terms of Reference (1286-4485)

Hi Michael,

I apologize for the numerous emails today. We have been retained for many projects in the Town of Milton which require your input.

We have been retained to put together a Traffic Impact Study for a development located at 70 Pine Street , in the Town of Milton. I have attached the latest site plan for your review.

The proposed residential development will have a relatively minor impact to the operations of the boundary road network and is estimated to generate 13 trips during the weekday AM Peak Hour and 15 trips during the weekday PM Peak Hour using the average rate of the ITE trip generation manual, Category 220 (Apartment).

Due to the small amount of trips generated by the proposed development would the Town agree to a Traffic Opinion Letter (TOL) rather than a full Traffic Impact Study?

If a TOL is satisfactory, we would like your approval of the following steps in order to begin our analysis:

- Analysis will include the intersection of Pine Street at Ontario Street.
- To reflect the residential use of the site, the weekday AM and PM peak hours will be analyzed.
- Trip distribution will be based on Existing Travel Patterns.
- Existing traffic volumes and total traffic volumes (which includes existing volumes and site generated traffic) will be analyzed.
- The safety at the site access will be analyzed.

I hope the above is acceptable. Should you have any questions or concerns please feel free to contact myself or my colleague Aaron Wignall copied on this email.

Thanks for your time,

| **NAWFAL KAMMAH E.I.T.** | C.F. CROZIER & ASSOCIATES
| 2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
| cfcrozier.ca | nkammah@cfcrozier.ca | tel 905 875 0026



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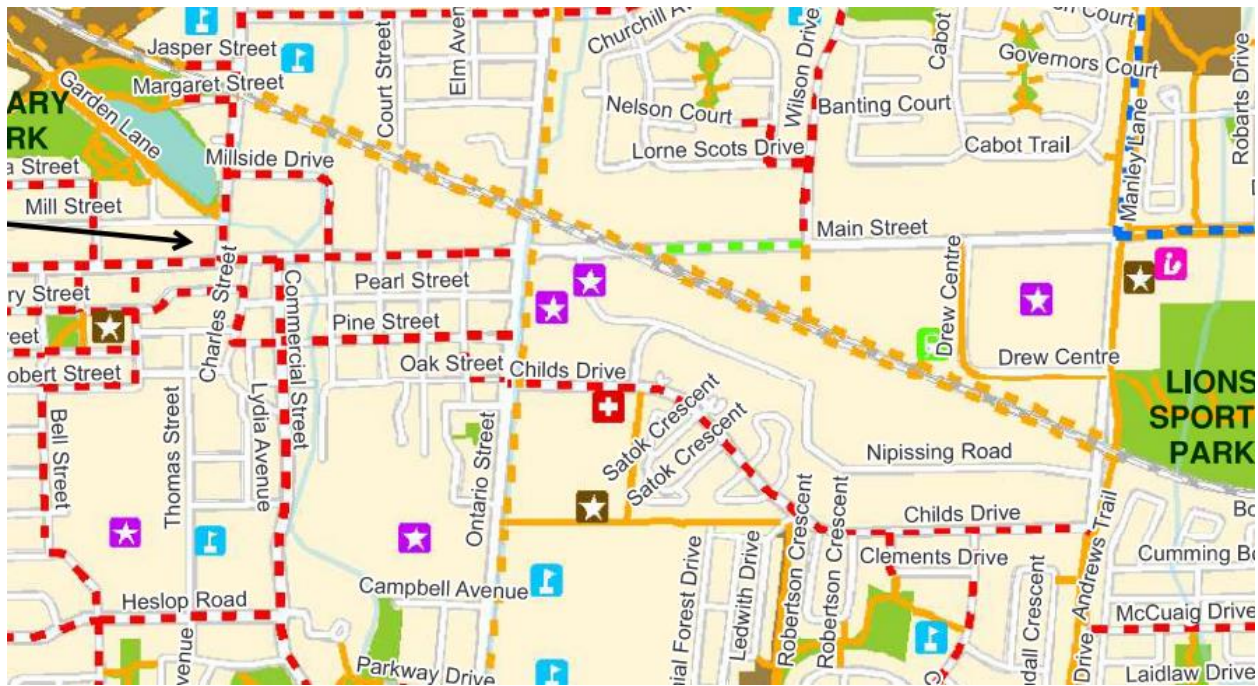
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Cycling Map and Legend



Legend

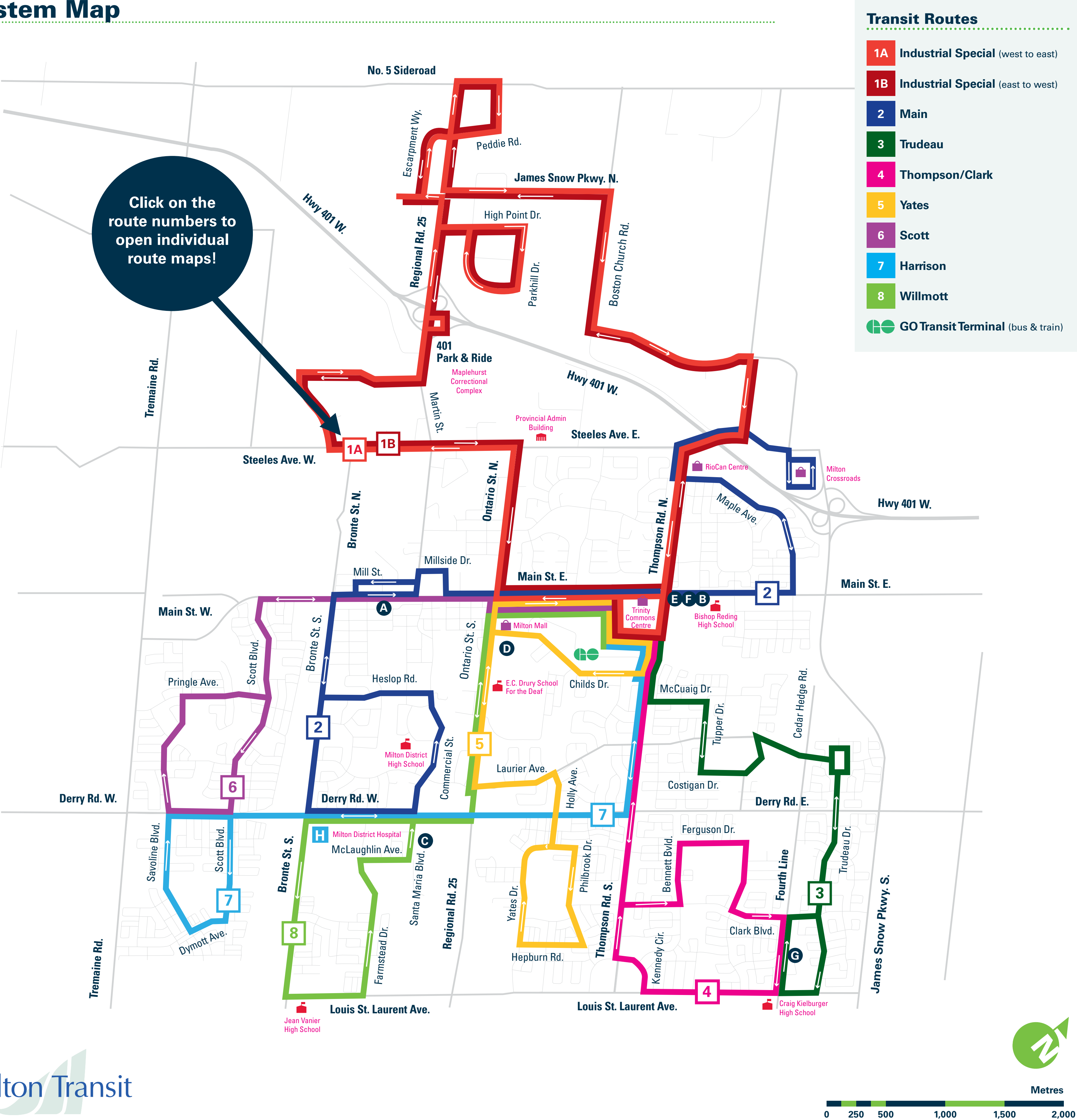
Existing Routes

- Existing Off-Road Trail
- Existing On-Road Bike Lane¹
- Existing On-Road Paved Shoulder
- Existing On-Road Signed Route
- Bruce Trail²
- Conservation Halton Trail²

Proposed Routes

- - - Proposed Multi-Use Trail³
- - - Proposed On-Road Bike Lane
- - - Proposed On-Road Bike Lane with In-Boulevard Multi-Use Trail on both sides of the road
- - - Proposed On-Road Paved Shoulder
- - - Proposed On-Road Signed Route⁴
- S Potential Staging Area
- }} Trail Bridge
- ▶ Potential Connection to Surrounding Municipality
- ➔ Conceptual Off-Road Route Alignment⁵

System Map



Ontario Traffic Inc

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 19:00:00

One Hour Peak

From: 16:30:00

To: 17:30:00

Municipality: Milton

Site #: 1635500001

Intersection: Ontario St & Pine St-Plaza Drivewa

TFR File #: 19

Count date: 13-Dec-16

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Ontario St runs N/S

North Leg Total: 2139

North Entering: 1147

North Peds: 9

Peds Cross: \bowtie

Heavys	0	3	0	3
Trucks	1	21	0	22
Cars	50	997	75	1122
Totals	51	1021	75	

Heavys 1

Trucks 35

Cars 956

Totals 992

East Leg Total: 245

East Entering: 121

East Peds: 4

Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
1	1	114	116



Pine St

Heavys	Trucks	Cars	Totals
0	1	33	34
1	0	19	20
0	0	64	64
1	1	116	



Cars	Trucks	Heavys	Totals
79	0	0	79
14	0	1	15
27	0	0	27
120	0	1	

Plaza Driveway



Cars	Trucks	Heavys	Totals
123	0	1	124

Peds Cross: \bowtie

West Peds: 4

West Entering: 118

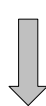
West Leg Total: 234

Cars 1088

Trucks 21

Heavys 3

Totals 1112



Cars	50	844	29	923
Trucks	0	34	0	34
Heavys	0	1	0	1
Totals	50	879	29	

Peds Cross: \bowtie

South Peds: 6

South Entering: 958

South Leg Total: 2070

Comments

Ontario Traffic Inc

Total Count Diagram

Municipality: Milton
Site #: 1635500001
Intersection: Ontario St & Pine St-Plaza Drivewa
TFR File #: 19
Count date: 13-Dec-16

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Ontario St runs N/S

North Leg Total: 5800
 North Entering: 3073
 North Peds: 21
 Peds Cross: \bowtie

	Heavys	0	4	0	4
Trucks	1	75	1	77	
Cars	124	2686	182	2992	
Totals	125	2765	183		



	Heavys	1
Trucks	90	
Cars	2636	
Totals	2727	

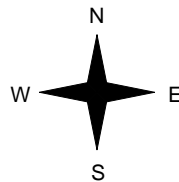
East Leg Total: 624
 East Entering: 303
 East Peds: 10
 Peds Cross: \bowtie

Heavys	Trucks	Cars	Totals
1	2	337	340



Pine St

Heavys	Trucks	Cars	Totals
0	1	83	84
2	1	52	55
0	0	169	169
2	2	304	



Ontario St

Cars	Trucks	Heavys	Totals
202	1	0	203
35	0	1	36
64	0	0	64
301	1	1	

Plaza Driveway



Cars	Trucks	Heavys	Totals
317	2	2	321

Peds Cross: \bowtie
 West Peds: 15
 West Entering: 308
 West Leg Total: 648

	Cars	2919
Trucks	75	
Heavys	4	
Totals	2998	



	Cars	178	2351	83
Trucks	1	88	0	
Heavys	0	1	0	
Totals	179	2440	83	

Peds Cross: \bowtie
 South Peds: 14
 South Entering: 2702
 South Leg Total: 5700

Comments

Ontario Traffic Inc

Traffic Count Summary

Intersection: Ontario St & Pine St-Plaza Drivew						Count Date: 13-Dec-16		Municipality: Milton					
North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0	
17:00:00	79	947	41	1067	8	2034	17:00:00	60	877	30	967	4	
18:00:00	60	981	49	1090	7	2033	18:00:00	72	847	24	943	7	
19:00:00	44	834	35	913	6	1701	19:00:00	47	712	29	788	3	

[illegible]

Count Date: 13-Dec-16 **Site #:** 1635500001

[illegible]

[illegible]

Count Date: 13-Dec-16 **Site #:** 1635500001

[illegible]

[illegible]

Count Date: 13-Dec-16 Site #: 1635500001

[illegible]

[illegible]

Count Date: 13-Dec-16 **Site #:** 1635500001

[illegible]

Ontario Traffic Inc

Mid-day Peak Diagram

Specified Period

From: 10:00:00

To: 15:00:00

One Hour Peak

From: 12:00:00

To: 13:00:00

Municipality: Milton

Site #: 1635500002

Intersection: Ontario St & Pine St-Plaza Driveway

TFR File #: 1

Count date: 10-Dec-16

Weather conditions:

Person(s) who counted:

**** Signalized Intersection ****

Major Road: Ontario St runs N/S

North Leg Total: 1852

North Entering: 910

North Peds: 21

Peds Cross: \times

	Heavys	Trucks	Cars	Totals
0	0	0	0	0
0	14	0	14	14
38	726	132	896	896
Totals	38	740	132	



	Heavys	Trucks	Cars	Totals
0	0	17	925	942
Totals				942

East Leg Total: 357

East Entering: 170

East Peds: 3

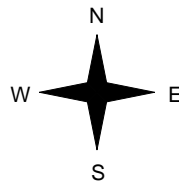
Peds Cross: \times

Heavys	Trucks	Cars	Totals
0	1	110	111



Pine St

Heavys	Trucks	Cars	Totals
0	0	42	42
0	0	28	28
0	0	72	72
0	0	142	



Ontario St

Cars	Trucks	Heavys	Totals
121	0	0	121
14	0	0	14
35	0	0	35
170	0	0	

Plaza Driveway



Cars	Trucks	Heavys	Totals
187	0	0	187

Peds Cross: \times

West Peds: 0

West Entering: 142

West Leg Total: 253

Cars	Trucks	Heavys	Totals
833	14	0	847
847			



Cars	Trucks	Heavys	Totals
58	1	0	59
762	17	0	779
27	0	0	27
847	18	0	

Peds Cross: \times

South Peds: 1

South Entering: 865

South Leg Total: 1712

Comments

Ontario Traffic Inc

Total Count Diagram

Municipality: Milton
Site #: 1635500002
Intersection: Ontario St & Pine St-Plaza Driveway
TFR File #: 1
Count date: 10-Dec-16

Weather conditions:
Person(s) who counted:

**** Signalized Intersection ****

Major Road: Ontario St runs N/S

North Leg Total: 8535
 North Entering: 4232
 North Peds: 96
 Peds Cross: \nlessgtr

Heavys	Trucks	Cars	Totals
0	0	0	0
0	67	0	67
152	3420	593	4165
152	3487	593	

Heavys	Trucks	Cars	Totals
0	87	4216	4303

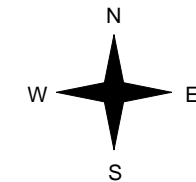
East Leg Total: 1656
 East Entering: 759
 East Peds: 19
 Peds Cross: \nlessgtr

Heavys	Trucks	Cars	Totals
0	1	490	491



Pine St

Heavys	Trucks	Cars	Totals
0	0	172	172
0	0	170	170
0	1	264	265
0	1	606	



Ontario St

Cars	Trucks	Heavys	Totals
500	0	0	500
84	0	0	84
175	0	0	175
759	0	0	

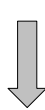
Plaza Driveway



Cars	Trucks	Heavys	Totals
897	0	0	897

Peds Cross: \nlessgtr
 West Peds: 26
 West Entering: 607
 West Leg Total: 1098

Cars	Trucks	Heavys	Totals
3859	68	0	3927



Cars	Trucks	Heavys	Totals
254	1	0	255
3544	87	0	3631
134	0	0	134
3932	88	0	

Peds Cross: \nlessgtr
 South Peds: 14
 South Entering: 4020
 South Leg Total: 7947

Comments

Ontario Traffic Inc

Traffic Count Summary

Intersection: Ontario St & Pine St-Plaza Driveway						Count Date: 10-Dec-16		Municipality: Milton					
North Approach Totals						North/South Total Approaches	South Approach Totals						
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds	
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total		
10:00:00	0	5	0	5	0	9	10:00:00	0	4	0	4	0	
11:00:00	115	627	20	762	14	1510	11:00:00	40	690	18	748	6	
12:00:00	124	658	26	808	14	1555	12:00:00	40	675	32	747	0	
13:00:00	132	740	38	910	21	1775	13:00:00	59	779	27	865	1	
14:00:00	102	740	34	876	31	1786	14:00:00	70	806	34	910	7	
15:00:00	120	717	34	871	16	1610	15:00:00	46	670	23	739	0	
						</							

[illegible]

Count Date: 10-Dec-16 Site #: 1635500002

[illegible]

[illegible]

Count Date: 10-Dec-16 Site #: 1635500002

[illegible]

[illegible]

Count Date: 10-Dec-16 **Site #:** 1635500002

[illegible]

[illegible]

Count Date: 10-Dec-16 Site #: 1635500002

[illegible]

Level of Service Definitions

Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Level of Service Definitions





















Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	> 10 and ≤ 20	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	> 20 and ≤ 35	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	> 35 and ≤ 55	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	> 55 and ≤ 80	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board













Lanes, Volumes, Timings
3: Ontario Street South & Pine Street

2016 Existing PM
1/6/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	20	64	27	15	79	50	879	29	75	1021	51
Ideal Flow (vphpl)	1800	1850	1550	1800	1850	1550	1800	1850	1550	1800	1850	1550
Storage Length (m)	20.0		0.0	0.0		0.0	25.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1679	1636	0	1729	1615	0	1729	3405	0	1729	3460	0
Flt Permitted	0.695			0.702			0.261			0.260		
Satd. Flow (perm)	1228	1636	0	1278	1615	0	475	3405	0	473	3460	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			81			4			8	
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		248.4			293.8			205.4			204.8	
Travel Time (s)		22.4			21.2			14.8			14.7	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	5%	0%	0%	7%	0%	0%	4%	0%	0%	2%	2%
Adj. Flow (vph)	35	20	65	28	15	81	51	897	30	77	1042	52
Shared Lane Traffic (%)												
Lane Group Flow (vph)	35	85	0	28	96	0	51	927	0	77	1094	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.02	1.28	1.06	1.02	1.28	1.06	1.02	1.28	1.06	1.02	1.28
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings
3: Ontario Street South & Pine Street

2016 Existing PM
1/6/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		5.0	15.0	
Minimum Split (s)	34.0	34.0		34.0	34.0		23.0	23.0		9.0	23.0	
Total Split (s)	38.0	38.0		38.0	38.0		50.0	50.0		17.0	67.0	
Total Split (%)	36.2%	36.2%		36.2%	36.2%		47.6%	47.6%		16.2%	63.8%	
Maximum Green (s)	31.0	31.0		31.0	31.0		44.0	44.0		13.0	61.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		10.0	10.0			10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effct Green (s)	10.1	10.1		10.1	10.1		56.8	56.8		66.0	65.3	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.68	0.68		0.79	0.78	
v/c Ratio	0.24	0.33		0.18	0.36		0.16	0.40		0.16	0.41	
Control Delay	37.9	17.0		36.4	15.2		9.5	8.8		3.6	4.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	37.9	17.0		36.4	15.2		9.5	8.8		3.6	4.6	
LOS	D	B		D	B		A	A		A	A	
Approach Delay		23.1			20.0			8.9			4.5	
Approach LOS		C			B			A			A	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 83.7

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.41

Intersection Signal Delay: 8.0






Intersection LOS: A

Intersection Capacity Utilization 67.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Ontario Street South & Pine Street









 p1	 p2	 p4
17 s	50 s	38 s
 p6		 p8
67 s		38 s

Queues

2016 Existing PM

3: Ontario Street South & Pine Street

1/6/2017

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	35	85	28	96	51	927	77	1094
v/c Ratio	0.24	0.33	0.18	0.36	0.16	0.40	0.16	0.41
Control Delay	37.9	17.0	36.4	15.2	9.5	8.8	3.6	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	17.0	36.4	15.2	9.5	8.8	3.6	4.6
Queue Length 50th (m)	5.2	2.9	4.1	2.2	3.3	38.6	2.5	30.0
Queue Length 95th (m)	13.6	15.5	11.8	15.3	9.3	54.4	5.6	40.8
Internal Link Dist (m)		224.4		269.8		181.4		180.8
Turn Bay Length (m)	20.0				25.0		45.0	
Base Capacity (vph)	454	646	473	649	322	2310	568	2699
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.13	0.06	0.15	0.16	0.40	0.14	0.41
Intersection Summary								

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	13.8	35.9	20.7	30.2	32.3	79.8	64.2	21.9	48.3	63.8
Average Queue (m)	5.7	11.9	6.7	11.1	13.3	38.5	23.5	11.4	30.2	25.7
95th Queue (m)	12.5	24.7	15.9	19.7	26.9	63.7	47.8	18.0	44.2	47.8
Link Distance (m)		234.1	279.5	279.5		194.8	194.8		194.1	194.1
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)		1			0	11			0	
Queuing Penalty (veh)		0			2	6			0	

Network Summary

Network wide Queuing Penalty: 8

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	25.3	28.8	22.2	34.3	32.4	71.2	63.4	34.9	70.5	56.6
Average Queue (m)	9.0	13.9	8.2	10.9	10.5	36.6	24.6	8.9	35.3	25.9
95th Queue (m)	19.8	26.6	18.3	23.2	24.0	60.1	49.0	19.9	56.8	45.7
Link Distance (m)		234.1	279.5	279.5		194.8	194.8		194.1	194.1
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	1	5			0	12			2	
Queuing Penalty (veh)	1	2			0	6			1	

Network Summary

Network wide Queuing Penalty: 10

Intersection: 3: Ontario Street South & Pine Street





















Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	20.0	28.6	34.9	34.3	32.3	54.2	47.7	27.8	47.0	47.7
Average Queue (m)	7.2	11.5	9.3	15.6	8.4	32.9	18.5	10.1	32.5	24.1
95th Queue (m)	16.8	21.1	22.3	29.7	20.0	50.1	41.4	19.5	52.9	46.1
Link Distance (m)		234.1	279.5	279.5		194.8	194.8		194.1	194.1
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	1	2			0	11			1	
Queuing Penalty (veh)	1	1			0	5			1	

Network Summary

Network wide Queuing Penalty: 7













Lanes, Volumes, Timings
3: Ontario Street South & Pine Street

2016 Existing SAT
1/6/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	28	72	35	14	121	59	779	27	132	740	38
Ideal Flow (vphpl)	1800	1850	1550	1800	1850	1550	1800	1850	1550	1800	1850	1550
Storage Length (m)	20.0		0.0	0.0		0.0	25.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.892			0.865			0.995			0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1669	0	1729	1618	0	1695	3469	0	1729	3463	0
Flt Permitted	0.663			0.687			0.334			0.264		
Satd. Flow (perm)	1207	1669	0	1250	1618	0	596	3469	0	480	3463	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		78			132			4			8	
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		248.4			293.8			205.4			204.8	
Travel Time (s)		22.4			21.2			14.8			14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	2%	0%
Adj. Flow (vph)	46	30	78	38	15	132	64	847	29	143	804	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	46	108	0	38	147	0	64	876	0	143	845	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.02	1.28	1.06	1.02	1.28	1.06	1.02	1.28	1.06	1.02	1.28
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings
3: Ontario Street South & Pine Street

2016 Existing SAT
1/6/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		5.0	15.0	
Minimum Split (s)	34.0	34.0		34.0	34.0		23.0	23.0		9.0	23.0	
Total Split (s)	38.0	38.0		38.0	38.0		50.0	50.0		17.0	67.0	
Total Split (%)	36.2%	36.2%		36.2%	36.2%		47.6%	47.6%		16.2%	63.8%	
Maximum Green (s)	31.0	31.0		31.0	31.0		44.0	44.0		13.0	61.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		10.0	10.0			10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effect Green (s)	10.4	10.4		10.4	10.4		49.6	49.6		63.0	61.0	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.59	0.59		0.75	0.72	
v/c Ratio	0.31	0.39		0.25	0.47		0.18	0.43		0.31	0.34	
Control Delay	39.7	17.6		37.8	13.7		10.3	10.6		4.8	4.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	39.7	17.6		37.8	13.7		10.3	10.6		4.8	4.7	
LOS	D	B		D	B		B	B		A	A	
Approach Delay		24.2			18.6			10.6			4.7	
Approach LOS		C			B			B			A	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 84.4

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.47

Intersection Signal Delay: 9.6






Intersection LOS: A

Intersection Capacity Utilization 73.2%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Ontario Street South & Pine Street









 ϕ1	 ϕ2	 ϕ4
17 s	50 s	38 s
 ϕ6		 ϕ8
67 s		38 s

Queues

2016 Existing SAT

3: Ontario Street South & Pine Street

1/6/2017

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	46	108	38	147	64	876	143	845
v/c Ratio	0.31	0.39	0.25	0.47	0.18	0.43	0.31	0.34
Control Delay	39.7	17.6	37.8	13.7	10.3	10.6	4.8	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.7	17.6	37.8	13.7	10.3	10.6	4.8	4.7
Queue Length 50th (m)	6.9	4.4	5.6	2.2	4.3	36.6	4.9	20.8
Queue Length 95th (m)	16.7	18.4	14.6	17.9	11.7	55.1	10.2	31.2
Internal Link Dist (m)		224.4		269.8		181.4		180.8
Turn Bay Length (m)	20.0				25.0		45.0	
Base Capacity (vph)	443	662	459	677	350	2039	550	2504
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.16	0.08	0.22	0.18	0.43	0.26	0.34
Intersection Summary								

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.2	29.5	22.1	28.0	32.3	59.2	66.0	52.2	62.4	34.3
Average Queue (m)	11.6	15.7	7.9	14.3	11.1	37.0	25.3	15.5	26.4	14.9
95th Queue (m)	25.0	27.8	17.6	22.6	23.7	56.6	52.2	29.3	45.5	29.0
Link Distance (m)		234.1	279.5	279.5		194.8	194.8		194.1	194.1
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	2	5				15			0	
Queuing Penalty (veh)	2	2				9			1	

Network Summary

Network wide Queuing Penalty: 14

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.2	47.5	21.3	41.2	32.4	72.1	61.1	52.3	60.5	43.0
Average Queue (m)	13.1	16.1	9.4	17.8	11.8	42.1	28.8	18.8	28.2	18.7
95th Queue (m)	25.3	30.7	17.9	33.3	26.8	67.0	54.3	35.7	46.0	34.4
Link Distance (m)		234.1	279.5	279.5		194.8	194.8		194.1	194.1
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	5	5			0	16		0	0	
Queuing Penalty (veh)	5	2			0	9		0	1	

Network Summary

Network wide Queuing Penalty: 18

Intersection: 3: Ontario Street South & Pine Street






















Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.3	35.1	21.5	27.9	32.4	54.2	53.2	22.0	47.3	41.4
Average Queue (m)	8.6	14.9	8.2	12.4	10.8	34.4	23.9	12.4	26.0	16.0
95th Queue (m)	20.3	27.9	17.9	22.1	27.6	55.5	48.5	20.2	42.4	34.7
Link Distance (m)		234.1	279.5	279.5		194.8	194.8		194.1	194.1
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	2	4			0	13			0	
Queuing Penalty (veh)	2	1			0	8			0	

Network Summary

Network wide Queuing Penalty: 12













Lanes, Volumes, Timings
3: Ontario Street South & Pine Street

2022 Total PM
1/18/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	29	73	38	22	113	58	1010	42	105	1174	59
Ideal Flow (vphpl)	1800	1850	1550	1800	1850	1550	1800	1850	1550	1800	1850	1550
Storage Length (m)	20.0		0.0	0.0		0.0	25.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.893			0.874			0.994			0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1679	1647	0	1729	1617	0	1729	3402	0	1729	3460	0
Flt Permitted	0.669			0.690			0.221			0.209		
Satd. Flow (perm)	1182	1647	0	1256	1617	0	402	3402	0	380	3460	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		74			115			6			9	
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		52.3			293.8			205.4			204.8	
Travel Time (s)		4.7			21.2			14.8			14.7	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	5%	0%	0%	7%	0%	0%	4%	0%	0%	2%	2%
Adj. Flow (vph)	40	30	74	39	22	115	59	1031	43	107	1198	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	104	0	39	137	0	59	1074	0	107	1258	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.02	1.28	1.06	1.02	1.28	1.06	1.02	1.28	1.06	1.02	1.28
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings
3: Ontario Street South & Pine Street

2022 Total PM
1/18/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		5.0	15.0	
Minimum Split (s)	34.0	34.0		34.0	34.0		23.0	23.0		9.0	23.0	
Total Split (s)	35.0	35.0		35.0	35.0		59.0	59.0		11.0	70.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		56.2%	56.2%		10.5%	66.7%	
Maximum Green (s)	28.0	28.0		28.0	28.0		53.0	53.0		7.0	64.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		10.0	10.0			10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effect Green (s)	10.4	10.4		10.4	10.4		57.1	57.1		67.9	65.9	
Actuated g/C Ratio	0.12	0.12		0.12	0.12		0.64	0.64		0.76	0.74	
v/c Ratio	0.29	0.41		0.27	0.47		0.23	0.49		0.28	0.49	
Control Delay	41.1	18.8		40.1	16.0		11.0	10.0		4.6	5.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.1	18.8		40.1	16.0		11.0	10.0		4.6	5.6	
LOS	D	B		D	B		B	B		A	A	
Approach Delay		25.0			21.3			10.1			5.6	
Approach LOS		C			C			B			A	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 89.3

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.49

Intersection Signal Delay: 9.3






Intersection LOS: A

Intersection Capacity Utilization 86.1%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Ontario Street South & Pine Street









 Ø1	 Ø2	 Ø4
11 s	59 s	35 s
 Ø6		 Ø8
70 s		35 s

Queues

2022 Total PM

3: Ontario Street South & Pine Street

1/18/2017

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	40	104	39	137	59	1074	107	1258
v/c Ratio	0.29	0.41	0.27	0.47	0.23	0.49	0.28	0.49
Control Delay	41.1	18.8	40.1	16.0	11.0	10.0	4.6	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	18.8	40.1	16.0	11.0	10.0	4.6	5.6
Queue Length 50th (m)	6.2	4.6	6.1	3.3	4.1	48.2	3.6	37.0
Queue Length 95th (m)	15.5	18.7	15.2	19.3	11.4	67.2	7.8	52.9
Internal Link Dist (m)		28.3		269.8		181.4		180.8
Turn Bay Length (m)	20.0				25.0		45.0	
Base Capacity (vph)	371	568	394	586	256	2176	394	2555
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.18	0.10	0.23	0.23	0.49	0.27	0.49
Intersection Summary								

Intersection

Int Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	139	4	4	135	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	151	4	4	147	2	2

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	155
Stage 1	-	-	153
Stage 2	-	-	155
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	1425	684
Stage 1	-	-	875
Stage 2	-	-	873
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1425	682
Mov Cap-2 Maneuver	-	-	709
Stage 1	-	-	875
Stage 2	-	-	870

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	790	-	-	1425	-
HCM Lane V/C Ratio	0.006	-	-	0.003	-
HCM Control Delay (s)	9.6	-	-	7.5	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.2	34.9	15.7	39.6	32.4	85.6	62.9	52.3	70.1	64.7
Average Queue (m)	11.4	15.1	7.1	19.5	11.3	47.7	29.5	15.2	42.7	29.9
95th Queue (m)	22.5	27.0	15.8	33.9	28.2	74.0	54.8	34.9	59.3	51.4
Link Distance (m)		34.0	279.5	279.5		193.5	193.5		194.1	194.1
Upstream Blk Time (%)		1								
Queuing Penalty (veh)		1								
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	3	4			0	17			3	
Queuing Penalty (veh)	3	2			1	10			3	

Intersection: 6: Site Access & Pine Street

Movement	NB
Directions Served	LR
Maximum Queue (m)	9.0
Average Queue (m)	1.5
95th Queue (m)	6.9
Link Distance (m)	41.4
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 19

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.2	34.9	28.5	42.6	32.4	80.8	91.1	52.5	72.9	50.8
Average Queue (m)	10.3	14.0	10.1	17.3	11.1	41.7	33.7	17.4	38.0	25.4
95th Queue (m)	21.8	27.6	22.1	31.4	24.7	70.2	67.0	39.5	64.7	49.7
Link Distance (m)		34.0	279.5	279.5		193.5	193.5		194.1	194.1
Upstream Blk Time (%)		1								
Queuing Penalty (veh)		1								
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	2	4			1	17			3	
Queuing Penalty (veh)	2	1			5	10			3	

Intersection: 6: Site Access & Pine Street

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	9.2	9.0
Average Queue (m)	0.3	1.2
95th Queue (m)	3.0	6.1
Link Distance (m)	34.0	41.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 21

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.4	35.1	21.8	48.1	32.2	86.1	65.1	27.2	79.8	72.2
Average Queue (m)	9.2	20.3	8.2	15.0	12.6	41.9	31.8	11.7	32.1	22.2
95th Queue (m)	22.2	33.5	19.0	28.6	25.8	72.2	60.7	21.0	58.2	49.2
Link Distance (m)		34.0	279.5	279.5		193.5	193.5		194.1	194.1
Upstream Blk Time (%)		1								
Queuing Penalty (veh)		1								
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	2	10			1	12			1	
Queuing Penalty (veh)	2	4			5	7			1	

Intersection: 6: Site Access & Pine Street






















Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	9.1	9.0	9.0
Average Queue (m)	0.3	0.3	0.3
95th Queue (m)	3.0	3.0	3.0
Link Distance (m)	189.5	34.0	41.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 21













Lanes, Volumes, Timings
3: Ontario Street South & Pine Street

2022 Total SAT
1/18/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	43	82	53	22	185	68	901	40	200	853	44
Ideal Flow (vphpl)	1800	1850	1550	1800	1850	1550	1800	1850	1550	1800	1850	1550
Storage Length (m)	20.0		0.0	0.0		0.0	25.0		0.0	45.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.6			7.6			7.6			7.6		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.902			0.866			0.994			0.993	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1729	1687	0	1729	1620	0	1695	3466	0	1729	3463	0
Flt Permitted	0.395			0.670			0.294			0.210		
Satd. Flow (perm)	719	1687	0	1219	1620	0	525	3466	0	382	3463	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87			201			5			9	
Link Speed (k/h)		40			50			50			50	
Link Distance (m)		52.3			293.8			205.4			204.8	
Travel Time (s)		4.7			21.2			14.8			14.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	2%	0%	0%	2%	0%
Adj. Flow (vph)	52	47	89	58	24	201	74	979	43	217	927	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	52	136	0	58	225	0	74	1022	0	217	975	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.7			3.7			3.7			3.7	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.9			4.9			4.9			4.9	
Two way Left Turn Lane												
Headway Factor	1.06	1.02	1.28	1.06	1.02	1.28	1.06	1.02	1.28	1.06	1.02	1.28
Turning Speed (k/h)	24		14	24		14	24		14	24		14
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	6.1	30.5		6.1	30.5		6.1	30.5		6.1	30.5	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	6.1	1.8		6.1	1.8		6.1	1.8		6.1	1.8	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		28.7			28.7			28.7			28.7	
Detector 2 Size(m)		1.8			1.8			1.8			1.8	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings
3: Ontario Street South & Pine Street

2022 Total SAT
1/18/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		1	6	
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		15.0	15.0		5.0	15.0	
Minimum Split (s)	34.0	34.0		34.0	34.0		23.0	23.0		9.0	23.0	
Total Split (s)	34.0	34.0		34.0	34.0		53.0	53.0		18.0	71.0	
Total Split (%)	32.4%	32.4%		32.4%	32.4%		50.5%	50.5%		17.1%	67.6%	
Maximum Green (s)	27.0	27.0		27.0	27.0		47.0	47.0		14.0	65.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	3.0	3.0		3.0	3.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0		6.0	6.0		4.0	6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None		Max	Max		None	Max	
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0			7.0	
Flash Dont Walk (s)	20.0	20.0		20.0	20.0		10.0	10.0			10.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0			0	
Act Effect Green (s)	11.5	11.5		11.5	11.5		51.9	51.9		67.1	65.1	
Actuated g/C Ratio	0.13	0.13		0.13	0.13		0.58	0.58		0.75	0.73	
v/c Ratio	0.57	0.47		0.37	0.59		0.24	0.51		0.51	0.39	
Control Delay	60.5	20.5		42.7	14.2		13.5	13.0		7.9	5.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	60.5	20.5		42.7	14.2		13.5	13.0		7.9	5.3	
LOS	E	C		D	B		B	B		A	A	
Approach Delay		31.5			20.0			13.0			5.8	
Approach LOS		C			C			B			A	

Intersection Summary

Area Type: Other

Cycle Length: 105

Actuated Cycle Length: 89.6

Natural Cycle: 75

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.59

Intersection Signal Delay: 11.9






Intersection LOS: B

Intersection Capacity Utilization 81.1%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Ontario Street South & Pine Street









 Ø1	 Ø2	 Ø4
18 s	53 s	34 s
 Ø6		 Ø8
71 s		34 s

Queues

2022 Total SAT

3: Ontario Street South & Pine Street

1/18/2017

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	52	136	58	225	74	1022	217	975
v/c Ratio	0.57	0.47	0.37	0.59	0.24	0.51	0.51	0.39
Control Delay	60.5	20.5	42.7	14.2	13.5	13.0	7.9	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.5	20.5	42.7	14.2	13.5	13.0	7.9	5.3
Queue Length 50th (m)	8.5	7.7	9.3	3.7	5.4	47.4	8.0	25.5
Queue Length 95th (m)	20.4	23.9	20.6	23.5	17.1	82.5	17.7	43.5
Internal Link Dist (m)		28.3		269.8		181.4		180.8
Turn Bay Length (m)	20.0				25.0		45.0	
Base Capacity (vph)	216	569	367	628	303	2008	496	2517
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.24	0.24	0.16	0.36	0.24	0.51	0.44	0.39
Intersection Summary								

Intersection

Int Delay, s/veh 0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Vol, veh/h	171	3	3	131	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	1	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	186	3	3	142	2	2

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	189	0	337	188
Stage 1	-	-	-	-	188	-
Stage 2	-	-	-	-	149	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1385	-	658	854
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	879	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1385	-	657	854
Mov Cap-2 Maneuver	-	-	-	-	692	-
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	877	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	9.7
HCM LOS	A		

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	765	-	-	1385	-
HCM Lane V/C Ratio	0.006	-	-	0.002	-
HCM Control Delay (s)	9.7	-	-	7.6	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.4	35.3	28.3	41.6	32.4	110.2	107.1	51.8	61.9	52.2
Average Queue (m)	12.1	20.0	12.1	20.2	16.0	53.2	44.4	24.3	32.3	22.3
95th Queue (m)	25.7	33.9	24.8	37.8	34.8	88.8	77.2	43.5	57.8	48.3
Link Distance (m)		33.9	279.5	279.5		193.5	193.5		194.1	194.1
Upstream Blk Time (%)		2								
Queuing Penalty (veh)		4								
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	1	10			0	22		2	2	
Queuing Penalty (veh)	2	5			0	15		8	4	

Intersection: 6: Site Access & Pine Street

Movement	EB	NB
Directions Served	TR	LR
Maximum Queue (m)	15.6	9.0
Average Queue (m)	1.3	1.2
95th Queue (m)	7.2	6.1
Link Distance (m)	189.5	62.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 38

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.2	29.0	27.8	47.4	32.4	109.6	85.6	52.2	60.1	48.2
Average Queue (m)	8.9	17.3	11.6	25.2	12.7	45.2	32.5	23.1	26.7	23.9
95th Queue (m)	20.7	30.1	24.1	44.1	27.5	77.6	63.0	38.6	47.6	40.6
Link Distance (m)		33.9	279.5	279.5		193.5	193.5		194.1	194.1
Upstream Blk Time (%)		0								
Queuing Penalty (veh)		0								
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	0	9			0	20			1	
Queuing Penalty (veh)	0	4			2	14			1	

Intersection: 6: Site Access & Pine Street

Movement	NB
Directions Served	LR
Maximum Queue (m)	9.0
Average Queue (m)	1.5
95th Queue (m)	6.9
Link Distance (m)	62.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 21

Intersection: 3: Ontario Street South & Pine Street

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.1	34.9	27.8	42.3	32.4	90.9	67.8	46.2	51.8	45.8
Average Queue (m)	9.9	19.1	12.0	22.6	12.9	47.5	35.4	19.9	29.4	21.1
95th Queue (m)	22.2	31.3	22.5	37.4	29.8	75.8	63.4	34.3	46.7	39.6
Link Distance (m)		33.9	279.5	279.5		193.5	193.5		194.1	194.1
Upstream Blk Time (%)		1								
Queuing Penalty (veh)		1								
Storage Bay Dist (m)	20.0				25.0			45.0		
Storage Blk Time (%)	6	5			0	21		0	1	
Queuing Penalty (veh)	7	3			0	15		1	2	

Intersection: 6: Site Access & Pine Street

Movement	NB
Directions Served	LR
Maximum Queue (m)	9.0
Average Queue (m)	2.0
95th Queue (m)	8.2
Link Distance (m)	62.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 29

Figure 2.3.3.4a Sight Distance for Crossing Movements and Vehicles Turning Left across Passenger Vehicle approaching from the Left

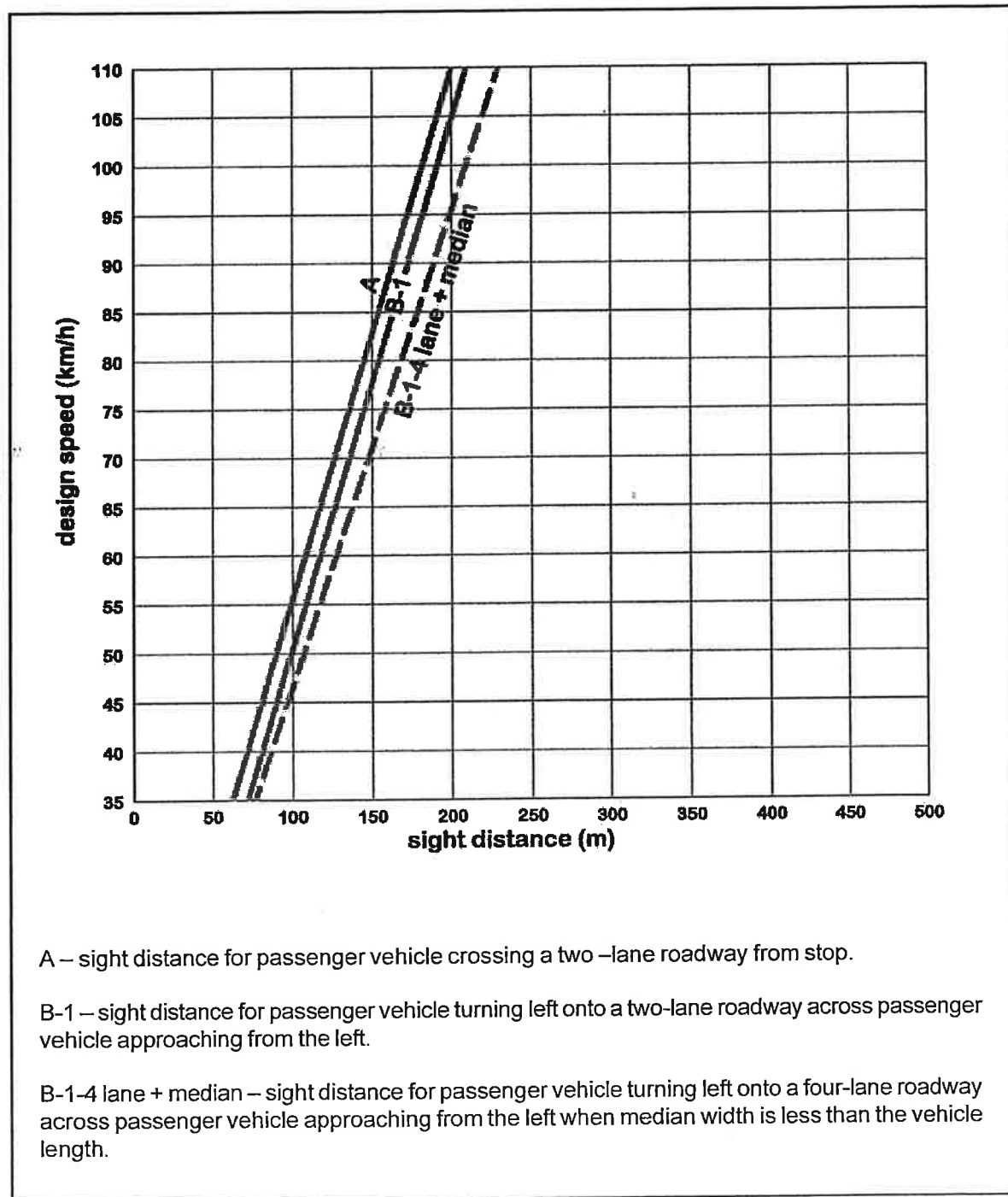
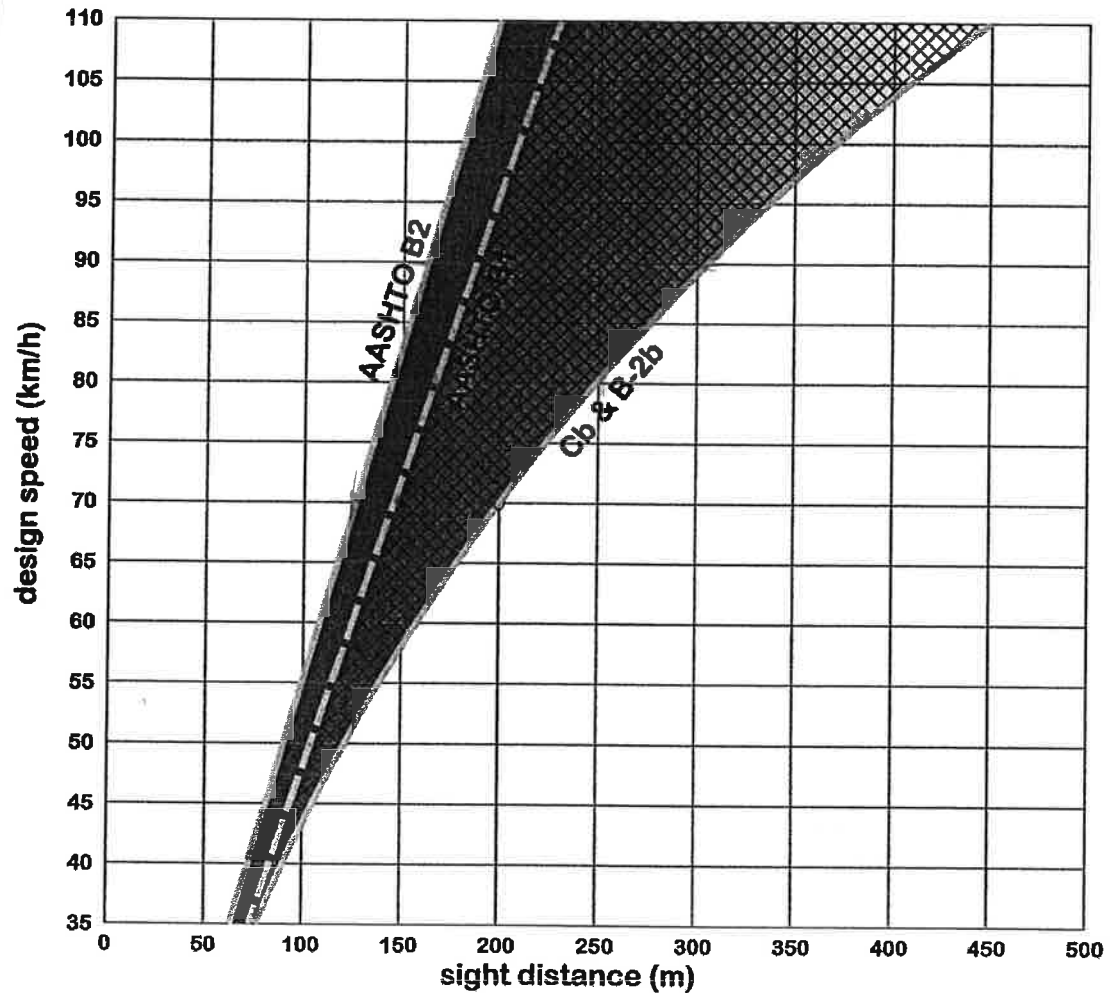


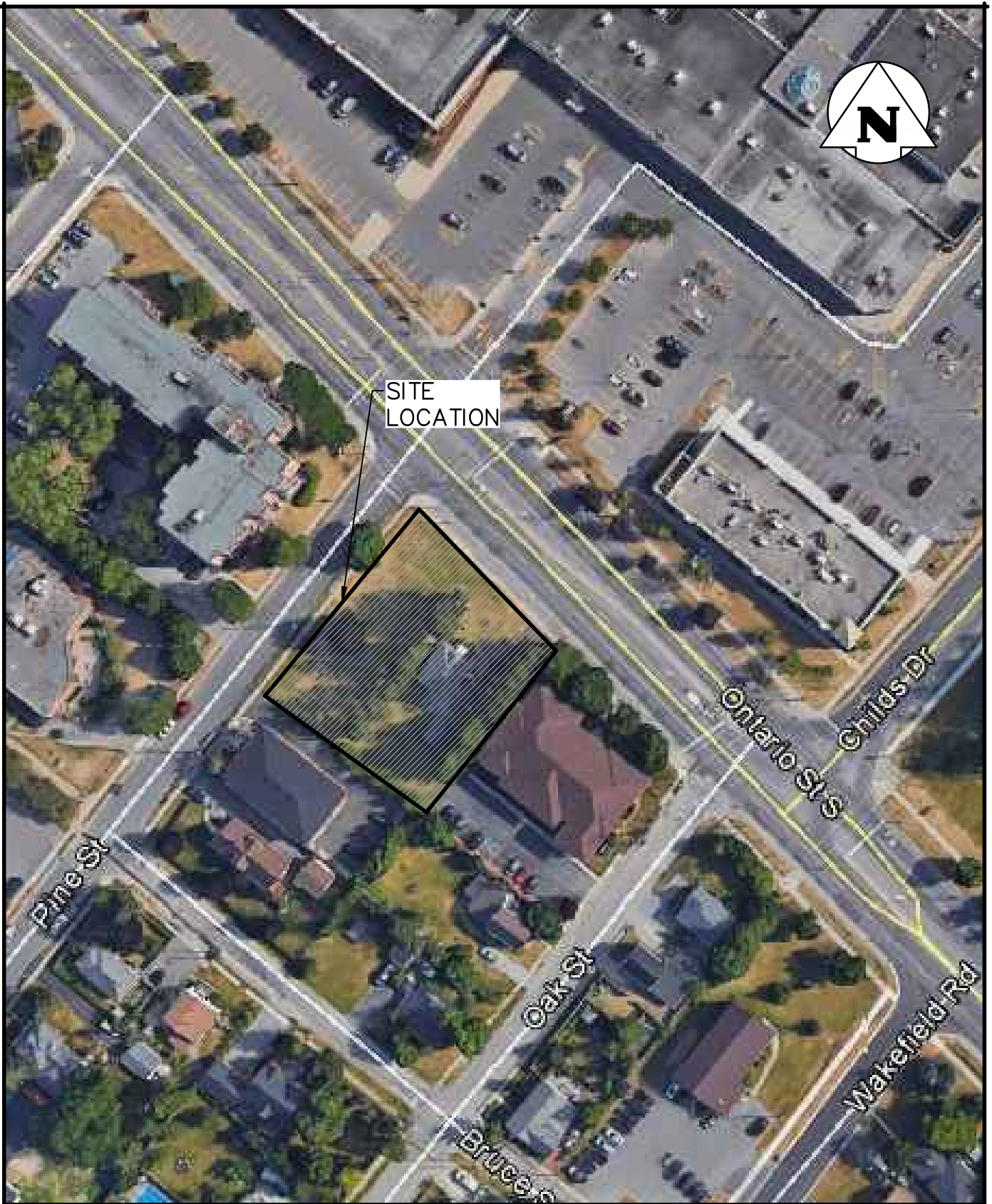
Figure 2.3.3.4b Sight Distance for Turning Movements with Vehicles approaching in the Intended Direction of Travel



Area bounded by AASHTO B1 and B-2b (crosshatched) – design domain for sight distance for passenger vehicle to turn left onto a two-lane roadway without being overtaken by a vehicle approaching from the right.

Area bounded by AASHTO B2 and Cb (shaded) – design domain for sight distance for passenger vehicle to turn right onto a two-lane roadway without being overtaken by a vehicle approaching from the left.

FIGURES



SITE
LOCATION

PINE-ONTARIO DEVELOPMENT LTD.
70 PINE STREET
TOWN OF MILTON

SITE LOCATION



**CROZIER
& ASSOCIATES**
Consulting Engineers

2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
www.cfcrozier.ca

Drawn	N.K.	Design	N.K.	Project No.	1286-4485
Check	R.A.W.	Check	R.A.W.	Scale	N.T.S.
				Dwg.	FIG. 01

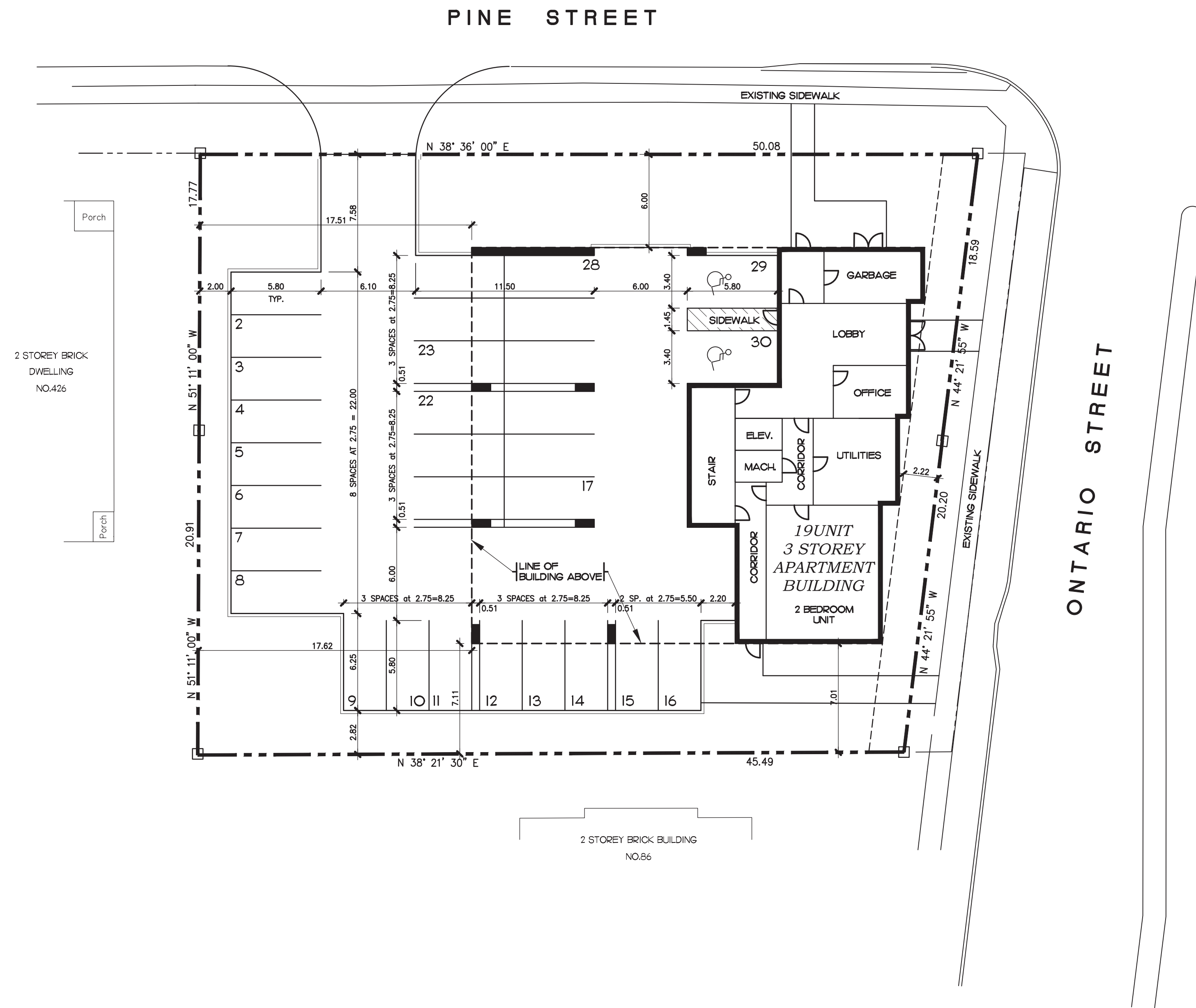
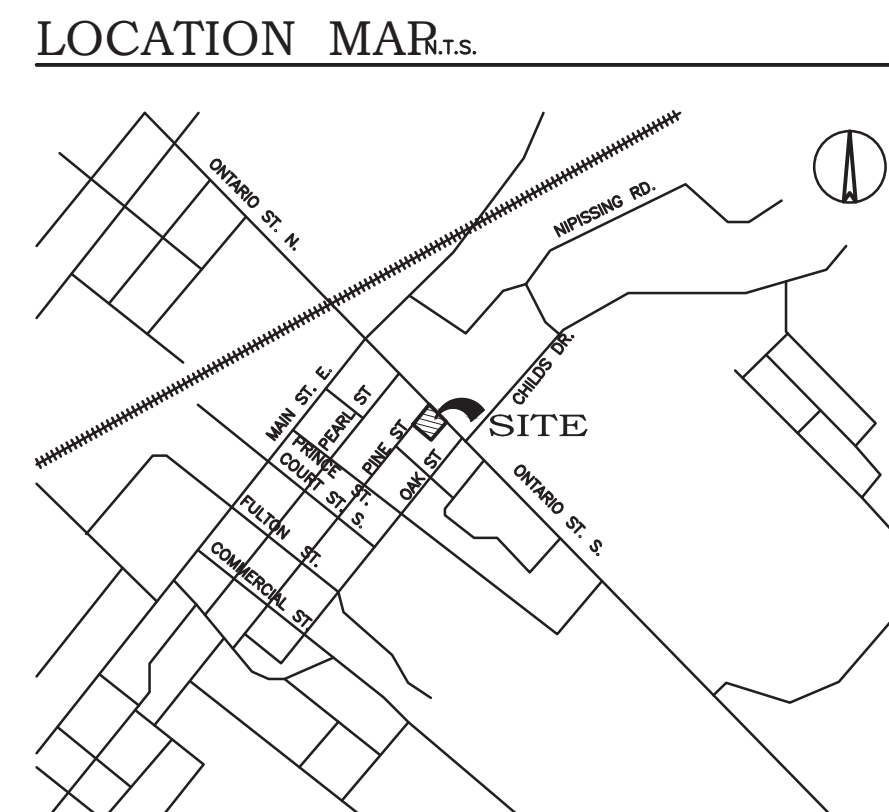


FIGURE 2



ZONING RLD TO RMD-II (19 APARTMENT UNITS)		
REGULATION	REQUIRED	PROPOSED
LOT AREA	-----	1,843.82 sq.m./0.184 ha
LOT FRONTAGE (MINIMUM)	30.0 m	38.79 m
LOT DEPTH (MINIMUM)	35.0 m	47.785 m
*FRONT YARD (MINIMUM)	6.0 m	*2.22 m
EXTERIOR SIDE YARD (MINIMUM)	6.0 m	6.00 m
INTERIOR SIDE YARD (MINIMUM)	6.0 m	7.01 m
*REAR YARD (MINIMUM)	22.50 m	*17.5 m
BUILDING HEIGHT (MAXIMUM)	12.50 m	10.50 m
LANDSCAPE OPEN SPACE (MIN.)	30%	643.33 sq.m. (34.89%)
*PARKING SPACES (MINIMUM)	PRIVATE 19x1.5=29 SP VISITOR (0.25 PER UNIT) - 5 SPACES TOTAL - 34 SPACES	* PRIVATE - 25 SPACES VISITOR (0.25 PER UNIT) - 5 SPACES TOTAL - 30 SPACES
* MINOR VARIANCE REQUIRED		

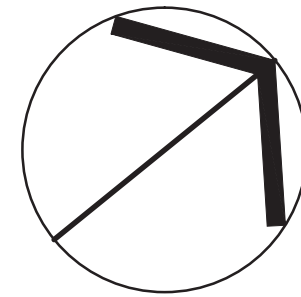
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		DRAWN BY MHW / ASB
TITLE	SITE PLAN EXTERIOR ELEVATIONS	DATE JANUARY 2017
		REVISED
		JOB No. 10685

A1.1

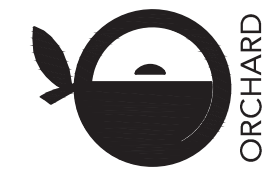
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"Guy R. Bellehumeur, B. Arch., OAA, MRAIC, Principal Architect of GB ARCHITECT INC. is the designer for this project with respect to all architectural work identified on this drawing sheet. The Ontario Association of Architects has assigned Guy R. Bellehumeur & GB ARCHITECT INC.

The Architect above has exercised responsible control with respect to design activities. The Architect's seal number is their BCDN number.



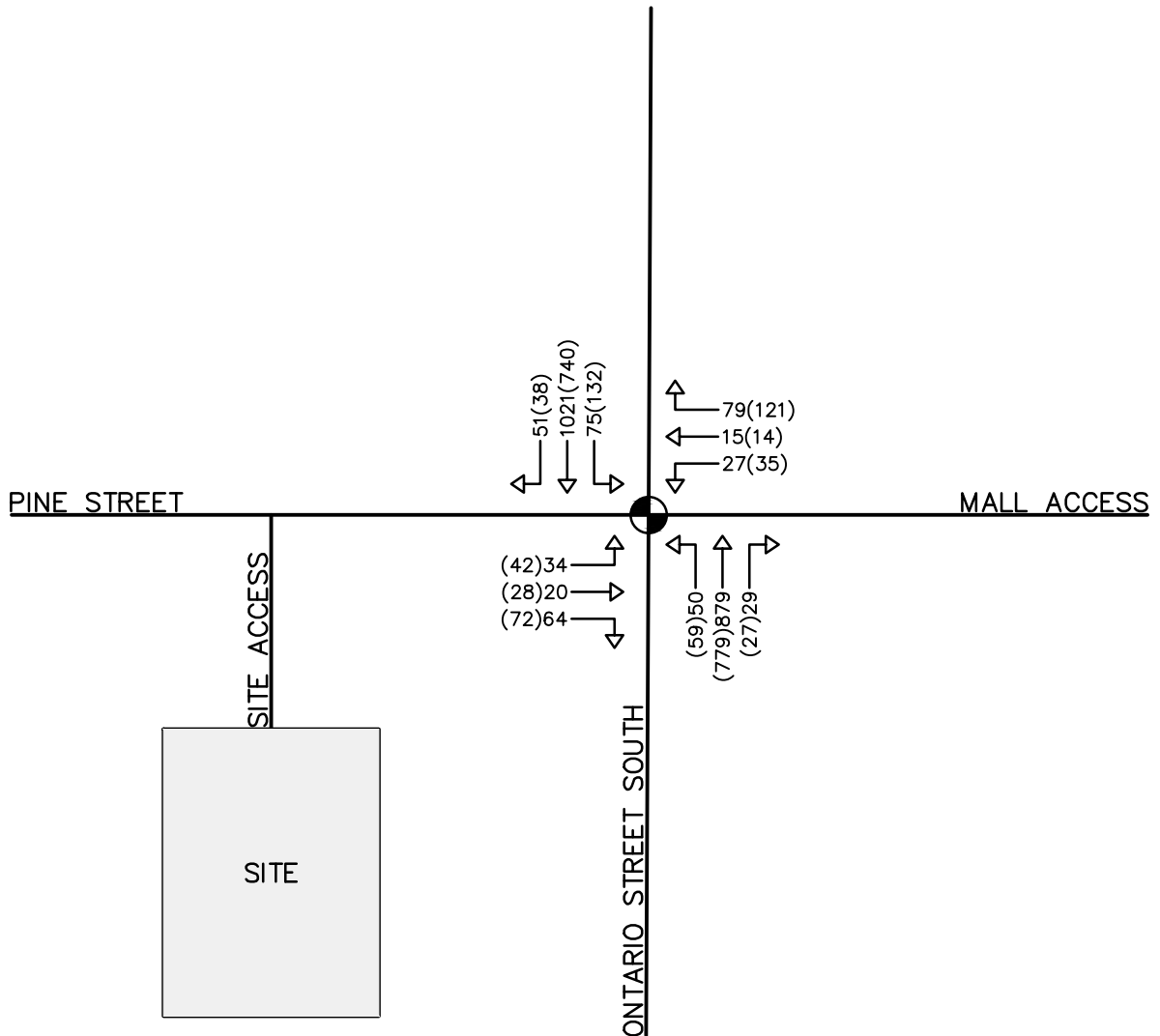
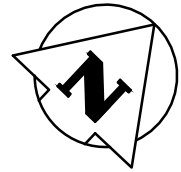
STRATFORD, ONTARIO N5A 3J2
PHONE (519) 272-0073 FAX (519) 272-1433



ORCHARD
DESIGN STUDIO INC.

NOTE:

THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:

-  SIGNAL CONTROL
-  STOP CONTROL
-  YIELD CONTROL
-  ROUND ABOUT
-  WEEKDAY PM
(SATURDAY)
TRIP DISTRIBUTION

**PINE-ONTARIO DEVELOPMENT LTD.
70 PINE STREET
TOWN OF MILTON**

2016 EXISTING CONDITIONS



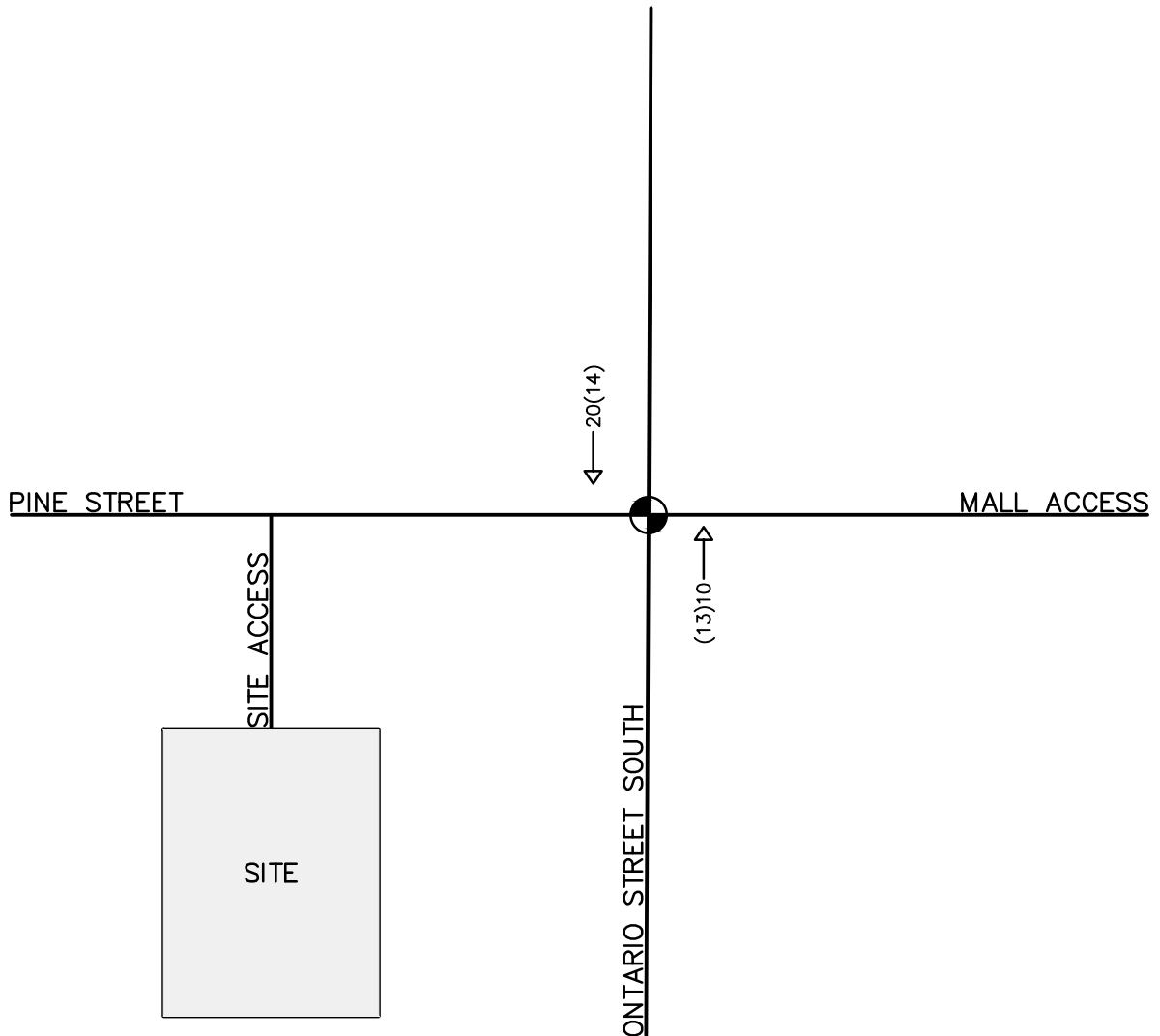
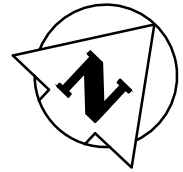
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Drawn	N.K.	Design	N.K.	Project No.	1286-4485
Check	R.A.W.	Check	R.A.W.	Scale	N.T.S.
				Dwg.	FIG. 03

NOTE:

THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:

-  SIGNAL CONTROL
-  STOP CONTROL
-  YIELD CONTROL
-  ROUND ABOUT
-  WEEKDAY PM
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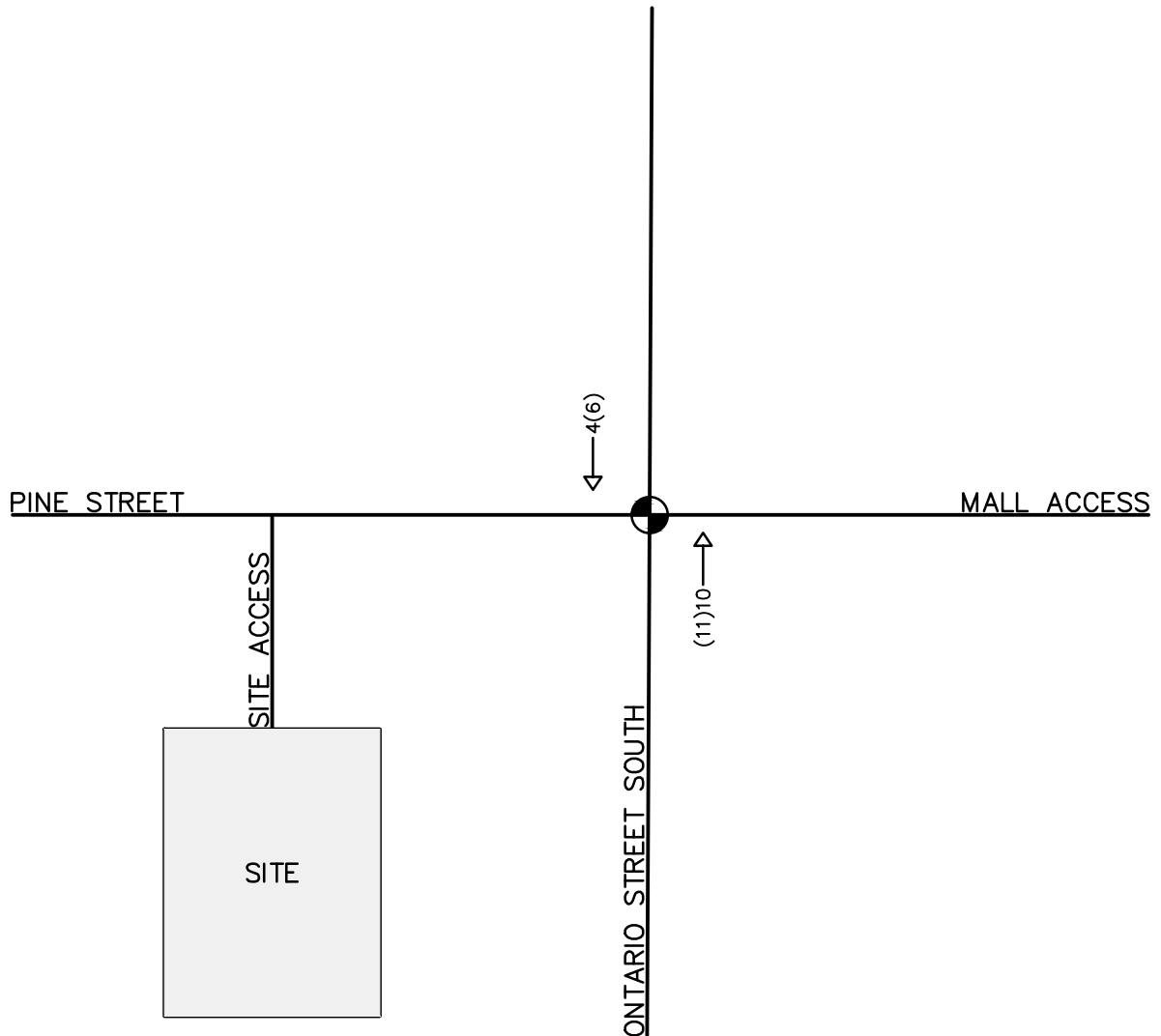
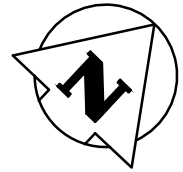
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Check	R.A.W.	Check	R.A.W.	Scale	N.T.S.
				Dwg.	FIG. 04

NOTE:

THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:

-  SIGNAL CONTROL
-  STOP CONTROL
-  YIELD CONTROL
-  ROUND ABOUT
WEEKDAY PM
(SATURDAY)
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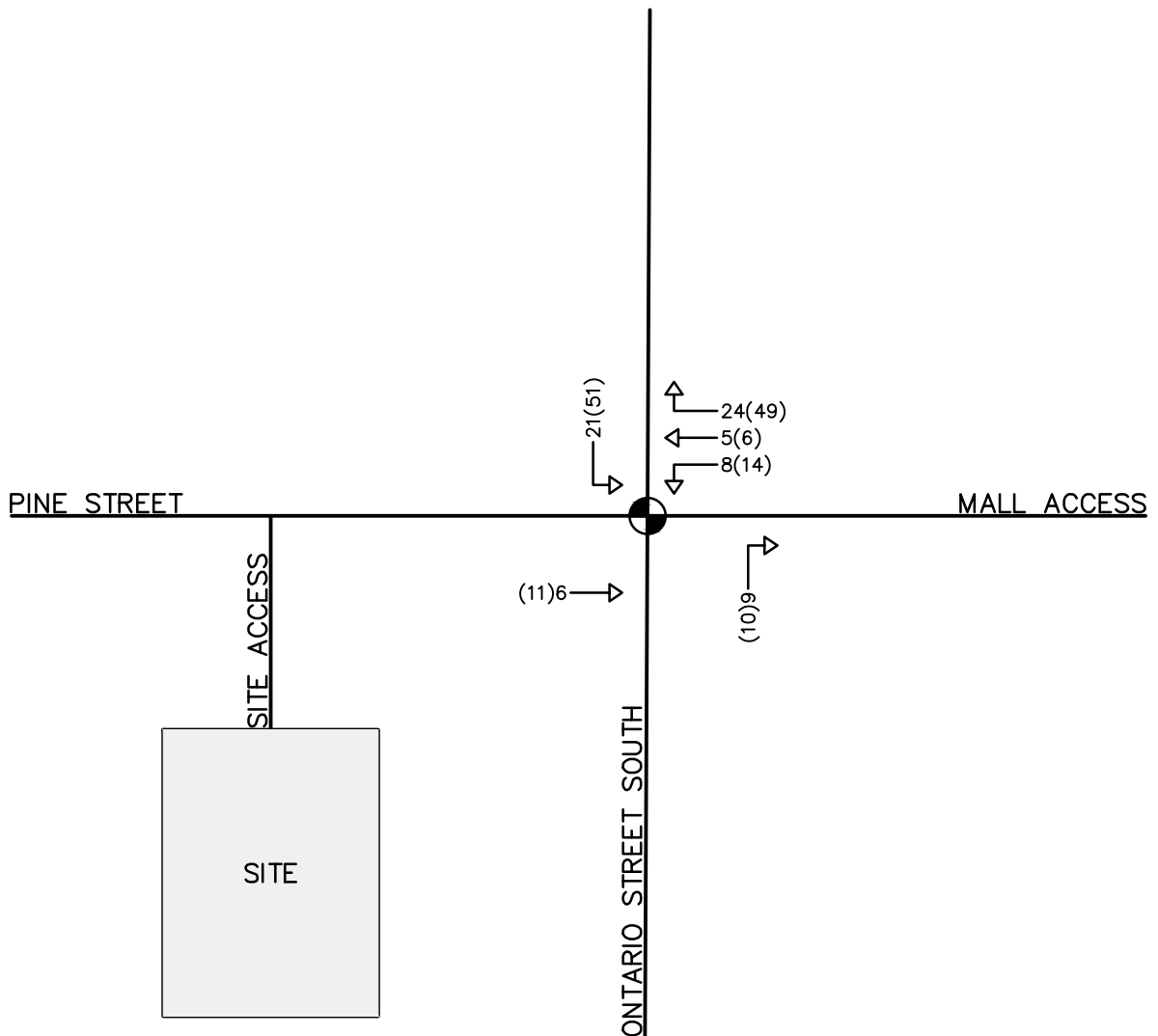
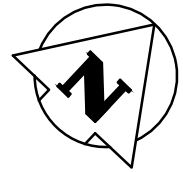
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Check	R.A.W.	Check	R.A.W.	Scale	N.T.S.
				Dwg.	FIG. 05

NOTE:

THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:

-  SIGNAL CONTROL
-  STOP CONTROL
-  YIELD CONTROL
-  ROUND ABOUT
-  WEEKDAY PM
-  (SATURDAY)
-  TRIP DISTRIBUTION

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LOWE'S BACKGROUND DEVELOPMENT



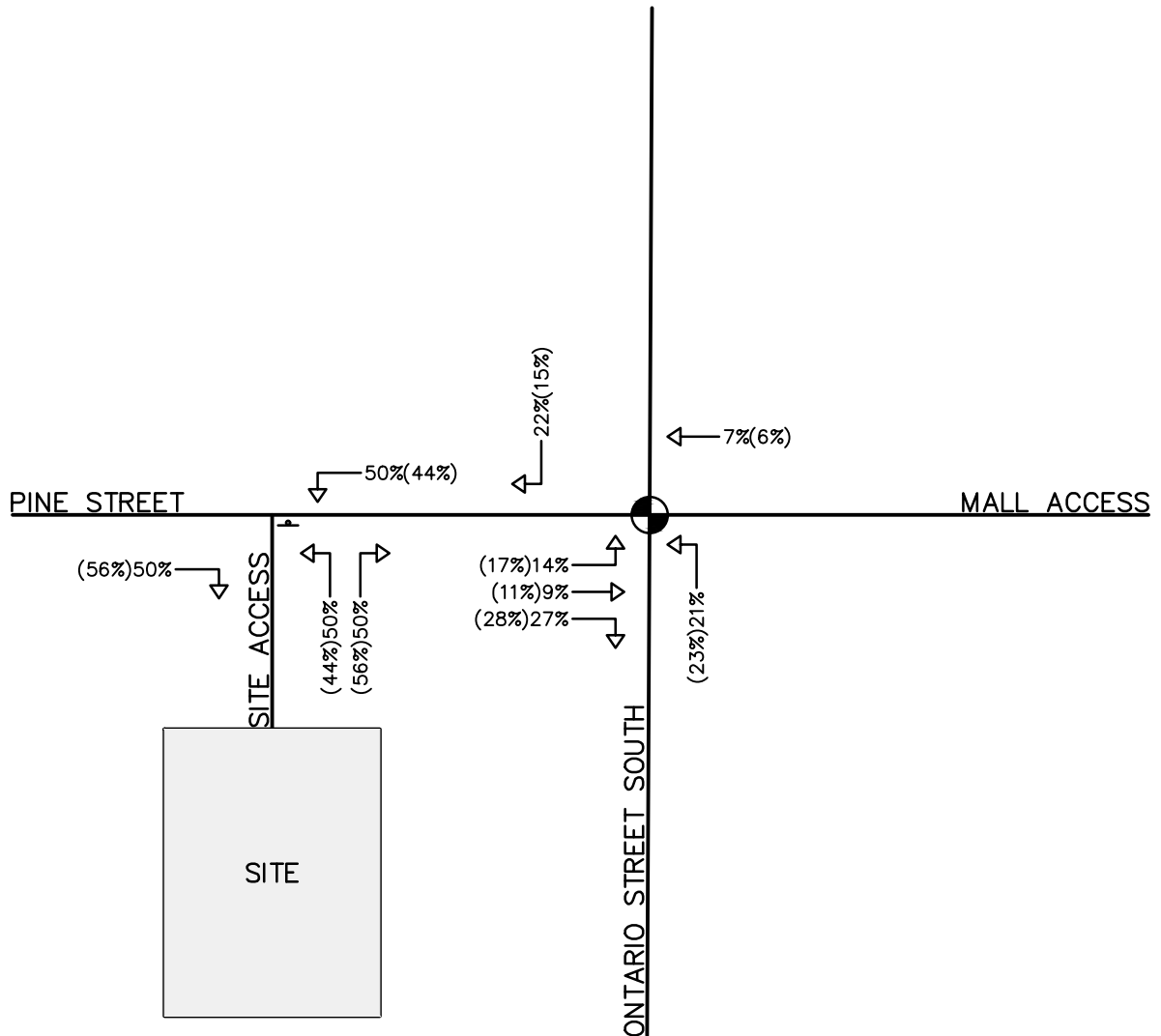
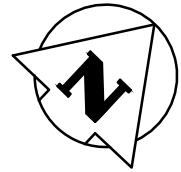
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Drawn	N.K.	Design	N.K.	Project No.	1286-4485
Check	R.A.W.	Check	R.A.W.	Scale	N.T.S.
					Dwg. FIG. 06

NOTE:

THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:

- SIGNAL CONTROL
- STOP CONTROL
- YIELD CONTROL
- ROUND ABOUT
- WEEKDAY PM
- (SATURDAY)
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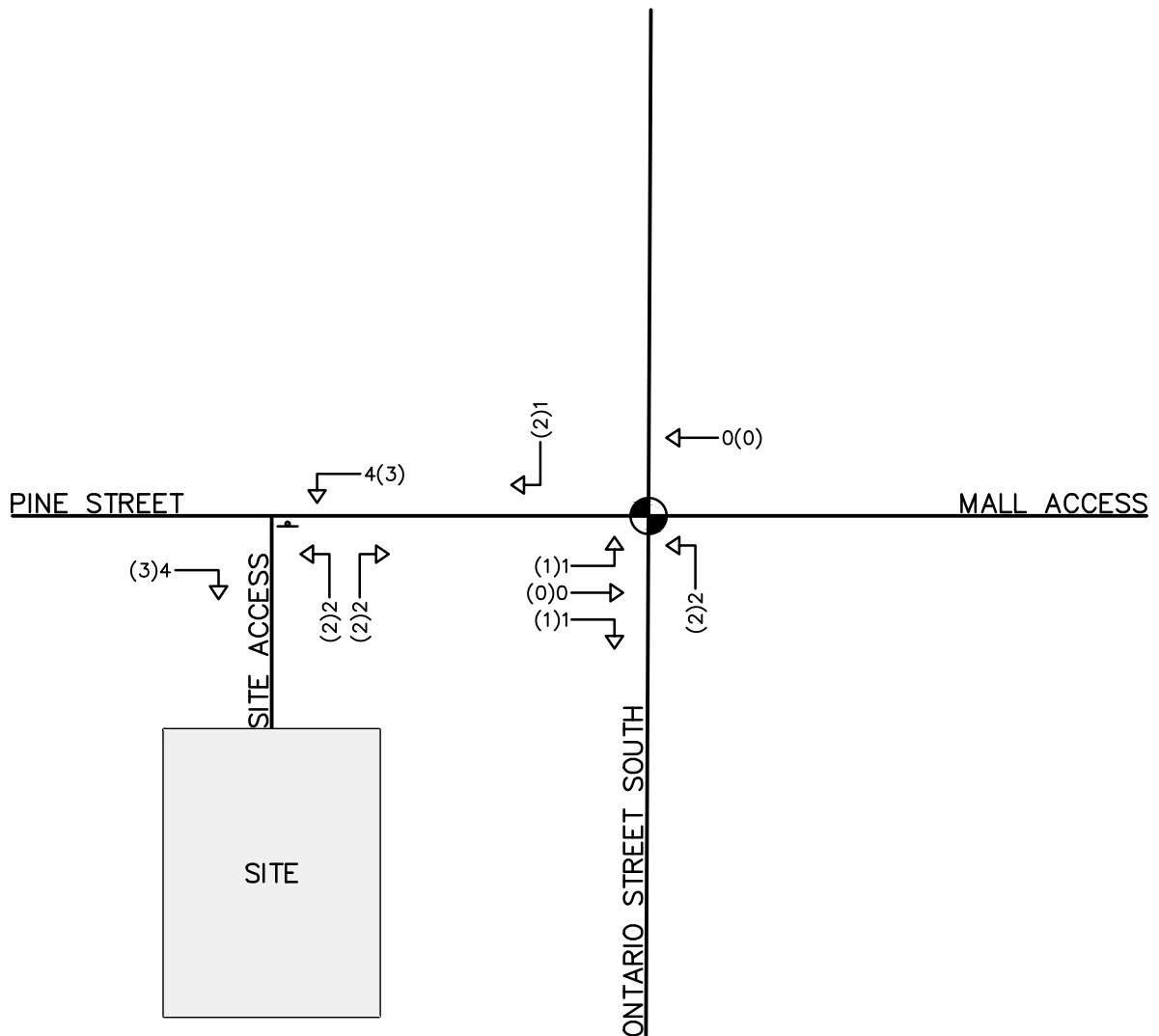
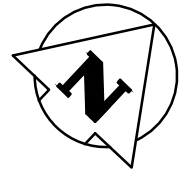
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Check	R.A.W.	Check	R.A.W.	Scale	N.T.S.
				Dwg.	FIG. 07

NOTE:

THIS FIGURE IS SCHEMATIC ONLY
AND IS NOT TO BE SCALED.



LEGEND:

-  SIGNAL CONTROL
-  STOP CONTROL
-  YIELD CONTROL
-  ROUND ABOUT
-  WEEKDAY PM
-  (SATURDAY)
-  TRIP DISTRIBUTION

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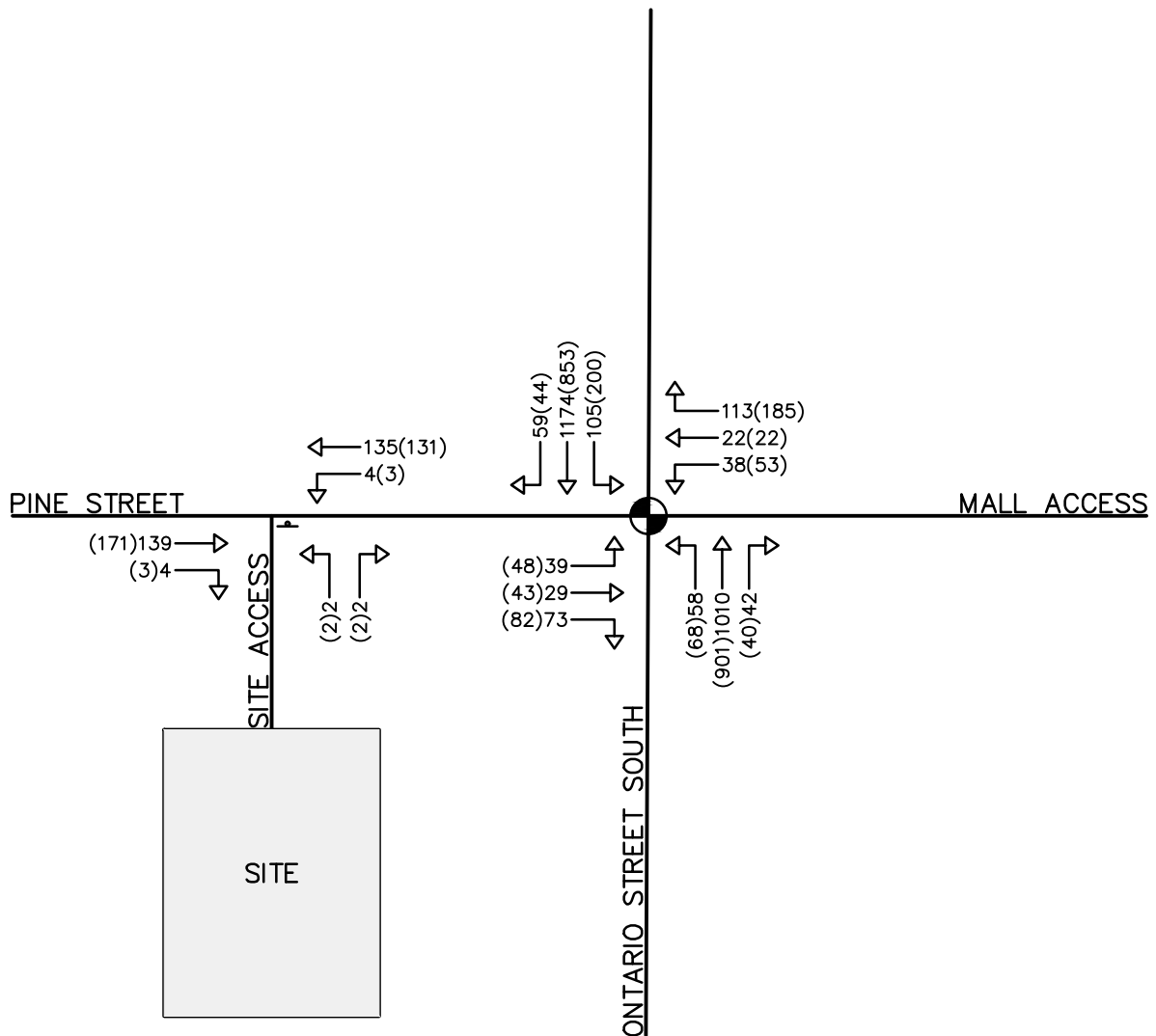
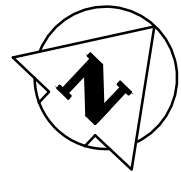
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Check	R.A.W.	Check	R.A.W.	Scale	N.T.S.
				Dwg.	FIG. 08

NOTE:

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LEGEND:

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- STOP CONTROL
- YIELD CONTROL
- ROUND ABOUT
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Drawn	N.K.	Design	N.K.	Project No.	1286-4485
Check	R.A.W.	Check	R.A.W.	Scale	N.T.S.
					Dwg. FIG. 09