

TRAFFIC IMPACT STUDY

**EDGEWOOD GREENS
TOWNSHIP OF SOUTHGATE**

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Revision Number	Date	Comments
Rev.0	December 2015	Original TIS Submission
Rev.1	February 2016	TIS Update Submission
Rev.2	June 2016	TIS Update Submission
Rev.3	January 2020	TIS Update Submission

1.0 Executive Summary

Crozier Consulting Engineers (Crozier) was retained by Flato Developments Inc. (Flato) to complete an updated Traffic Impact Study (TIS) to support the Official Plan Amendment, Zoning By-law Amendment, Redline Draft Plan and Site Plan Applications for a proposed commercial block located within the Dundalk Meadows development (the site) (now referred to as Edgewood Greens) in Dundalk, Township of Southgate.

The original TIS was submitted in December 2015 to the Ontario Ministry of Transportation (MTO) and Township of Southgate. The first update was prepared in response to discussions with MTO and to reflect the additional lands acquired by Flato (Flato North). Subsequent updates were completed in February 2016 and June 2016 in response to comments provided by the MTO. Flato West has been constructed and occupied, Flato North is currently under construction, a portion of Flato East has been constructed and the remaining lands are Draft Plan Approved and are undergoing detailed design.

A proposed commercial block will replace 33 townhouse units in Phases 12 and 13. The commercial building is proposed to have a gross floor area (GFA) of 1,635 square metres (17,599 square feet). The development includes 80 parking spaces and two loading spaces. The addition of the commercial block increases the distance between Highway 10 and the closest internal street intersection from approximately 30 metres to approximately 110 metres as it results in the removal of the Street "H" and Street "G" intersection illustrated in the Concept Plan (Colgan Crescent/Milliner Avenue on the Phasing Plan).

With the inclusion of the commercial block and the removal of the constructed units, the total outstanding unit breakdown is now as follows:

- 477 Single-detached Units
- 219 Semi-detached Units
- Commercial Building with a GFA of 1,635 m² (17,599 ft²)

The analysis contained within this report included the following intersections:

- Highway 10 & Main Street,
- Main Street & Russell Street,
- Main Street & Mill Street/ Alice Street,
- Main Street & Osprey Street,
- Victoria Street & Elm Street, and
- Highway 10 & the proposed public road access.

Analysis of the 2019 existing traffic operations at the study intersections indicates that the intersections are operating with a LOS "B" or better in the weekday a.m. and p.m. peak hours, with reserve capacity for increase in traffic volumes.

The development is expected to be fully built-out by 2025, accordingly, the 2025, 2030 and 2035 horizon years were analysed, reflecting the full build-out and 5 - and 10-year horizons. For consistency with the previous submissions, a growth rate of 1.5 percent compounded annually was applied to all movements on the boundary road network.

Analysis of the 2025 through 2035 future background conditions indicate that the study intersections are expected to continue operating with a LOS "B" or better, with the exception of Main Street and Alice Street/ Mill Street, which is expected to operate with a LOS "C" in the p.m. peak hour.

The development is forecasted to generate 460 and 618 two-way primary trips in the weekday a.m. and p.m. peak hours, respectively, and 0 and 23 pass-by trips in the a.m. and p.m. peak hours, respectively.

The analysis of the study intersections under future total traffic volume conditions indicates the following:

- An auxiliary northbound left-turn lane with a minimum of 40 meters storage length is warranted at the Highway 10 site access.
- The intersection of Highway 10 & Main Street, Main Street & Russell Street, and Elm Street and Victoria Street are expected to continue operating with a LOS "B" or better in all time periods.
- The intersection of Main Street and Alice Street/ Mill Street, Main Street and Osprey Street, and Highway 10 and the proposed site access are expected to operate with a LOS "C" or better in all time periods.
- The addition of the site generated traffic is expected to result in a maximum control delay increase of 3.4 seconds (a.m. Osprey Street) and a maximum volume-to-capacity ratio increase of 0.16 (NB, a.m. – Russell Street).

The available stopping and intersection sight distance on Highway 10 to the north and south of the site access exceeds the minimum requirements outlined in the TAC GDGCR.

It is concluded that the traffic generated by the proposed residential and commercial development can be accommodated by the boundary road network, within the noted improvement.

The analysis undertaken herein was prepared using the most recent Draft Plans and Concept Plan (dated November 22, 2019). Any minor changes to the Plans will not materially affect the conclusion contained within this report.

The proposed development can be supported from a traffic operations perspective, with the implementations of the noted improvement.

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2.0 Introduction

2.1 Background

Crozier Consulting Engineers (Crozier) was retained by Flato Developments Inc. (Flato) to complete an updated Traffic Impact Study (TIS) to support the Official Plan Amendment, Zoning By-law Amendment, Redline Draft Plan and Site Plan Applications for a proposed commercial block located within the Dundalk Meadows development (now referred to as Edgewood Greens) in Dundalk, Township of Southgate.

The original TIS was submitted in December 2015 to the Ontario Ministry of Transportation (MTO) and Township of Southgate. The first update was prepared in response to discussions with MTO and to reflect the additional lands acquired by Flato (Flato North). Subsequent updates were completed in February 2016 and June 2016 in response to comments provided by the MTO. Since these updates, Flato North, East and West and been Draft Plan Approved. Flato West has been constructed and occupied, Flato North is currently under construction, a portion of Flato East has been constructed and the remaining lands are Draft Plan Approved and undergoing detailed design.

2.2 Development Proposal

As described above, Edgewood Greens (formerly Dundalk Meadows) is divided into three properties (North, West and East) and 13 Phases, all of which have been Draft Plan Approved. The development details and the status of each of the Draft Plan Approved Phases are summarized in **Table 1** below.

Table 1: Edgewood Greens Development Details and Status

Phase	Development Property	Units	Approval Status
Phase 1	Flato West	70	Constructed and Occupied
Phase 2B	Flato East	38	Constructed and Occupied
Phases 2A and 3-6	Flato North	267	Draft Plan Approved/ Under Construction
Phases 7, 8	Flato East	141	Draft Plan Approved/ Under Detailed Design
Phases 9-13	Flato East	321	Draft Plan Approved/ Subject to Future Detailed Design
Total		837	

The residential units will consist of a combination of single-detached units and semi-detached units. A total of 585 single-detached units and 252 semi-detached units were Draft Plan Approved in Flato North, West and East.

As noted above, Phase 1 and 2B were constructed and occupied at the time of undertaking the turning movement counts. As such, the trips generated by these dwelling units have been captured in the 2019 existing traffic volumes.

The proposed commercial block will replace 33 semi-detached units in Phases 12 and 13. The commercial building is proposed to have a gross floor area (GFA) of 1,635 square metres (17,599 square feet). The development includes 80 parking spaces and two loading spaces. The addition of the commercial block increases the distance between Highway 10 and the closest internal street intersection from approximately 30 metres to approximately 110 metres as it results in the removal of

the Street "H" and Street "G" intersection illustrated in the Concept Plan (Colgan Crescent/Milliner Avenue on the Phasing Plan).

With the inclusion of the commercial block and the removal of the constructed units, the total outstanding unit breakdown is now as follows:

- 477 Single-detached Units
- 219 Semi-detached Units
- Commercial Building with a GFA of 1,635 m² (17,599 ft²)

The Edgewood Greens development has three access points to the boundary road network. A direct connection is provided to Highway 10, access to Main Street is provided through Russell Street, and Hagan Street provides access to Elm Street which in turn connects with Victoria Street.

Access to the commercial block is proposed through two full-moves entrances to Street "G" (Colgan Crescent) and Street "H" (Milliner Avenue). Street "H" will intersect with Highway 10 to the east. The latest Phasing Plan has been included as **Figure 1** and the Concept Plan for the commercial block has been included as **Figure 2**.

2.3 Purpose and Scope

The purpose of the study is to evaluate the transportation-related impacts of the proposed development on the boundary road network and to recommend or confirm any required mitigation measures, if warranted. Previous versions of the TIS had recommended a northbound left-turn lane on Highway 10 at the public road entrance to the site.

The study reviews the following main aspects of the proposed development from a transportation engineering perspective:

- Existing, future background, and future total traffic operations on the boundary road network during the weekday a.m. and p.m. peak hours;
- Forecasted trip generation of the proposed development; and,
- Minimum sight distance and auxiliary turn-lane requirements.

The study has been completed in accordance with the MTO's "Guidelines for the Preparation of Traffic Impact Studies" (September 2014).

3.0 Existing Conditions

3.1 Development Lands

The site is bound by Highway 10 to the northeast, active agricultural lands/mixed woods to the southeast and existing residential dwellings to the northwest. Flato West is located in the southwest portion of the site and has been fully built-out. The Site Location Plan has been included as **Figure 3**.

3.2 Study Intersections

The Traffic Impact Study analyzes the following intersections:

- Highway 10 and Main Street
- Main Street and Russell Street
- Main Street and Alice Street/Mill Street

- Main Street and Osprey Street
- Elm Street and Victoria Street
- Highway 10 and the proposed public road access

Details relating to the boundary roadways are summarized in the subsequent section. **Figure 4** illustrates the existing traffic control and lane configuration at the study intersections.

3.3 Boundary Road Network

Due to the skewed nature of the roadway, the directional orientation of the boundary road network is ambiguous. Accordingly, to provide clarity throughout the report, Highway 10, Russell Street, Alice Street/Mill Street, Osprey Street and Elm Street have been given a north-south orientation and Main Street and Victoria Street have been given an east-west orientation.

Highway 10 is a north-south two-way highway under the jurisdiction of the MTO. Highway 10 has a posted speed limit of 80 km/h. The roadway consists of two approximate 3.7 metre travel lanes with granular shoulders. No pedestrian facilities exist on either side of this highway.

Main Street (Grey County Road 9) is an east-west two-lane two-way arterial roadway under the jurisdiction of the Grey County. Main Street has a posted speed limit of 50 km/h. The roadway consists of two approximate 3.7 metre travel lanes with curb and gutter along both the north and south sides. Approximate 1.5 metre concrete pedestrian sidewalks exist along the north and south sides of Main Street.

Russell Street is a north-south two-lane two-way local roadway under the jurisdiction of the Township of Southgate. There is no posted speed limit; thus, the speed limit is assumed to be 50 km/h. The roadway consists of two approximate 3.2 metre travel lanes with curb and gutter to the east and west. On the east side of the roadway, approximate two metre grass strip separates an approximate 1.5 metre sidewalk from the curb.

Alice Street is a north-south two-lane two-way local roadway under the jurisdiction of the Township of Southgate. There is no posted speed limit; thus, the speed limit is assumed to be 50 km/h. The roadway consists of two approximate 3.2 metre travel lanes with asphalt swales to the east and earthen swales to the west. An approximate 1.5 metre concrete sidewalk exists on the east side of the roadway.

Mill Street is a north-south two-lane two-way local roadway under the jurisdiction of the Township of Southgate. It is offset approximately 15 metres westward from Alice Street. There is no posted speed limit; thus, the speed limit is assumed to be 50 km/h. The roadway consists of two approximate 3.2 metre travel lanes with asphalt swales to the west and earthen swales to the east. On the west side of the roadway, an approximate two metre grass strip separates an approximate 1.5 metre sidewalk from the curb.

Elm Street is a north-south two-lane two-way local roadway under the jurisdiction of the Township of Southgate. There is no posted speed limit; thus, the speed limit is assumed to be 50 km/h. The roadway consists of two approximate 3.2 metre travel lanes with earthen swales to the east and west. No pedestrian facilities exist on this section of roadway.

Victoria Street is an east-west two-lane two-way local roadway under the jurisdiction of the Township of Southgate. There is no posted speed limit; thus, the speed limit is assumed to be 50 km/h. The roadway consists of two approximate 3.5 metre travel lanes with an approximate 2.0 metre grass boulevard with a 1.5 metre concrete sidewalk.

Osprey Street is a north-south two-lane two-way local roadway under the jurisdiction of the Township of Southgate. There is no posted speed limit; thus, the speed limit is assumed to be 50 km/h. South of Main Street, the roadway consists of two approximate 3.5 metre travel lanes with asphalt swales and approximate 1.5 metre concrete sidewalks on the east and west sides. North of Main Street, the roadway consists of approximate 3.5 metre travel lanes approximate 1.5 metre concrete sidewalk on the east side of the roadway.

The signalized intersection of Highway 10 and Main Street is semi-actuated with left turn lanes in all approaches and crosswalks approximately two metres in width. The intersections of Main Street and Russell Street, Main Street and Mill Street/ Alice Street, Victoria Street North and Elm Street, and Main Street and Osprey Street are two-way stop-controlled with no dedicated turn lanes. **Figure 4** illustrates the existing boundary road network, including lane configurations and intersection control.

3.4 Traffic Data

Turning movement counts were conducted by Spectrum Traffic Data Inc. (Spectrum) staff at the study intersections on Thursday, December 19, 2019 between 6:00 a.m. – 10:00 a.m. and 3:00 p.m. – 7:00 p.m. Intersection analysis was conducted utilizing peak hour factors (PHFs) as calculated for each intersection during each time period. **Table 2** outlines the calculated peak hour factors at each intersection during each peak hour. The traffic count data is contained in **Appendix A**. **Figure 5** illustrates the 2019 existing traffic volumes that were recorded.

Table 2: Peak Hour Factors

Intersection	Peak Hour	Peak Hour Factor
Highway 10 and Main Street	Weekday A.M. 8:30 a.m. to 9:30 a.m.	0.88
	Weekday P.M. 4:45 p.m. – 5:45 p.m.	0.91
Main Street and Russell Street	Weekday A.M. 8:30 a.m. to 9:30 a.m.	0.96
	Weekday P.M. 4:45 p.m. – 5:45 p.m.	0.92
Main Street and Alice Street/Mill Street	Weekday A.M. 8:30 a.m. to 9:30 a.m.	0.92
	Weekday P.M. 3:45 p.m. – 4:45 p.m.	0.92
Main Street and Osprey Street	Weekday A.M. 8:30 a.m. to 9:30 a.m.	0.97
	Weekday P.M. 3:45 p.m. – 4:45 p.m.	0.92
Elm Street and Victoria Street	Weekday A.M. 8:30 a.m. to 9:30 a.m.	0.69
	Weekday P.M. 3:15 p.m. – 4:15 p.m.	0.86

3.5 Traffic Modelling

The boundary road network was modelled in Synchro 9.0 using existing roadway geometrics, collected traffic data, and default modelling parameters such as ideal saturation flow rates and lost time values. The signal timing plan was obtained from MTO staff and has been utilized for the existing, future background and future total analyses. 95th percentile queue lengths were derived from Synchro.

The assessment of intersections is based on the “Highway Capacity Manual (HCM)” methodology. Intersections are assessed using a Level of Service (LOS) metric with ranges of delay assigned a letter from “A” to “F”; “A” representing low delays and “F” representing heavy delays. The LOS definitions for signalized and unsignalized intersections are included in **Appendix B**.

3.6 Intersection Operations

The existing operations at the study intersections were analyzed using the existing 2019 traffic volumes illustrated in **Figure 5**. Detailed capacity analysis worksheets are included in **Appendix C**. **Table 3** outlines the 2019 existing traffic operations.

Table 3: 2019 Existing Levels of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²	95 th Percentile Queues > Storage
Highway 10 and Main Street	Signal	A.M.	B	10.0 s	0.28 (EBL)	None
		P.M.	A	9.9 s	0.33 (EBT)	None
Main Street and Russell Street	Two-way Stop	A.M.	A	9.6 s	0.05 (NB)	None
		P.M.	B	10.3 s	0.05 (NB)	None
Main Street and Alice Street/Mill Street	Two-way Stop	A.M.	B	10.1 s	0.04 (NB)	None
		P.M.	B	11.8 s	0.04 (NB)	None
Main Street and Osprey Street	Two-way Stop	A.M.	B	10.5 s	0.03 (SB)	None
		P.M.	B	11.7 s	0.03 (SB/NB)	None
Elm Street and Victoria Street	Two-way Stop	A.M.	A	9.0 s	0.06 (NB)	None
		P.M.	A	8.9 s	0.02 (NB)	None

Note¹: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU). The Level of Service of a two-way stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection. Any movements that experience a v/c ratio in excess of 0.85 are considered critical per the MTO TIS Guidelines.

The metrics summarized above indicate that the study intersections operate at a LOS “B” or better in the weekday a.m. and p.m. peak hours. The maximum volume-to-capacity ratio of 0.33 (Highway 10 and Main Street, EBT, p.m.) indicates that the study intersections have reserve capacity for increases in traffic volumes. All 95th percentile queues can be contained within their respective auxiliary turn-lanes.

4.0 Future Background Conditions

4.1 Horizon Years

For the purpose of this assessment, it has been assumed that the entirety of Edgewood Greens will be built out by 2025. The MTO's guidelines require analysis of the full build-out horizon and the five- and ten-year horizons from the estimated year of full build-out. Therefore, the 2025, 2030 and 2035 horizon years were analyzed.

4.2 Growth Rate

The MTO's "Provincial Highways Traffic Volumes 1988-2016" document was reviewed to analyze historical traffic volumes on Highway 10. The document provides historical traffic data for the segment of Highway 10 between Shelburne and Flesherton. A growth rate of 0.57 percent compounded annually was calculated for the Annual Average Daily Traffic (AADT) between 2010 and 2016.

For the purpose of a conservative analysis, and to be consistent with the previous submissions of the TIS, a growth rate of 1.5 percent compounded annually was applied to all movements on the boundary road network to forecast 2025, 2030 and 2035 future background traffic volumes. **Appendix D** contains the growth rate analysis. The 2025, 2030 and 2035 future background traffic volumes are illustrated in **Figures 6, 7 and 8**, respectively.

4.3 Future Road Improvements

No capacity improvements have been identified for the boundary roads within the study horizons. Any external improvements triggered by the proposed development are discussed in **Section 5**.

4.4 Background Developments

The Glenelg residential development is located at 231 Glenelg Street in the northwest end of Dundalk. The development has been Draft Plan Approved and is currently undergoing detailed design, with construction scheduled to commence summer 2020. The development proposal includes 130 single detached units and 33 townhouse units.

Crozier completed the Glenelg TIS in September 2018. The report was based on an earlier version of the plan that proposed 127 single family detached units and 26 townhouse units. An updated trip generation estimate has been provided in **Table 4** which accounts for the additional ten units proposed.

Table 4: Glenelg Trip Generation

Use	Trip Type	Peak Hour	Number of Trips		
			Inbound	Outbound	Total
L.U. 210: Single Family Detached Housing (130 Units)	Primary	Weekday A.M.	24	73	97
	Primary	Weekday P.M.	82	49	131
L.U. 220: Multifamily Housing (Low-Rise) (33 Units)	Primary	Weekday A.M.	4	13	17
	Primary	Weekday P.M.	14	8	22
Total	Primary	Weekday A.M.	28	86	114
	Primary	Weekday P.M.	96	57	153

Trips generated by Glenelg were assigned to the boundary road network based on the distributions described in the original TIS (Crozier, September 2018). 50 percent of trips were assumed to travel to and from the south on Highway 10 and ten percent of trips were assumed to travel to and from the east on Grey Road 9. These remaining trips were assumed to remain within Dundalk or travel to and from the north on Ida Street or to and from the west on Grey Road 9. The trips travelling to and from the east on Grey Road 9 and to and from the south on Highway 10 were assigned as through volumes on Main Street at the study intersections. The trips assignment for the Glenelg Development is illustrated in **Figure 6** and relevant excerpts from the Glenelg TIS, as well as the most recent Draft Plan have been included in **Appendix E**.

4.5 Intersection Operations

The future background operations at the study intersections were analyzed using the 2025, 2030 and 2035 future background traffic volumes illustrated in **Figures 7, 8 and 9**, respectively. Detailed capacity analysis worksheets are included in **Appendix C. Table 5, Table 6 and Table 7** outline the 2025, 2030 and 2035 future background traffic operations, respectively.

Table 5: 2025 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²	95 th Percentile Queues > Storage
Highway 10 and Main Street	Signal	A.M.	B	10.2 s	0.40 (EBT)	None
		P.M.	B	11.6 s	0.45 (EBT)	None
Main Street and Russell Street	Two-way Stop	A.M.	A	9.8 s	0.06 (NB)	None
		P.M.	B	10.4 s	0.05(NB)	None
Main Street and Alice Street/Mill Street	Two-way Stop	A.M.	B	10.8 s	0.05 (NB)	None
		P.M.	B	13.4 s	0.05 (NB)	None
Main Street and Osprey Street	Two-way Stop	A.M.	B	11.3 s	0.04 (SB)	None
		P.M.	B	13.3 s	0.04 (SB)	None
Elm Street and Victoria Street	Two-way Stop	A.M.	A	9.1 s	0.06 (NB)	None
		P.M.	A	9.0 s	0.03 (NB)	None

Note¹: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a two-way stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection. Any movements that experience a v/c ratio in excess of 0.85 are considered critical per the MTO TIS Guidelines.

Table 6: 2030 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²	95 th Percentile Queues > Storage
Highway 10 and Main Street	Signal	A.M.	B	10.4 s	0.41 (EBT)	None
		P.M.	B	12.1 s	0.48 (EBT)	None
Main Street and Russell Street	Two-way Stop	A.M.	A	9.9 s	0.06 (NB)	None
		P.M.	B	10.6 s	0.05 (NB)	None
Main Street and Alice Street/Mill Street	Two-way Stop	A.M.	B	11.0 s	0.05 (NB)	None
		P.M.	B	13.9 s	0.06 (NB)	None
Main Street and Osprey Street	Two-way Stop	A.M.	B	11.4 s	0.04 (SB)	None
		P.M.	B	13.6 s	0.05 (SB)	None
Elm Street and Victoria Street	Two-way Stop	A.M.	A	9.1 s	0.07 (NB)	None
		P.M.	A	9.1 s	0.04 (NB)	None

Note¹: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a two-way stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection. Any movements that experience a v/c ratio in excess of 0.85 are considered critical per the MTO TIS Guidelines.

Table 7: 2035 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²	95 th Percentile Queues > Storage
Highway 10 and Main Street	Signal	A.M.	B	10.6 s	0.42 (EBT)	None
		P.M.	B	12.6 s	0.50 (EBT)	None
Main Street and Russell Street	Two-way Stop	A.M.	B	10.1 s	0.07 (NB)	None
		P.M.	B	10.8 s	0.06 (NB)	None
Main Street and Alice Street/Mill Street	Two-way Stop	A.M.	B	11.3 s	0.06 (NB)	None
		P.M.	C	15.2 s	0.07 (NB)	None
Main Street and Osprey Street	Two-way Stop	A.M.	B	11.8 s	0.04 (SB)	None
		P.M.	B	14.2 s	0.06 (SB)	None
Elm Street and Victoria Street	Two-way Stop	A.M.	A	9.2 s	0.07 (NB)	None
		P.M.	A	9.2 s	0.04 (NB)	None

Note¹: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a two-way stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection. Any movements that experience a v/c ratio in excess of 0.85 are considered critical per the MTO TIS Guidelines.

The metrics summarized above indicate that the study intersections are expected to continue operating with a LOS "B" or better, with the exception of Main Street and Alice Street/Mill Street, which is expected to operate with a LOS "C" in the weekday p.m. peak hour. The maximum volume-to-capacity ratio of 0.50 (Highway 10 and Main Street, EBT, p.m.) indicates that the intersections have reserve capacity for increases in traffic volumes. The 95th percentile queues through all horizon years and peak hours can be contained within their available storage lengths.

5.0 Future Total Conditions

5.1 Site Generated Traffic

The proposed mixed-use development will result in additional vehicles on the boundary road network that would otherwise not exist. The proposed development will also result in additional turning movements at the study intersections.

As noted, the remainder of the development is proposed to consist of the following:

- 477 Single-detached Units
- 219 Semi-detached Units
- Commercial Building with a GFA of 1,635 m² (17,599 ft²)

The trip generation of the proposed residential dwelling and commercial units was forecasted using published data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition. The ITE Trip Generation Manual is a compendium of industry collected trip generation data across North America for a variety of land uses and is used industry-wide as a source for trip generation forecasts.

The applicable average rates and fitted curve equations for Land Use Category (LUC) 210 "Single Family Detached Housing" and LUC 220 "Multifamily Housing (Low-Rise)" were applied to the proposed residential dwelling units, and the average rates for LUC 820 "Shopping Centre" were applied to the proposed commercial GFA.

As defined by the ITE Trip Generation Handbook, 3rd Edition, primary trips are made for the specific purpose of visiting the generator. Pass-by trips are made as intermediate stops on the way from an origin to a primary destination without a route diversion. Accordingly, these vehicles do not increase the volume of vehicles on the roadway.

The pass-by trip percentage of the commercial retail pass-by trips was forecasted using the rates provided by the ITE Trip Generation Handbook. LUC 820 was used to establish a pass-by percentage of 34 percent for the p.m. peak period. A pass-by percentage was not applied to the a.m. peak period as this trip generation generally captures employees of the commercial uses.

Relevant excerpts from the ITE Trip Generation Manual, 10th Edition and ITE Trip Generation Handbook, 3rd Edition have been included in **Appendix I**. The forecasted trip generation of the mixed-use development is summarized in **Table 8**.

Table 8: Trip Generation

Land Use	Units/GFA	Peak Hour	Trip Type	Trips Generated		
				Inbound	Outbound	Total
LUC 210: Single Family Detached Housing	477 Units	A.M.	Primary	85	258	343
		P.M.		287	168	455
LUC 220: Multifamily Housing (Low-Rise)	219 Units	A.M.	Primary	23	77	100
		P.M.		75	44	119
LUC 820: Shopping Centre	17,599 ft²	A.M.	Primary	10	7	17
			Pass-by	0	0	0
		P.M.	Primary	21	23	44
			Pass-by	11	12	23
Total		A.M.	Primary	118	342	460
			Pass-by	0	0	0
		P.M.	Primary	383	235	618
			Pass-by	11	12	23

5.2 Trip Distribution and Assignment

5.2.1 Residential Trips

The trips generated by the proposed residential portion of the development were distributed to the boundary road network using the distribution described in the June 2016 TIS Update, which was completed using Transportation Tomorrow Survey (TTS) data. Excerpts from the June 2016 TIS as well as the TTS data have been included in **Appendix G**.

The following residential trip distribution was established:

- 50% to and from the south on Highway 10 via the Highway 10 Access
- 5% to and from the north on Highway 10 via the Highway 10 Access

- 5% to and from the east on Main Street via the Highway 10 Access
- 15% travelling to and from the west on Main Street via Elm Street and Osprey Street
- 15% to and from the west on Main Street via Russell Street
- 5% to and from the east on Main Street via Russell Street
- 5% to and from the north on Highway 10 via Russell Street

Figure 10 outlines the residential trip distribution for the development. The associated primary trip assignment is illustrated in **Figure 13**.

5.2.2. Commercial Primary Trips

The primary trips generated by the commercial component of the proposed development were distributed to the boundary road network based on the expected catchment areas in the community. The main catchment area is expected to be comprised of the surrounding residential dwellings in the urban area of the Community of Dundalk.

Given the scale of the Edgewood Greens development, it is assumed that the commercial development will primarily service residents from within the development. As such, half the primary commercial trips were assumed to remain within Edgewood Greens. The remaining trips were distributed to the west on Main Street and Victoria Street via Russell Street and Elm Street, respectively.

Figure 11 outlines the residential trip distribution for the development. The associated primary trip assignment is illustrated in **Figure 14**.

5.2.3. Commercial Pass-By Trips

The pass-by trips generated by the proposed development are expected to utilize the proposed site access to Highway 10. Existing turning movement counts were used to establish the pass-by trip distribution. Pass-by trips are only considered in the p.m. peak hour, accordingly, only this timeframe was analyzed. In the weekday p.m. peak hour, 35 percent of trips were observed travelling south on Highway 10, with the remaining 65 percent travelling north on Highway 10.

Figure 12 outlines the pass-by trip distribution for the site, and **Figure 15** outlines the corresponding pass-by trip assignment.

5.3 Auxiliary Turn-Lane Assessment

Auxiliary left-turn lane warrants were undertaken for a northbound left-turn lane on Highway 10 at the proposed site access. The warrants were completed using the MTO Design Supplement for TAC Geometric Design Guide for Canadian Roads. Highway 10 has a posted speed limit of 80 km/h fronting the site access. Accordingly, a design speed of 100 km/h was selected, reflecting the engineering convention of a 20 km/h increase on higher speed roadways. **Table 9** summarizes the results of the northbound left-turn lane analyses.

Table 9: 2035 Future Total Auxiliary Lane Analysis

Intersection	Peak Hour	V _A	% Left Turns in V _A	V _O	Warranted	Minimum Storage	MTO GDSOH Figure
Highway 10 and Site Access	A.M.	272	20%	277	Yes	15 m	Ex 9A-23
	P.M.	687	27%	316	Yes	40 m	Ex 9A-24

It can be seen that the volumes on Highway 10 exceed the minimum threshold for an auxiliary left-turn lane in the weekday a.m. and p.m. peak hours. The morning volumes warrant a left-turn lane with a minimum storage length of 15 metres, while the evening volumes warrant a left-turn lane with a minimum storage length of 40 metres. The auxiliary left-turn lane warrant charts have been included in **Appendix H** for reference.

A southbound right-turn lane was considered on Highway 10 at the proposed site access. Per the Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (GDGCR), a right-turn lane is required when the volume of right-turns causes a large delay to the through movements. The projected volume of right-turning vehicles at the site accesses is forecasted to be a maximum of 40 vehicles (p.m.), which represents approximately 13 percent of southbound volumes. This volume of right-turning vehicles is not expected to cause a delay to the southbound through traffic on Highway 10, which is evidenced by the future total results described in the subsequent section. Accordingly, an auxiliary right-turn lane or taper is not warranted for reasons of delay.

5.4 Intersection Operations

The site generated traffic volumes illustrated in **Figures 13, 14 and 15** were added to the 2025, 2030 and 2035 future background traffic volumes in **Figures 7, 8 and 9**, respectively, to determine the future total traffic volumes. **Figures 16, 17 and 18** outline the 2025, 2030 and 2035 future total traffic volumes, respectively. **Table 10, Table 11 and Table 12** outline the 2025, 2030 and 2035 future total traffic operations, respectively. Detailed capacity analysis worksheets are included in **Appendix C**.

Table 10: 2025 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²	95 th Percentile Queues > Storage
Highway 10 and Main Street	Signal	A.M.	B	11.3 s	0.45 (EBT)	None
		P.M.	B	12.4 s	0.49 (EBT)	None
Main Street and Russell Street	Two-way Stop	A.M.	B	11.7 s	0.20 (NB)	None
		P.M.	B	13.0 s	0.17 (NB)	None
Main Street and Alice Street/Mill Street	Two-way Stop	A.M.	B	11.2 s	0.05 (NB)	None
		P.M.	B	14.7 s	0.06 (NB)	None
Main Street and Osprey Street	Two-way Stop	A.M.	B	14.1 s	0.14 (NB)	None
		P.M.	C	15.5 s	0.13 (NB)	None
Elm Street and Victoria Street	Two-way Stop	A.M.	A	9.8 s	0.15 (NB)	None
		P.M.	A	9.9 s	0.10 (NB)	None
Highway 10 and Site Access	Two-way Stop	A.M.	B	12.6 s	0.32 (EB)	None
		P.M.	C	17.0 s	0.34 (EB)	None

Note¹: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a two-way stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection. Any movements that experience a v/c ratio in excess of 0.85 are considered critical per the MTO TIS Guidelines.

Table 11: 2030 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²	95 th Percentile Queues > Storage
Highway 10 and Main Street	Signal	A.M.	B	11.5 s	0.46 (EBT)	None
		P.M.	B	12.9 s	0.51 (EBT)	None
Main Street and Russell Street	Two-way Stop	A.M.	B	12.0 s	0.21 (NB)	None
		P.M.	B	13.5 s	0.19 (NB)	None
Main Street and Alice Street/Mill Street	Two-way Stop	A.M.	B	11.4 s	0.06 (NB)	None
		P.M.	C	15.3 s	0.07 (NB)	None
Main Street and Osprey Street	Two-way Stop	A.M.	B	14.5 s	0.15 (NB)	None
		P.M.	C	16.2 s	0.14 (NB)	None
Elm Street and Victoria Street	Two-way Stop	A.M.	A	9.8 s	0.15 (NB)	None
		P.M.	A	9.9 s	0.10 (NB)	None
Highway 10 and Site Access	Two-way Stop	A.M.	B	12.9 s	0.33 (EB)	None
		P.M.	C	17.9 s	0.35 (EB)	None

Note¹: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a two-way stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection. Any movements that experience a v/c ratio in excess of 0.85 are considered critical per the MTO TIS Guidelines.

Table 12: 2035 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service ¹	Control Delay	Maximum v/c ratio ²	95 th Percentile Queues > Storage
Highway 10 and Main Street	Signal	A.M.	B	11.8 s	0.48 (EBT)	None
		P.M.	B	13.4 s	0.54 (EBT)	None
Main Street and Russell Street	Two-way Stop	A.M.	B	12.4 s	0.23 (NB)	None
		P.M.	B	14.1 s	0.20 (NB)	None
Main Street and Alice Street/Mill Street	Two-way Stop	A.M.	B	11.7 s	0.06 (NB)	None
		P.M.	C	16.9 s	0.08 (NB)	None
Main Street and Osprey Street	Two-way Stop	A.M.	C	15.2 s	0.16 (NB)	None
		P.M.	C	16.9 s	0.15 (NB)	None
Elm Street and Victoria Street	Two-way Stop	A.M.	A	9.9 s	0.16 (NB)	None
		P.M.	B	10.1 s	0.11 (NB)	None
Highway 10 and Site Access	Two-way Stop	A.M.	B	13.2 s	0.34 (EB)	None
		P.M.	C	19.1 s	0.37 (EB)	None

Note¹: The Level of Service of a signalized intersection is based on the average control delay per vehicle (Synchro/ICU).
The Level of Service of a two-way stop-controlled intersection is based on the delay associated with the critical minor road approach (HCM 2000).

Note²: The maximum v/c ratio for two-way stop-controlled intersections represents the maximum v/c for the minor road approach movements at the intersection. Any movements that experience a v/c ratio in excess of 0.85 are considered critical per the MTO TIS Guidelines.

The intersections of Highway 10 and Main Street, Main Street and Russell Street, and Elm Street and Victoria Street are expected to continue operating with a LOS "B" or better under 2035 future total traffic volume conditions in the weekday a.m. and p.m. peak hours. The intersections of Main Street and Alice Street/Mill Street, Main Street and Osprey Street, and Highway 10 and the proposed site access are expected to operate at a LOS "C" or better under 2035 future total traffic volume conditions in the weekday a.m. and p.m. peak hours.

Across all intersections, the maximum increase in control delay is forecasted to be 3.4 seconds in the a.m. peak hour at the intersection of Main Street and Osprey Street, when compared to the 2035 future background operations. Similarly, the maximum increase in volume-to-capacity ratio across all intersections is forecasted to be 0.16 in the a.m. peak hour at the intersection of Main Street and Russell Street. The 95th percentile queue length for northbound left-turns at the proposed Highway 10 access is anticipated to be approximately 14 metres. This can be contained within the proposed 40-metre storage length.

All of the study intersections are expected to continue operating with good levels of service under 2035 future total traffic volume conditions, and all 95th percentile queues can be contained within their available storage lengths. The additional traffic generated by the proposed development is expected to have a minimal impact on the operations of the boundary road network. Accordingly, the proposed development can be supported from an operations perspective.

6.0 Sight Distance Analysis

A sight distance analysis was conducted to confirm that there is sufficient sight distance for drivers approaching and exiting the site at the proposed site access. The measured sight distances were compared to the standards set out in the Transportation Association of Canada (TAC) Geometric Design Guild for Canadian Roads (GDGCR).

6.1 Stopping Sight Distance

Highway 10 has a posted speed limit of 80 km/h. Accordingly, a design speed of 100 km/h was selected, reflecting the convention of a 20 km/h increase to the posted speed limit for higher speed roads. Highway 10 is straight and relatively flat adjacent to the site.

Per TAC GDGCR Table 2.5.2, the minimum stopping sight distance for level roadways with a design speed of 100 km/h is 185 metres. Clear visibility in excess of 500 metres is available to the north and south of the proposed site access. Accordingly, there is sufficient stopping sight distance for vehicles approaching from the north and south of the site access.

Relevant TAC GDGCR excerpts are included in **Appendix I**.

6.2 Intersection Sight Distance

Section 9.9 of the TAC GDGCR provides intersection sight distance for different intersection control types. The applicable cases are as follows:

- Case B – Intersections with stop control on the minor road
 - Case B1 – Left turn from the minor road (Site Access)
 - Case B2 – Right turn from the minor road (Site Access)
- Case F – Left turns from the major road (Highway 10)

Intersection sight distance is calculated using equation 9.9.1 from the GDGCR as outlined below:

$$ISD = 0.278 * V_{major} * t_G$$

Where;

ISD = Intersection Sight Distance

V_{major} = design speed of roadway (km/h)

t_G = assumed time gap for vehicles to turn from stop onto roadway (s)

The calculated and design sight distances are further summarized in TAC GDGCR Tables 9.9.4, 9.9.6 and 9.9.12 for vehicles turning left from stop, turning right from stop, or turning left from the major road, respectively.

Case B1 (vehicles turning left from stop) results in the greatest required sight distance. As such, only the requirements of Case B1 are summarized below. The time gap was obtained from Table 9.9.3 in the GDGCR. Relevant excerpts from TAC GDGCR are included in **Appendix I. Table 13** contains a summary of the intersection sight distance requirements for Case B1.

Table 13: Intersection Sight Distance

Case	Time Gap	Required Intersection Sight Distance	Available Sight Distance	TAC Reference
Highway 10 Design Speed = 100 km/h				
B1: Vehicles turning left from stop	7.5 s	210 m	+500 m (north and south)	Table 9.9.4

The available sight distance on Highway 10 to the north and south of the site access exceeds the minimum sight distance requirements. Accordingly, the proposed access can be supported from a sight distance perspective.

7.0 Conclusions

The analysis contained within this report has resulted in the following key findings:

- All study intersections are currently operating with a LOS "B" or better in the weekday a.m. and p.m. hours.
- Examination of the future background conditions indicates the following:
 - All intersections are expected to continue operating with a LOS of "B" or greater under the future background conditions for both a.m. and p.m. peaks, with the exception of Main street and Mill Street/ Alice Street which operates at a LOS "C" during the p.m. peak hour.
 - 95th percentile queues are not expected to exceed available storage lengths.
- The development is forecasted to generate 460 and 618 two-way primary trips in the weekday a.m. and p.m. peak hours, respectively. The development is forecasted to generate 0 and 23 pass-by trips in the a.m. and p.m. peak hours, respectively. The trips were distributed to the boundary road network based on TTS data as well as the location of the expected catchment areas for the commercial component of the development.

- The addition of site traffic to the boundary road network is expected to result in minor impacts to traffic operations. The analysis of future total traffic conditions indicates the following:
 - An auxiliary northbound left-turn lane with a minimum storage length of 40 metres is warranted at the proposed Highway 10 site access. The intersection is expected to operate with LOS "B" in the a.m. and LOS "C" in the p.m. peak hours.
 - The intersections of Highway 10 and Main Street, and Main Street and Russell Street are expected to continue operating with a LOS "B" in all time periods.
 - The intersections of Main Street and Osprey Street is expected to operate with a LOS "C" in the a.m. and p.m. peak hours.
 - The intersection of Elm Street and Victoria Street is expected to continue operating with a LOS "B" in the a.m. and LOS "A" in the p.m. peak hours.
 - The intersection of Main Street and Mill Street/Alice Street is expected to continue to operate at a LOS "B" in the a.m. and LOS "C" in the p.m. peak hours.
 - The addition of the site generated traffic is expected to result in a maximum control delay increase of 3.4 seconds (a.m. – Osprey Street) and a maximum volume-to-capacity ratio increase of 0.16 (NB, a.m. – Russell Street).
- The available stopping and intersection sight distances on Highway 10 to the north and south of the site access exceed the minimum requirements outlined in the TAC GDGCR and can therefore support the additional vehicular traffic.

It is concluded that the traffic generated by the proposed development can be accommodated by the boundary road network, with the noted recommendation.

The analysis undertaken herein was prepared using the most recent Draft Plans and Concept Plan. Any minor changes to the Plan will not materially affect the conclusions contained within this report.

The proposed mixed-use residential/commercial development can be supported from a traffic operations and safety perspective.

Respectfully submitted by,

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APPENDIX A

Traffic Data



Turning Movement Count (1 . HWY 10 & MAIN ST)

Start Time	N Approach HWY 10						E Approach MAIN ST						S Approach HWY 10						W Approach MAIN ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
06:00:00	5	16	1	0	0	22	0	1	4	0	0	5	4	9	5	0	0	18	20	2	11	0	0	33	78		
06:15:00	8	23	3	0	0	34	0	7	0	0	0	7	3	8	5	0	0	16	13	4	6	0	0	23	80		
06:30:00	8	23	3	0	0	34	1	11	1	0	0	13	6	13	7	0	0	26	6	14	9	0	0	29	102		
06:45:00	14	15	8	0	0	37	1	7	0	0	0	8	10	9	3	0	0	22	19	10	4	0	0	33	100	360	
07:00:00	16	29	1	0	0	46	0	7	0	0	0	7	6	12	0	0	0	18	16	6	9	0	0	31	102	384	
07:15:00	12	23	3	0	0	38	0	12	1	0	0	13	3	13	16	0	0	32	17	11	9	0	0	37	120	424	
07:30:00	20	30	5	0	0	55	1	5	1	0	0	7	8	25	6	0	0	39	13	10	6	0	0	29	130	452	
07:45:00	19	24	2	0	0	45	0	14	2	0	0	16	6	14	9	0	0	29	17	11	4	0	0	32	122	474	
08:00:00	14	22	0	0	0	36	1	12	0	0	0	13	5	32	5	0	0	42	19	9	11	0	0	39	130	502	
08:15:00	16	31	2	0	0	49	3	15	3	0	0	21	7	22	9	0	0	38	11	8	7	0	0	26	134	516	
08:30:00	19	24	0	0	0	43	0	13	2	0	0	15	9	28	10	0	0	47	14	5	22	0	0	41	146	532	
08:45:00	20	22	1	0	0	43	4	11	0	0	0	15	8	23	5	0	0	36	11	6	16	0	0	33	127	537	
09:00:00	14	29	1	0	0	44	0	17	3	0	0	20	5	17	8	0	0	30	20	6	13	0	0	39	133	540	
09:15:00	18	37	1	0	0	56	2	9	0	0	0	11	11	26	11	0	0	48	14	14	17	0	0	45	160	566	
09:30:00	10	20	1	0	0	31	2	12	3	0	0	17	4	22	6	0	0	32	8	6	10	0	0	24	104	524	
09:45:00	18	35	1	0	0	54	1	9	2	0	0	12	4	14	10	0	0	28	8	10	6	0	0	24	118	515	
BREAK																											
15:00:00	9	36	5	0	0	50	2	15	1	0	0	18	3	29	14	0	0	46	14	14	16	0	0	44	158		
15:15:00	22	21	1	0	0	44	3	13	5	0	0	21	12	42	26	0	0	80	23	7	10	0	0	40	185		
15:30:00	14	14	0	0	0	28	1	16	2	0	0	19	1	45	25	0	0	71	15	10	8	0	0	33	151		
15:45:00	23	55	1	0	0	79	1	17	3	0	0	21	8	46	17	0	0	71	18	8	11	0	0	37	208	702	
16:00:00	15	22	1	0	0	38	6	9	3	0	0	18	5	54	30	0	0	89	19	14	14	0	0	47	192	736	
16:15:00	16	26	3	0	0	45	5	13	4	0	0	22	4	41	22	0	0	67	23	10	13	0	0	46	180	731	
16:30:00	7	21	1	0	0	29	2	12	4	0	0	18	4	46	38	0	0	88	19	16	13	0	0	48	183	763	
16:45:00	18	39	0	0	0	57	3	9	3	0	0	15	6	43	32	0	0	81	21	12	13	0	0	46	199	754	
17:00:00	21	27	1	0	0	49	6	18	5	0	0	29	6	50	34	0	0	90	16	10	7	0	0	33	201	763	
17:15:00	16	12	4	0	0	32	1	15	4	0	0	20	6	49	37	0	0	92	15	12	8	0	0	35	179	762	
17:30:00	16	27	1	0	0	44	0	24	4	0	0	28	7	56	35	0	0	98	25	14	10	0	0	49	219	798	
17:45:00	16	20	2	0	0	38	2	17	4	0	0	23	3	29	32	0	0	64	17	18	8	0	0	43	168	767	
18:00:00	5	18	4	0	0	27	1	13	5	0	0	19	9	41	36	0	0	86	11	10	3	0	0	24	156	722	
18:15:00	6	20	0	0	0	26	3	17	0	0	0	20	5	53	17	0	0	75	11	10	1	0	0	22	143	686	



18:30:00	3	16	0	0	0	19	1	13	1	0	0	15	6	35	25	0	0	66	8	12	4	0	0	24	124	591
18:45:00	3	5	0	0	0	8	1	7	1	0	0	9	2	25	15	0	0	42	4	3	4	0	0	11	70	493
Grand Total	441	782	57	0	0	1280	54	390	71	0	0	515	186	971	550	0	0	1707	485	312	303	0	0	1100	4602	-
Approach%	34.5%	61.1%	4.5%	0%		-	10.5%	75.7%	13.8%	0%		-	10.9%	56.9%	32.2%	0%		-	44.1%	28.4%	27.5%	0%		-	-	-
Totals %	9.6%	17%	1.2%	0%		27.8%	1.2%	8.5%	1.5%	0%		11.2%	4%	21.1%	12%	0%		37.1%	10.5%	6.8%	6.6%	0%		23.9%	-	-
Heavy	4	54	3	0		-	2	10	5	0		-	9	67	7	0		-	5	12	7	0		-	-	-
Heavy %	0.9%	6.9%	5.3%	0%		-	3.7%	2.6%	7%	0%		-	4.8%	6.9%	1.3%	0%		-	1%	3.8%	2.3%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)

Start Time	N Approach HWY 10						E Approach MAIN ST						S Approach HWY 10						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:30:00	19	24	0	0	0	43	0	13	2	0	0	15	9	28	10	0	0	47	14	5	22	0	0	41	146
08:45:00	20	22	1	0	0	43	4	11	0	0	0	15	8	23	5	0	0	36	11	6	16	0	0	33	127
09:00:00	14	29	1	0	0	44	0	17	3	0	0	20	5	17	8	0	0	30	20	6	13	0	0	39	133
09:15:00	18	37	1	0	0	56	2	9	0	0	0	11	11	26	11	0	0	48	14	14	17	0	0	45	160
Grand Total	71	112	3	0	0	186	6	50	5	0	0	61	33	94	34	0	0	161	59	31	68	0	0	158	566
Approach%	38.2%	60.2%	1.6%	0%		-	9.8%	82%	8.2%	0%		-	20.5%	58.4%	21.1%	0%		-	37.3%	19.6%	43%	0%		-	-
Totals %	12.5%	19.8%	0.5%	0%		32.9%	1.1%	8.8%	0.9%	0%		10.8%	5.8%	16.6%	6%	0%		28.4%	10.4%	5.5%	12%	0%		27.9%	-
PHF	0.89	0.76	0.75	0		0.83	0.38	0.74	0.42	0		0.76	0.75	0.84	0.77	0		0.84	0.74	0.55	0.77	0		0.88	-
Heavy	1	9	0	0		10	1	2	0	0		3	3	13	2	0		18	1	2	1	0		4	-
Heavy %	1.4%	8%	0%	0%		5.4%	16.7%	4%	0%	0%		4.9%	9.1%	13.8%	5.9%	0%		11.2%	1.7%	6.5%	1.5%	0%		2.5%	-
Lights	65	98	2	0		165	2	45	5	0		52	27	75	28	0		130	57	28	53	0		138	-
Lights %	91.5%	87.5%	66.7%	0%		88.7%	33.3%	90%	100%	0%		85.2%	81.8%	79.8%	82.4%	0%		80.7%	96.6%	90.3%	77.9%	0%		87.3%	-
Mediums	5	5	1	0		11	3	3	0	0		6	3	6	4	0		13	1	1	14	0		16	-
Mediums %	7%	4.5%	33.3%	0%		5.9%	50%	6%	0%	0%		9.8%	9.1%	6.4%	11.8%	0%		8.1%	1.7%	3.2%	20.6%	0%		10.1%	-
Articulated Trucks	1	9	0	0		10	1	2	0	0		3	3	13	2	0		18	1	2	1	0		4	-
Articulated Trucks %	1.4%	8%	0%	0%		5.4%	16.7%	4%	0%	0%		4.9%	9.1%	13.8%	5.9%	0%		11.2%	1.7%	6.5%	1.5%	0%		2.5%	-



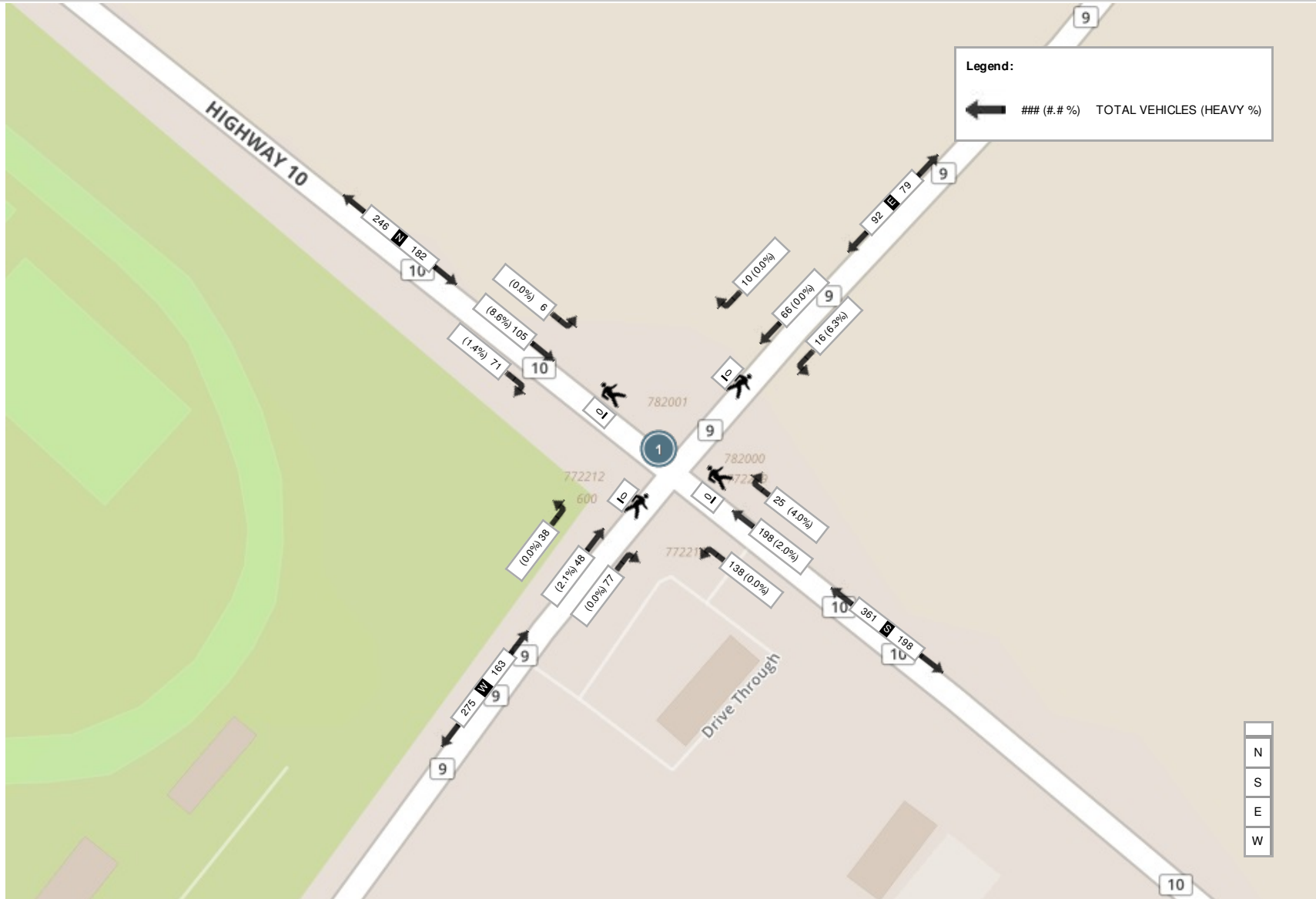
Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (-8.78 °C)

Start Time	N Approach HWY 10						E Approach MAIN ST						S Approach HWY 10						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
16:45:00	18	39	0	0	0	57	3	9	3	0	0	15	6	43	32	0	0	81	21	12	13	0	0	46	199
17:00:00	21	27	1	0	0	49	6	18	5	0	0	29	6	50	34	0	0	90	16	10	7	0	0	33	201
17:15:00	16	12	4	0	0	32	1	15	4	0	0	20	6	49	37	0	0	92	15	12	8	0	0	35	179
17:30:00	16	27	1	0	0	44	0	24	4	0	0	28	7	56	35	0	0	98	25	14	10	0	0	49	219
Grand Total	71	105	6	0	0	182	10	66	16	0	0	92	25	198	138	0	0	361	77	48	38	0	0	163	798
Approach%	39%	57.7%	3.3%	0%		-	10.9%	71.7%	17.4%	0%		-	6.9%	54.8%	38.2%	0%		-	47.2%	29.4%	23.3%	0%		-	-
Totals %	8.9%	13.2%	0.8%	0%		22.8%	1.3%	8.3%	2%	0%		11.5%	3.1%	24.8%	17.3%	0%		45.2%	9.6%	6%	4.8%	0%		20.4%	-
PHF	0.85	0.67	0.38	0		0.8	0.42	0.69	0.8	0		0.79	0.89	0.88	0.93	0		0.92	0.77	0.86	0.73	0		0.83	-
Heavy	1	9	0	0		10	0	0	1	0		1	1	4	0	0		5	0	1	0	0		1	-
Heavy %	1.4%	8.6%	0%	0%		5.5%	0%	0%	6.3%	0%		1.1%	4%	2%	0%	0%		1.4%	0%	2.1%	0%	0%		0.6%	-
Lights	69	88	4	0		161	6	65	15	0		86	24	183	137	0		344	76	44	34	0		154	-
Lights %	97.2%	83.8%	66.7%	0%		88.5%	60%	98.5%	93.8%	0%		93.5%	96%	92.4%	99.3%	0%		95.3%	98.7%	91.7%	89.5%	0%		94.5%	-
Mediums	1	8	2	0		11	4	1	0	0		5	0	11	1	0		12	1	3	4	0		8	-
Mediums %	1.4%	7.6%	33.3%	0%		6%	40%	1.5%	0%	0%		5.4%	0%	5.6%	0.7%	0%		3.3%	1.3%	6.3%	10.5%	0%		4.9%	-
Articulated Trucks	1	9	0	0		10	0	0	1	0		1	1	4	0	0		5	0	1	0	0		1	-
Articulated Trucks %	1.4%	8.6%	0%	0%		5.5%	0%	0%	6.3%	0%		1.1%	4%	2%	0%	0%		1.4%	0%	2.1%	0%	0%		0.6%	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (-8.78 °C)





Turning Movement Count (2 . MAIN ST & RUSSELL ST)

Start Time	E Approach MAIN ST					S Approach RUSSELL ST					W Approach MAIN ST					Int. Total (15 min)		Int. Total (1 hr)	
	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds W:	Approach Total				
06:00:00	12	2	0	0	14	3	0	0	1	3	0	42	0	1	42	59			
06:15:00	13	0	0	0	13	3	0	0	0	3	0	26	0	0	26	42			
06:30:00	25	2	0	0	27	2	0	0	0	2	0	40	0	0	40	69			
06:45:00	21	0	0	0	21	5	0	0	0	5	1	40	0	0	41	67		237	
07:00:00	15	2	0	0	17	2	1	0	0	3	0	43	0	0	43	63		241	
07:15:00	35	5	0	0	40	8	0	0	0	8	0	46	0	0	46	94		293	
07:30:00	32	3	0	0	35	9	1	0	0	10	1	37	0	0	38	83		307	
07:45:00	44	2	0	0	46	5	0	0	0	5	0	43	0	0	43	94		334	
08:00:00	34	2	0	0	36	4	3	0	0	7	2	49	0	0	51	94		365	
08:15:00	34	2	0	0	36	8	0	0	0	8	1	39	0	0	40	84		355	
08:30:00	43	3	0	0	46	13	2	0	0	15	1	43	0	0	44	105		377	
08:45:00	41	1	0	0	42	10	0	0	0	10	3	49	0	0	52	104		387	
09:00:00	50	0	0	0	50	6	0	0	0	6	2	45	0	0	47	103		396	
09:15:00	39	4	0	0	43	9	0	0	0	9	3	55	0	0	58	110		422	
09:30:00	34	4	0	0	38	5	1	0	0	6	2	34	0	0	36	80		397	
09:45:00	40	0	0	0	40	3	2	0	1	5	2	34	0	0	36	81		374	
BREAK																			
15:00:00	41	0	0	0	41	2	0	0	0	2	0	50	0	0	50	93			
15:15:00	51	5	0	0	56	2	3	0	0	5	0	45	0	0	45	106			
15:30:00	59	3	0	0	62	2	2	0	0	4	0	42	0	0	42	108			
15:45:00	58	7	0	0	65	4	1	0	1	5	3	48	0	0	51	121		428	
16:00:00	65	4	0	0	69	3	0	0	0	3	0	64	0	0	64	136		471	
16:15:00	50	0	0	0	50	8	1	0	1	9	2	53	0	0	55	114		479	
16:30:00	63	4	0	0	67	7	1	0	1	8	2	47	0	0	49	124		495	



16:45:00	61	2	0	0	63	4	3	0	0	7	2	46	0	0	48	118	492
17:00:00	66	4	0	0	70	6	1	0	3	7	0	44	0	0	44	121	477
17:15:00	66	7	0	0	73	4	3	0	0	7	1	41	0	0	42	122	485
17:30:00	67	5	0	0	72	8	1	0	1	9	1	52	0	0	53	134	495
17:45:00	66	2	0	0	68	6	2	0	0	8	0	39	0	0	39	115	492
18:00:00	47	2	0	0	49	1	0	0	0	1	2	33	0	0	35	85	456
18:15:00	46	3	0	0	49	1	1	0	0	2	1	39	0	0	40	91	425
18:30:00	46	4	0	0	50	3	1	0	0	4	1	25	0	0	26	80	371
18:45:00	26	1	0	0	27	3	2	0	0	5	1	22	0	0	23	55	311
Grand Total	1390	85	0	0	1475	159	32	0	9	191	34	1355	0	1	1389	3055	-
Approach%	94.2%	5.8%	0%		-	83.2%	16.8%	0%		-	2.4%	97.6%	0%		-	-	-
Totals %	45.5%	2.8%	0%		48.3%	5.2%	1%	0%		6.3%	1.1%	44.4%	0%		45.5%	-	-
Heavy	20	0	0		-	1	0	0		-	1	23	0		-	-	-
Heavy %	1.4%	0%	0%		-	0.6%	0%	0%		-	2.9%	1.7%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)

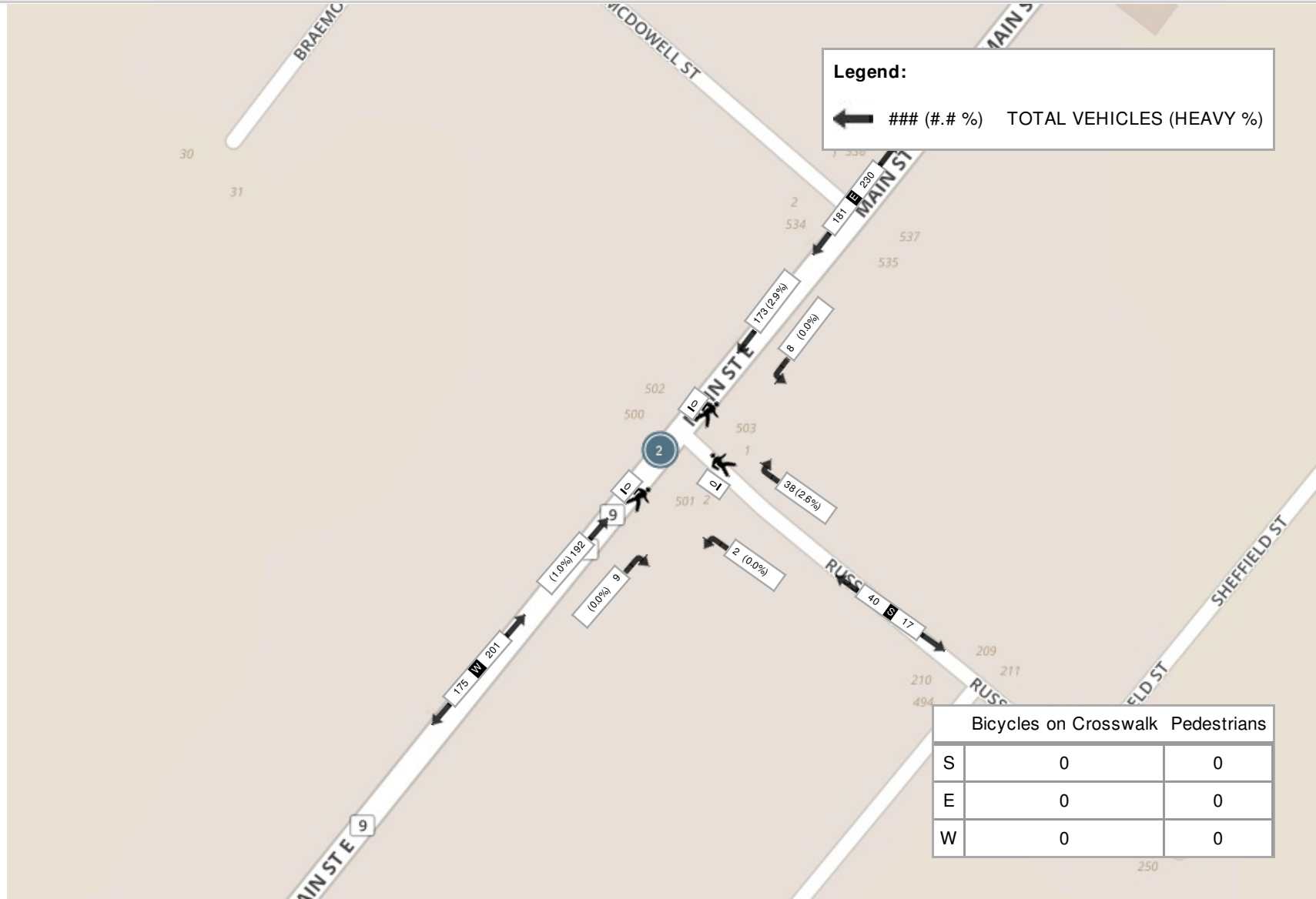
Start Time	E Approach MAIN ST					S Approach RUSSELL ST					W Approach MAIN ST					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
08:30:00	43	3	0	0	46	13	2	0	0	15	1	43	0	0	44	105
08:45:00	41	1	0	0	42	10	0	0	0	10	3	49	0	0	52	104
09:00:00	50	0	0	0	50	6	0	0	0	6	2	45	0	0	47	103
09:15:00	39	4	0	0	43	9	0	0	0	9	3	55	0	0	58	110
Grand Total	173	8	0	0	181	38	2	0	0	40	9	192	0	0	201	422
Approach%	95.6%	4.4%	0%		-	95%	5%	0%		-	4.5%	95.5%	0%		-	-
Totals %	41%	1.9%	0%		42.9%	9%	0.5%	0%		9.5%	2.1%	45.5%	0%		47.6%	-
PHF	0.87	0.5	0		0.91	0.73	0.25	0		0.67	0.75	0.87	0		0.87	-
Heavy	5	0	0		5	1	0	0		1	0	2	0		2	-
Heavy %	2.9%	0%	0%		2.8%	2.6%	0%	0%		2.5%	0%	1%	0%		1%	-
Lights	158	7	0		165	33	1	0		34	9	177	0		186	-
Lights %	91.3%	87.5%	0%		91.2%	86.8%	50%	0%		85%	100%	92.2%	0%		92.5%	-
Mediums	10	1	0		11	4	1	0		5	0	13	0		13	-
Mediums %	5.8%	12.5%	0%		6.1%	10.5%	50%	0%		12.5%	0%	6.8%	0%		6.5%	-
Articulated Trucks	5	0	0		5	1	0	0		1	0	2	0		2	-
Articulated Trucks %	2.9%	0%	0%		2.8%	2.6%	0%	0%		2.5%	0%	1%	0%		1%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-



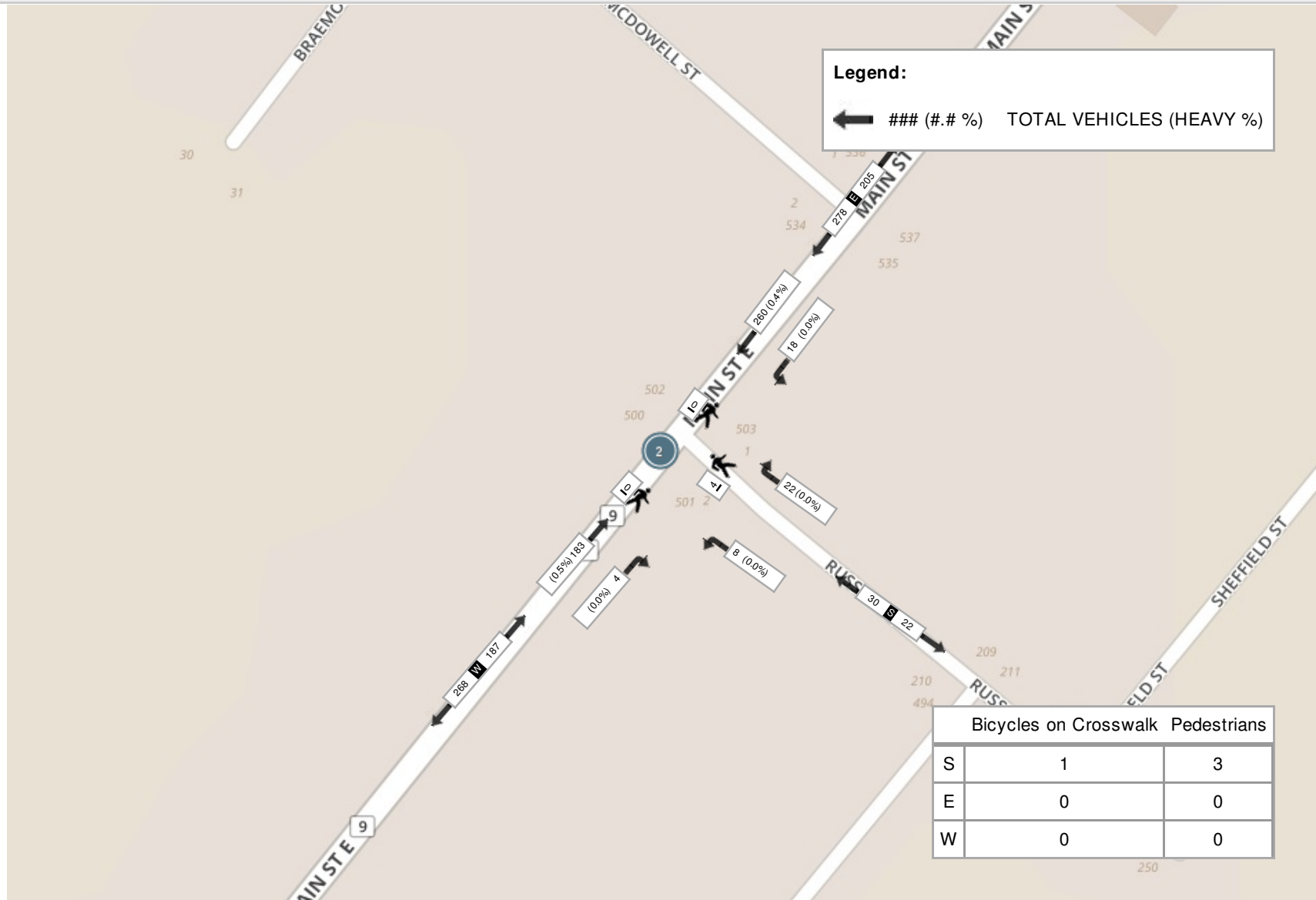
Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (-8.78 °C)

Start Time	E Approach MAIN ST					S Approach RUSSELL ST					W Approach MAIN ST					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:45:00	61	2	0	0	63	4	3	0	0	7	2	46	0	0	48	118
17:00:00	66	4	0	0	70	6	1	0	3	7	0	44	0	0	44	121
17:15:00	66	7	0	0	73	4	3	0	0	7	1	41	0	0	42	122
17:30:00	67	5	0	0	72	8	1	0	1	9	1	52	0	0	53	134
Grand Total	260	18	0	0	278	22	8	0	4	30	4	183	0	0	187	495
Approach%	93.5%	6.5%	0%		-	73.3%	26.7%	0%		-	2.1%	97.9%	0%		-	-
Totals %	52.5%	3.6%	0%		56.2%	4.4%	1.6%	0%		6.1%	0.8%	37%	0%		37.8%	-
PHF	0.97	0.64	0		0.95	0.69	0.67	0		0.83	0.5	0.88	0		0.88	-
Heavy	1	0	0		1	0	0	0		0	0	1	0		1	-
Heavy %	0.4%	0%	0%		0.4%	0%	0%	0%		0%	0%	0.5%	0%		0.5%	-
Lights	255	18	0		273	19	7	0		26	4	175	0		179	-
Lights %	98.1%	100%	0%		98.2%	86.4%	87.5%	0%		86.7%	100%	95.6%	0%		95.7%	-
Mediums	4	0	0		4	3	1	0		4	0	7	0		7	-
Mediums %	1.5%	0%	0%		1.4%	13.6%	12.5%	0%		13.3%	0%	3.8%	0%		3.7%	-
Articulated Trucks	1	0	0		1	0	0	0		0	0	1	0		1	-
Articulated Trucks %	0.4%	0%	0%		0.4%	0%	0%	0%		0%	0%	0.5%	0%		0.5%	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	75%	-	-	-	-	0%	-	-
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	1	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	0%	-	-	-	-	25%	-	-	-	-	0%	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)



Peak Hour: 04:45 PM - 05:45 PM Weather: Overcast Clouds (-8.78 °C)





Turning Movement Count (3 . MAIN ST & ALICE ST / MILL ST)

Start Time	N Approach MILL ST						E Approach MAIN ST						S Approach ALICE ST						W Approach MAIN ST						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total		
06:00:00	0	0	1	0	0	1	1	11	1	0	0	13	6	0	0	0	1	6	0	36	0	0	0	36	56	
06:15:00	0	0	0	0	0	0	0	13	1	0	0	14	1	0	1	0	0	2	0	27	0	0	0	27	43	
06:30:00	0	0	1	0	0	1	0	24	0	0	0	24	6	0	1	0	0	7	0	33	1	0	0	34	66	
06:45:00	0	0	2	0	0	2	0	22	2	0	0	24	1	0	0	0	0	1	1	37	0	0	0	38	65	230
07:00:00	0	0	0	0	0	0	0	17	0	0	0	17	7	1	1	0	0	9	0	40	0	0	0	40	66	240
07:15:00	2	0	0	0	0	2	0	29	4	0	0	33	2	0	0	0	0	2	0	39	1	0	0	40	77	274
07:30:00	0	0	0	0	0	0	0	31	0	0	0	31	3	0	1	0	1	4	0	34	0	0	0	34	69	277
07:45:00	0	0	0	0	0	0	0	47	2	0	0	49	0	0	3	0	0	3	1	45	0	0	0	46	98	310
08:00:00	1	0	0	0	0	1	0	35	3	0	0	38	1	0	0	0	0	1	0	47	0	0	0	47	87	331
08:15:00	0	0	1	0	0	1	0	31	4	0	0	35	2	0	1	0	0	3	0	34	0	0	0	34	73	327
08:30:00	0	0	0	0	0	0	0	44	0	0	0	44	3	0	1	0	1	4	1	41	0	0	1	42	90	348
08:45:00	1	0	0	0	0	1	0	37	3	0	0	40	6	0	3	0	0	9	1	46	1	0	0	48	98	348
09:00:00	0	0	1	0	0	1	1	47	3	0	0	51	7	1	1	0	0	9	1	44	0	0	0	45	106	367
09:15:00	2	0	0	0	1	2	1	33	3	0	0	37	4	0	1	0	0	5	0	51	0	0	0	51	95	389
09:30:00	1	0	1	0	0	2	1	30	5	0	0	36	2	0	0	0	0	2	2	31	1	0	0	34	74	373
09:45:00	0	0	1	1	2	2	0	37	1	1	0	39	2	0	1	0	0	3	2	32	0	0	1	34	78	353
BREAK																										
15:00:00	0	0	1	0	0	1	0	42	0	0	0	42	5	0	3	0	0	8	2	41	0	0	0	43	94	
15:15:00	0	0	0	0	0	0	0	46	4	0	0	50	5	1	0	0	0	6	3	40	1	0	0	44	100	
15:30:00	0	0	0	0	1	0	0	60	5	0	2	65	3	0	1	0	0	4	3	39	0	0	0	42	111	
15:45:00	0	0	1	0	0	1	0	54	5	0	0	59	3	0	2	0	0	5	1	51	1	0	0	53	118	423
16:00:00	0	0	1	0	0	1	0	56	6	0	0	62	5	0	3	0	1	8	4	55	0	0	0	59	130	459
16:15:00	1	0	0	0	3	1	0	50	3	0	0	53	4	0	2	0	4	6	1	48	0	0	0	49	109	468
16:30:00	0	0	0	0	0	0	2	60	1	0	0	63	2	0	3	0	0	5	4	49	1	0	0	54	122	479
16:45:00	1	0	0	0	3	1	1	57	4	0	3	62	4	0	3	0	2	7	1	44	0	0	1	45	115	476
17:00:00	0	0	0	0	0	0	0	61	5	0	0	66	4	0	2	0	0	6	5	39	0	0	0	44	116	462
17:15:00	1	0	0	0	0	1	0	62	5	0	0	67	0	0	1	0	0	1	2	42	0	0	0	44	113	466
17:30:00	0	0	0	0	0	0	0	63	6	0	0	69	2	0	0	0	1	2	4	51	1	0	0	56	127	471
17:45:00	0	0	1	0	1	1	1	60	1	0	0	62	2	0	0	0	0	2	0	34	0	0	0	34	99	455
18:00:00	0	0	0	0	0	0	0	46	2	0	0	48	1	0	0	0	0	1	1	36	0	0	0	37	86	425
18:15:00	0	0	0	0	0	0	0	43	5	0	0	48	1	0	1	0	1	2	0	38	0	0	0	38	88	400



18:30:00	0	0	0	0	1	0	0	43	4	0	0	47	0	0	2	0	0	2	1	24	0	0	0	25	74	347
18:45:00	0	0	0	0	0	0	2	24	3	0	0	29	2	1	2	0	1	5	5	17	0	0	0	22	56	304
Grand Total	10	0	12	1	12	23	10	1315	91	1	5	1417	96	4	40	0	13	140	46	1265	8	0	3	1319	2899	-
Approach%	43.5%	0%	52.2%	4.3%	-	0.7%	92.8%	6.4%	0.1%	-	68.6%	2.9%	28.6%	0%	-	3.5%	95.9%	0.6%	0%	-	-	-	-	-	-	
Totals %	0.3%	0%	0.4%	0%	0.8%	0.3%	45.4%	3.1%	0%	48.9%	3.3%	0.1%	1.4%	0%	4.8%	1.6%	43.6%	0.3%	0%	45.5%	-	-	-	-	-	
Heavy	0	0	0	0	-	0	19	1	0	-	0	0	0	0	-	0	22	0	0	-	-	-	-	-	-	
Heavy %	0%	0%	0%	0%	-	0%	1.4%	1.1%	0%	-	0%	0%	0%	0%	-	0%	1.7%	0%	0%	-	-	-	-	-	-	
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	



Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)

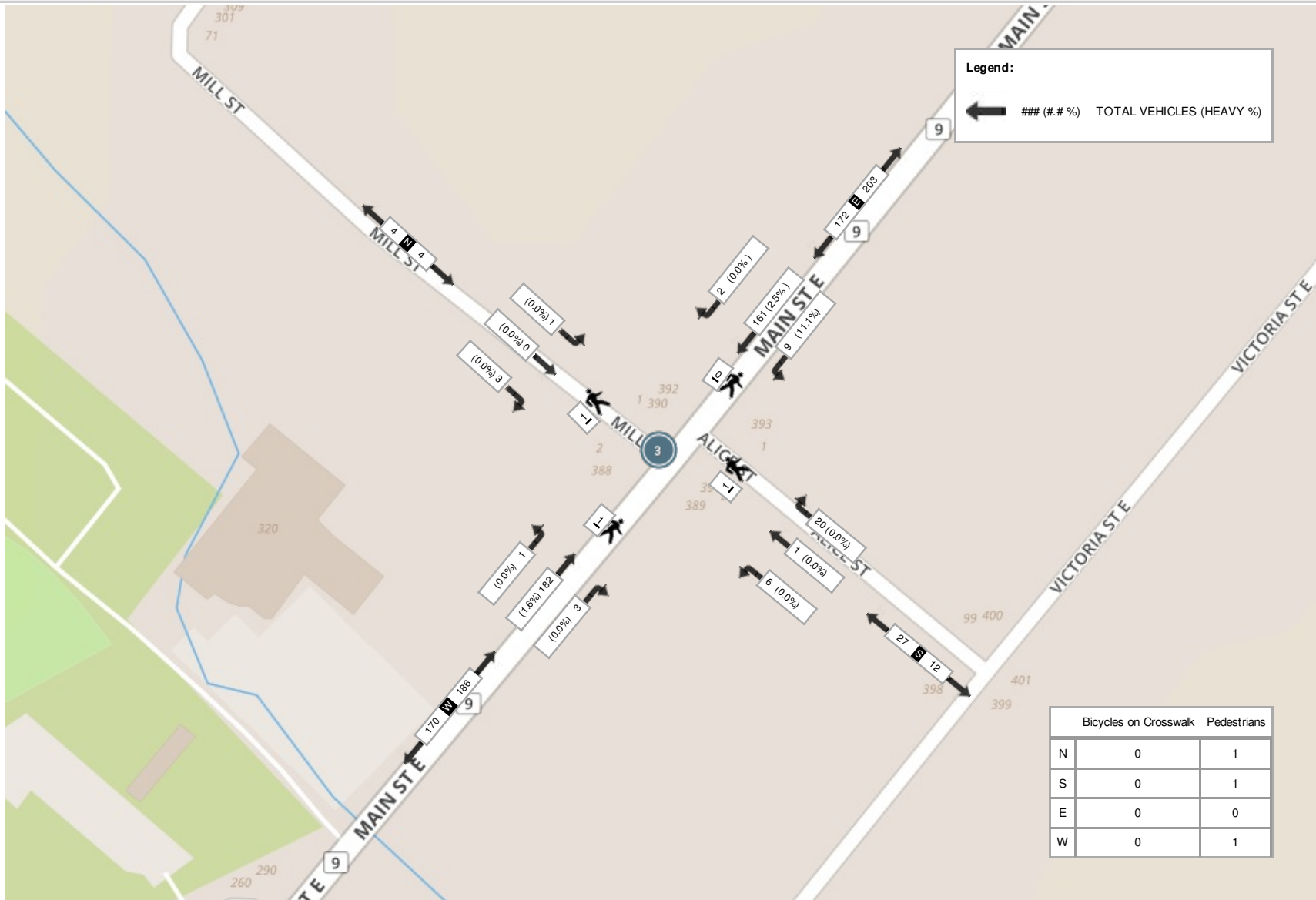
Start Time	N Approach MILL ST						E Approach MAIN ST						S Approach ALICE ST						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:30:00	0	0	0	0	0	0	0	44	0	0	0	44	3	0	1	0	1	4	1	41	0	0	1	42	90
08:45:00	1	0	0	0	0	1	0	37	3	0	0	40	6	0	3	0	0	9	1	46	1	0	0	48	98
09:00:00	0	0	1	0	0	1	1	47	3	0	0	51	7	1	1	0	0	9	1	44	0	0	0	45	106
09:15:00	2	0	0	0	1	2	1	33	3	0	0	37	4	0	1	0	0	5	0	51	0	0	0	51	95
Grand Total	3	0	1	0	1	4	2	161	9	0	0	172	20	1	6	0	1	27	3	182	1	0	1	186	389
Approach%	75%	0%	25%	0%		-	1.2%	93.6%	5.2%	0%		-	74.1%	3.7%	22.2%	0%		-	1.6%	97.8%	0.5%	0%		-	-
Totals %	0.8%	0%	0.3%	0%		1%	0.5%	41.4%	2.3%	0%		44.2%	5.1%	0.3%	1.5%	0%		6.9%	0.8%	46.8%	0.3%	0%		47.8%	-
PHF	0.38	0	0.25	0		0.5	0.5	0.86	0.75	0		0.84	0.71	0.25	0.5	0		0.75	0.75	0.89	0.25	0		0.91	-
Heavy	0	0	0	0		0	0	4	1	0		5	0	0	0	0		0	0	3	0	0		3	-
Heavy %	0%	0%	0%	0%		0%	0%	2.5%	11.1%	0%		2.9%	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		1.6%	-
Lights	3	0	1	0		4	2	146	8	0		156	19	1	6	0		26	3	167	1	0		171	-
Lights %	100%	0%	100%	0%		100%	100%	90.7%	88.9%	0%		90.7%	95%	100%	100%	0%		96.3%	100%	91.8%	100%	0%		91.9%	-
Mediums	0	0	0	0		0	0	11	0	0		11	1	0	0	0		1	0	12	0	0		12	-
Mediums %	0%	0%	0%	0%		0%	0%	6.8%	0%	0%		6.4%	5%	0%	0%	0%		3.7%	0%	6.6%	0%	0%		6.5%	-
Articulated Trucks	0	0	0	0		0	0	4	1	0		5	0	0	0	0		0	0	3	0	0		3	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	2.5%	11.1%	0%		2.9%	0%	0%	0%	0%		0%	0%	1.6%	0%	0%		1.6%	-
Pedestrians	-	-	-	-	1	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	33.3%	-	-	-	-	0%	-	-	-	-	-	33.3%	-	-	-	-	-	-	33.3%	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	-	0	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-	0%	-	-	-	-	-	-	0%	-	-



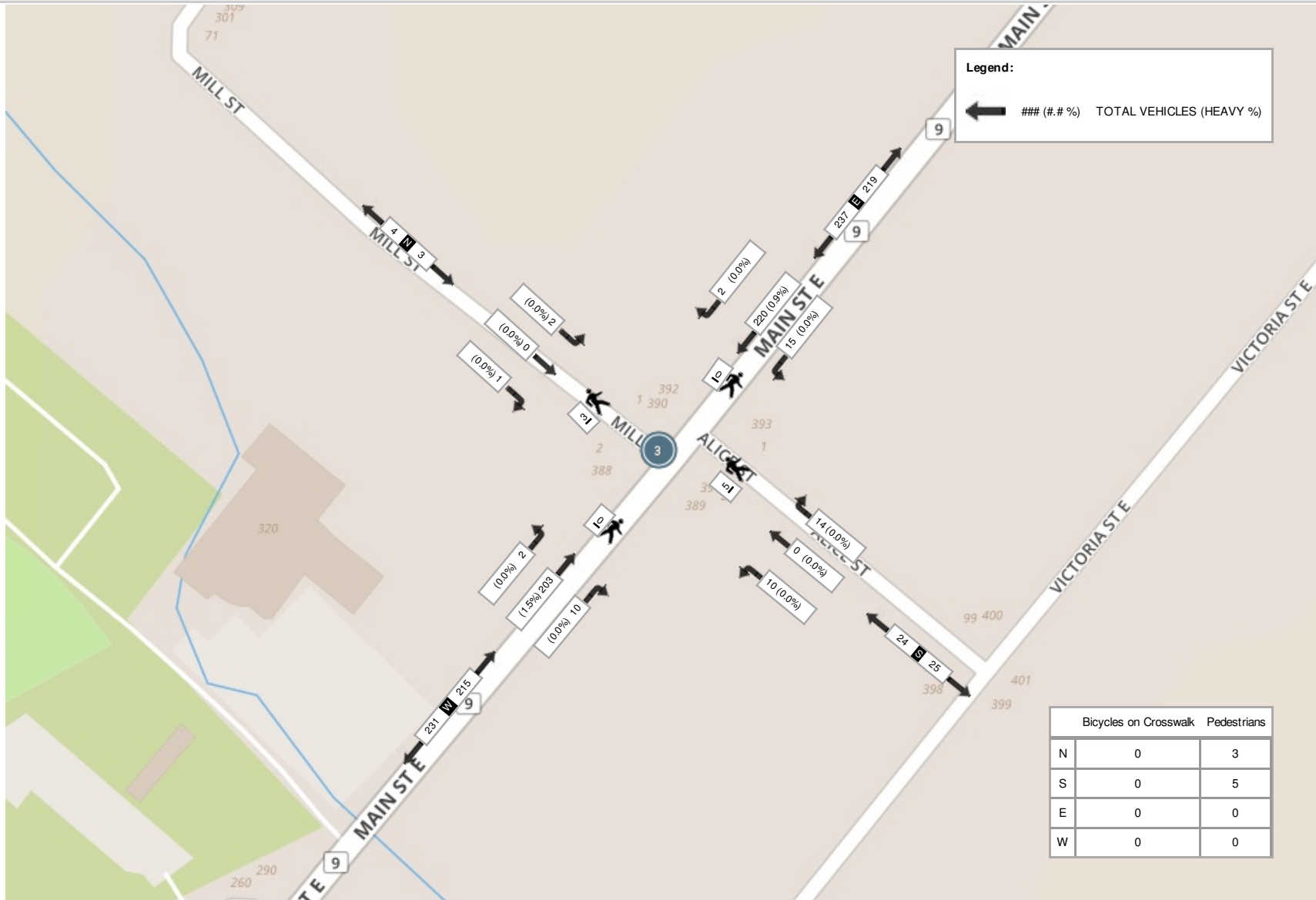
Peak Hour: 03:45 PM - 04:45 PM Weather: Overcast Clouds (-8.78 °C)

Start Time	N Approach MILL ST						E Approach MAIN ST						S Approach ALICE ST						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
15:45:00	0	0	1	0	0	1	0	54	5	0	0	59	3	0	2	0	0	5	1	51	1	0	0	53	118
16:00:00	0	0	1	0	0	1	0	56	6	0	0	62	5	0	3	0	1	8	4	55	0	0	0	59	130
16:15:00	1	0	0	0	3	1	0	50	3	0	0	53	4	0	2	0	4	6	1	48	0	0	0	49	109
16:30:00	0	0	0	0	0	0	2	60	1	0	0	63	2	0	3	0	0	5	4	49	1	0	0	54	122
Grand Total	1	0	2	0	3	3	2	220	15	0	0	237	14	0	10	0	5	24	10	203	2	0	0	215	479
Approach%	33.3%	0%	66.7%	0%	-	-	0.8%	92.8%	6.3%	0%	-	-	58.3%	0%	41.7%	0%	-	-	4.7%	94.4%	0.9%	0%	-	-	-
Totals %	0.2%	0%	0.4%	0%	0.6%	0.4%	45.9%	3.1%	0%	49.5%	2.9%	0%	2.1%	0%	5%	2.1%	42.4%	0.4%	0%	44.9%	-	-	-	-	-
PHF	0.25	0	0.5	0	0.75	0.25	0.92	0.63	0	0.94	0.7	0	0.83	0	0.75	0.63	0.92	0.5	0	0.91	-	-	-	-	-
Heavy	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	3	0	0	3	3	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	0.9%	0%	0%	0.8%	0%	0%	0%	0%	0%	0%	0%	0%	1.5%	0%	0%	1.4%	1.4%	-
Lights	1	0	2	0	3	2	210	14	0	226	14	0	10	0	24	10	184	2	0	196	-	-	-	-	-
Lights %	100%	0%	100%	0%	100%	100%	95.5%	93.3%	0%	95.4%	100%	0%	100%	0%	100%	100%	90.6%	100%	0%	91.2%	-	-	-	-	-
Mediums	0	0	0	0	0	0	8	1	0	9	0	0	0	0	0	0	16	0	0	16	-	-	-	-	-
Mediums %	0%	0%	0%	0%	0%	0%	3.6%	6.7%	0%	3.8%	0%	0%	0%	0%	0%	0%	7.9%	0%	0%	7.4%	-	-	-	-	-
Articulated Trucks	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	-	-	-	-	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	0.9%	0%	0%	0.8%	0%	0%	0%	0%	0%	0%	1.5%	0%	0%	1.4%	-	-	-	-	-
Pedestrians	-	-	-	-	3	-	-	-	-	0	-	-	-	-	5	-	-	-	-	0	-	-	-	-	-
Pedestrians%	-	-	-	-	37.5%	-	-	-	-	0%	-	-	-	-	62.5%	-	-	-	-	0%	-	-	-	-	-
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-	-	-	-
Bicycles on Crosswalk%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-	-	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)



Peak Hour: 03:45 PM - 04:45 PM Weather: Overcast Clouds (-8.78 °C)





Turning Movement Count (4 . MAIN ST & OSPREY ST)

Start Time	N Approach OSPREY ST						E Approach MAIN ST						S Approach OSPREY ST						W Approach MAIN ST						Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds W:	Approach Total			
06:00:00	0	0	4	0	0	4	0	11	0	0	0	11	2	0	1	0	1	3	1	25	0	0	0	26	44		
06:15:00	0	0	4	0	0	4	0	10	0	0	0	10	1	1	0	0	0	2	0	18	0	0	0	18	34		
06:30:00	0	0	4	0	0	4	0	22	1	0	0	23	0	0	0	0	0	0	0	29	0	0	0	29	56		
06:45:00	0	0	8	0	4	8	0	20	0	0	0	20	0	0	1	0	0	1	0	25	0	0	4	25	54	188	
07:00:00	1	0	3	0	0	4	0	14	2	0	0	16	1	0	0	0	0	1	0	31	0	0	0	31	52	196	
07:15:00	2	0	3	0	0	5	0	21	0	0	0	21	1	1	0	0	0	2	0	33	1	0	0	34	62	224	
07:30:00	0	0	4	0	0	4	0	26	0	0	0	26	1	1	2	0	0	4	1	26	1	0	0	28	62	230	
07:45:00	1	0	4	0	0	5	1	36	0	0	0	37	3	0	2	0	0	5	2	34	2	0	0	38	85	261	
08:00:00	0	1	4	0	1	5	0	25	0	0	0	25	1	0	1	0	0	2	0	36	1	0	1	37	69	278	
08:15:00	0	0	5	0	1	5	1	37	0	0	0	38	1	1	1	0	0	3	1	27	4	0	0	32	78	294	
08:30:00	2	1	3	0	10	6	1	37	1	0	1	39	0	4	0	0	0	4	1	26	5	0	0	32	81	313	
08:45:00	2	1	3	0	2	6	1	34	1	0	0	36	1	0	0	0	0	1	1	37	2	0	1	40	83	311	
09:00:00	1	0	3	0	3	4	1	28	4	0	0	33	2	1	1	0	0	4	2	39	4	0	0	45	86	328	
09:15:00	4	0	0	0	2	4	2	31	3	0	0	36	2	1	0	0	1	3	3	36	3	0	0	42	85	335	
09:30:00	0	0	2	0	5	2	2	25	2	0	0	29	1	0	0	0	0	1	1	25	3	1	1	30	62	316	
09:45:00	4	2	2	0	6	8	1	25	1	0	0	27	1	2	0	0	0	3	2	24	2	0	0	28	66	299	
BREAK																											
15:00:00	0	0	0	0	0	0	0	23	5	0	0	28	0	2	0	0	0	2	1	32	1	0	0	34	64		
15:15:00	0	0	0	0	2	0	1	38	0	0	0	39	0	1	0	0	0	1	1	41	1	0	0	43	83		
15:30:00	1	0	2	0	1	3	0	51	4	0	0	55	1	1	0	0	0	2	1	33	3	0	2	37	97		
15:45:00	1	1	4	0	2	6	0	45	3	0	0	48	2	1	0	0	0	3	1	37	1	0	0	39	96	340	
16:00:00	0	0	2	0	0	2	0	49	1	0	0	50	0	1	3	0	1	4	1	52	3	0	0	56	112	388	
16:15:00	0	1	4	0	1	5	0	48	0	0	0	48	3	0	3	0	0	6	0	36	1	1	1	38	97	402	
16:30:00	2	0	3	0	0	5	1	51	2	0	0	54	1	2	0	0	0	3	3	38	2	0	1	43	105	410	
16:45:00	2	0	1	0	0	3	0	43	3	0	0	46	2	1	1	0	1	4	1	35	2	0	0	38	91	405	
17:00:00	3	1	2	0	0	6	1	41	1	0	0	43	1	0	1	0	3	2	3	37	0	0	0	40	91	384	
17:15:00	1	1	2	0	0	4	0	41	2	0	0	43	1	1	1	0	0	3	0	35	4	0	0	39	89	376	
17:30:00	0	1	7	0	0	8	0	35	3	0	0	38	0	2	0	0	0	2	0	37	1	0	0	38	86	357	
17:45:00	0	2	0	0	0	2	2	47	4	0	0	53	3	1	2	0	0	6	2	28	3	0	0	33	94	360	
18:00:00	2	0	1	0	3	3	1	30	0	0	1	31	1	3	1	0	2	5	1	24	4	0	0	29	68	337	
18:15:00	1	2	6	0	0	9	0	32	2	0	0	34	2	1	1	0	2	4	1	35	0	0	0	36	83	331	



18:30:00	2	1	1	0	0	4	1	24	0	0	0	25	1	1	2	0	0	4	2	15	1	0	0	18	51	296
18:45:00	1	1	2	0	0	4	0	15	2	0	0	17	1	0	1	0	1	2	1	14	1	0	0	16	39	241
Grand Total	33	16	93	0	43	142	17	1015	47	0	2	1079	37	30	25	0	12	92	34	1000	56	2	11	1092	2405	-
Approach%	23.2%	11.3%	65.5%	0%		-	1.6%	94.1%	4.4%	0%		-	40.2%	32.6%	27.2%	0%		-	3.1%	91.6%	5.1%	0.2%		-	-	-
Totals %	1.4%	0.7%	3.9%	0%		5.9%	0.7%	42.2%	2%	0%		44.9%	1.5%	1.2%	1%	0%		3.8%	1.4%	41.6%	2.3%	0.1%		45.4%	-	-
Heavy	0	0	0	0		-	0	19	0	0		-	0	0	0	0		-	0	21	0	0		-	-	-
Heavy %	0%	0%	0%	0%		-	0%	1.9%	0%	0%		-	0%	0%	0%	0%		-	0%	2.1%	0%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-



Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)

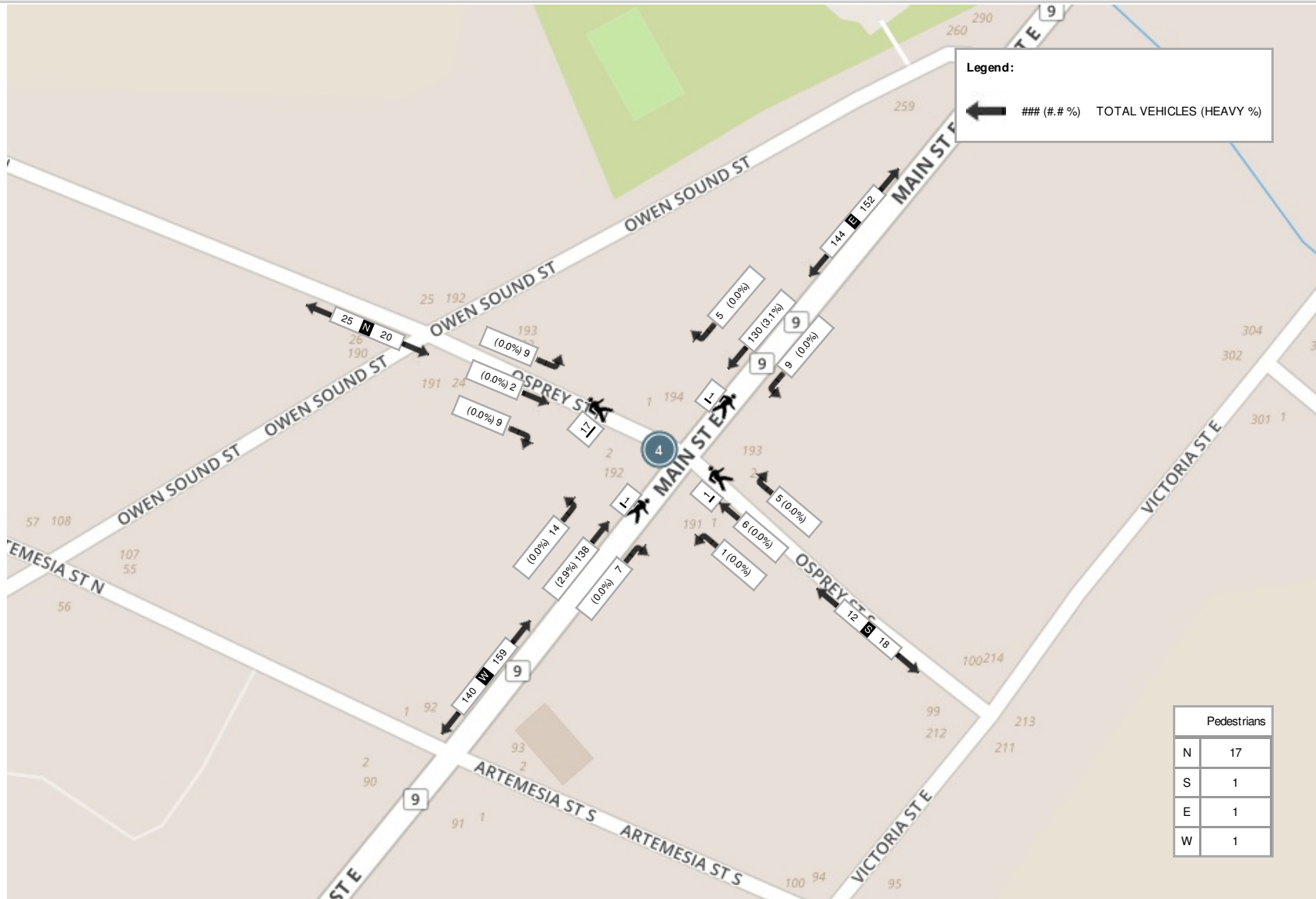
Start Time	N Approach OSPREY ST						E Approach MAIN ST						S Approach OSPREY ST						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
08:30:00	2	1	3	0	10	6	1	37	1	0	1	39	0	4	0	0	0	4	1	26	5	0	0	32	81
08:45:00	2	1	3	0	2	6	1	34	1	0	0	36	1	0	0	0	0	1	1	37	2	0	1	40	83
09:00:00	1	0	3	0	3	4	1	28	4	0	0	33	2	1	1	0	0	4	2	39	4	0	0	45	86
09:15:00	4	0	0	0	2	4	2	31	3	0	0	36	2	1	0	0	1	3	3	36	3	0	0	42	85
Grand Total	9	2	9	0	17	20	5	130	9	0	1	144	5	6	1	0	1	12	7	138	14	0	1	159	335
Approach%	45%	10%	45%	0%		-	3.5%	90.3%	6.3%	0%		-	41.7%	50%	8.3%	0%		-	4.4%	86.8%	8.8%	0%		-	-
Totals %	2.7%	0.6%	2.7%	0%		6%	1.5%	38.8%	2.7%	0%		43%	1.5%	1.8%	0.3%	0%		3.6%	2.1%	41.2%	4.2%	0%		47.5%	-
PHF	0.56	0.5	0.75	0		0.83	0.63	0.88	0.56	0		0.92	0.63	0.38	0.25	0		0.75	0.58	0.88	0.7	0		0.88	-
Heavy	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	4	0	0		4	-
Heavy %	0%	0%	0%	0%		0%	0%	3.1%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	2.9%	0%	0%		2.5%	-
Lights	9	2	8	0		19	5	117	8	0		130	4	6	1	0		11	7	123	14	0		144	-
Lights %	100%	100%	88.9%	0%		95%	100%	90%	88.9%	0%		90.3%	80%	100%	100%	0%		91.7%	100%	89.1%	100%	0%		90.6%	-
Mediums	0	0	1	0		1	0	9	1	0		10	1	0	0	0		1	0	11	0	0		11	-
Mediums %	0%	0%	11.1%	0%		5%	0%	6.9%	11.1%	0%		6.9%	20%	0%	0%	0%		8.3%	0%	8%	0%	0%		6.9%	-
Articulated Trucks	0	0	0	0		0	0	4	0	0		4	0	0	0	0		0	0	4	0	0		4	-
Articulated Trucks %	0%	0%	0%	0%		0%	0%	3.1%	0%	0%		2.8%	0%	0%	0%	0%		0%	0%	2.9%	0%	0%		2.5%	-
Pedestrians	-	-	-	-	17	-	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	1	-	-
Pedestrians%	-	-	-	-	85%	-	-	-	-	-	5%	-	-	-	-	-	5%	-	-	-	-	-	5%	-	-



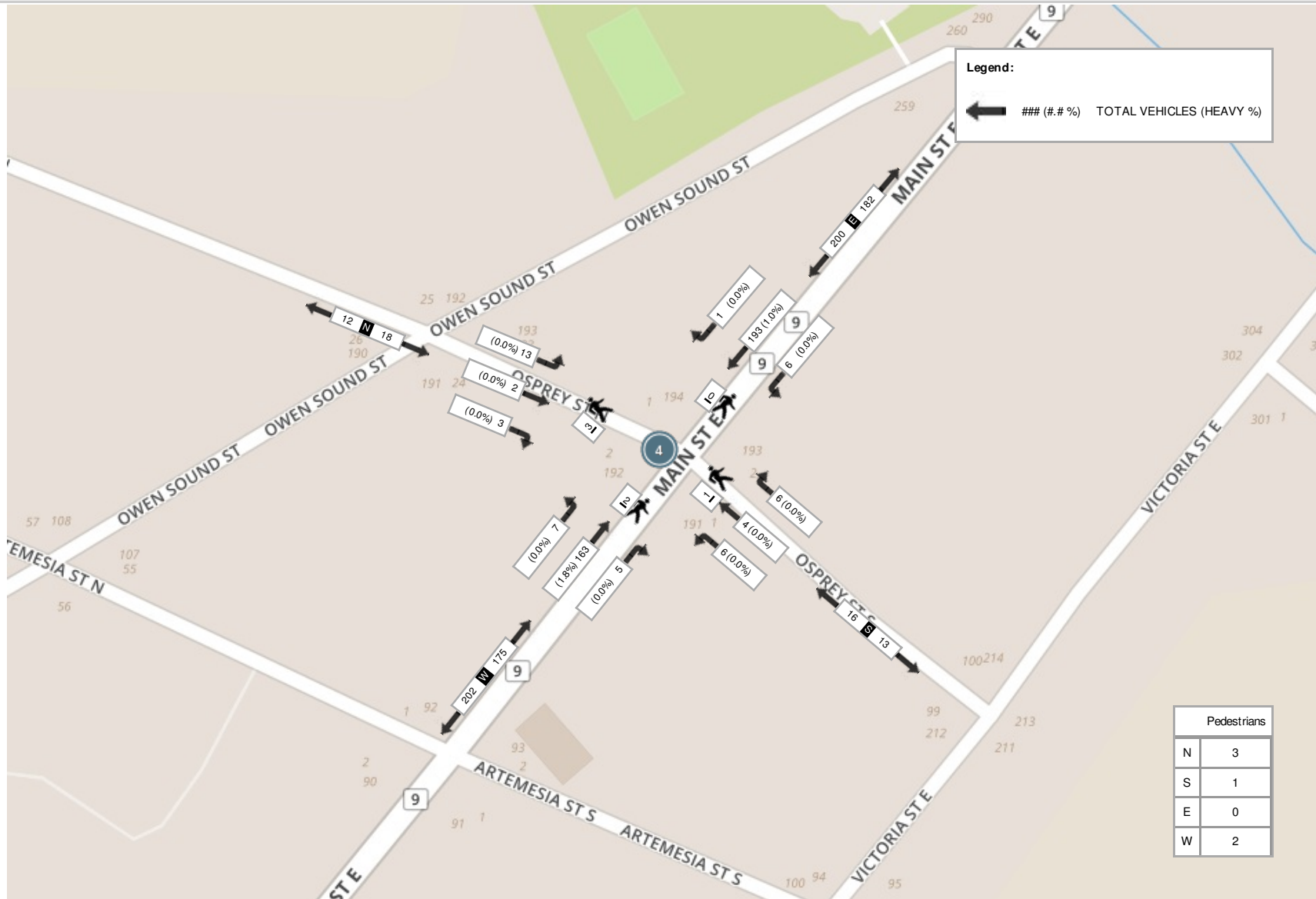
Peak Hour: 03:45 PM - 04:45 PM Weather: Overcast Clouds (-8.78 °C)

Start Time	N Approach OSPREY ST						E Approach MAIN ST						S Approach OSPREY ST						W Approach MAIN ST						Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	Right	Thru	Left	U-Turn	Peds	Approach Total	
15:45:00	1	1	4	0	2	6	0	45	3	0	0	48	2	1	0	0	0	3	1	37	1	0	0	39	96
16:00:00	0	0	2	0	0	2	0	49	1	0	0	50	0	1	3	0	1	4	1	52	3	0	0	56	112
16:15:00	0	1	4	0	1	5	0	48	0	0	0	48	3	0	3	0	0	6	0	36	1	1	1	38	97
16:30:00	2	0	3	0	0	5	1	51	2	0	0	54	1	2	0	0	0	3	3	38	2	0	1	43	105
Grand Total	3	2	13	0	3	18	1	193	6	0	0	200	6	4	6	0	1	16	5	163	7	1	2	176	410
Approach%	16.7%	11.1%	72.2%	0%	-	-	0.5%	96.5%	3%	0%	-	-	37.5%	25%	37.5%	0%	-	-	2.8%	92.6%	4%	0.6%	-	-	-
Totals %	0.7%	0.5%	3.2%	0%	4.4%	0.2%	47.1%	1.5%	0%	48.8%	1.5%	1%	1.5%	0%	3.9%	1.2%	39.8%	1.7%	0.2%	42.9%	-	-	-	-	-
PHF	0.38	0.5	0.81	0	0.75	0.25	0.95	0.5	0	0.93	0.5	0.5	0.5	0	0.67	0.42	0.78	0.58	0.25	0.79	-	-	-	-	-
Heavy	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	3	0	0	3	0	-
Heavy %	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	1.8%	0%	0%	1.7%	0	-
Lights	3	2	11	0	16	1	184	6	0	191	5	4	6	0	15	4	147	7	1	159	7	1	2	159	-
Lights %	100%	100%	84.6%	0%	88.9%	100%	95.3%	100%	0%	95.5%	83.3%	100%	100%	0%	93.8%	80%	90.2%	100%	100%	90.3%	-	-	-	-	-
Mediums	0	0	2	0	2	0	7	0	0	7	1	0	0	0	1	1	13	0	0	14	0	0	14	0	-
Mediums %	0%	0%	15.4%	0%	11.1%	0%	3.6%	0%	0%	3.5%	16.7%	0%	0%	0%	6.3%	20%	8%	0%	0%	8%	0	0	8%	0	-
Articulated Trucks	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	0	0	3	0	0	3	0	-
Articulated Trucks %	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1.8%	0%	0%	1.7%	0	0	1.7%	0	-
Pedestrians	-	-	-	-	3	-	-	-	-	0	-	-	-	-	1	-	-	-	-	-	-	2	-	-	-
Pedestrians%	-	-	-	-	50%	-	-	-	-	0%	-	-	-	-	16.7%	-	-	-	-	-	-	33.3%	-	-	-

Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)



Peak Hour: 03:45 PM - 04:45 PM Weather: Overcast Clouds (-8.78 °C)





Turning Movement Count (5 . ELM ST & VICTORIA ST)

Start Time	E Approach VICTORIA ST					S Approach ELM ST					W Approach VICTORIA ST					Int. Total (15 min)		Int. Total (1 hr)	
	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds W:	Approach Total				
06:00:00	1	0	0	0	1	3	1	0	0	4	2	1	0	0	3	8			
06:15:00	0	1	0	0	1	3	1	0	0	4	0	2	0	0	2	7			
06:30:00	1	0	0	0	1	3	2	0	0	5	1	2	0	0	3	9			
06:45:00	4	2	0	0	6	2	1	0	0	3	2	1	0	0	3	12		36	
07:00:00	0	0	0	0	0	6	2	0	0	8	2	1	0	0	3	11		39	
07:15:00	1	4	0	0	5	2	1	0	0	3	1	5	0	0	6	14		46	
07:30:00	1	0	0	0	1	2	2	0	0	4	2	8	0	0	10	15		52	
07:45:00	1	1	0	0	2	2	3	0	0	5	2	5	0	0	7	14		54	
08:00:00	1	3	0	0	4	0	1	0	0	1	1	3	0	0	4	9		52	
08:15:00	7	3	0	0	10	1	1	0	1	2	1	3	0	0	4	16		54	
08:30:00	7	0	0	0	7	6	7	0	0	13	6	13	0	0	19	39		78	
08:45:00	4	0	0	0	4	3	3	0	0	6	5	12	0	0	17	27		91	
09:00:00	6	1	0	0	7	5	4	0	0	9	2	4	0	0	6	22		104	
09:15:00	1	3	0	0	4	6	3	0	0	9	2	5	0	0	7	20		108	
09:30:00	3	3	0	0	6	5	1	0	0	6	3	1	0	0	4	16		85	
09:45:00	5	3	0	1	8	1	2	0	1	3	2	6	0	0	8	19		77	
BREAK																			
15:00:00	1	0	0	0	1	5	3	0	0	8	3	2	0	0	5	14			
15:15:00	3	3	0	0	6	1	3	0	0	4	6	11	0	0	17	27			
15:30:00	9	3	0	0	12	3	2	0	0	5	5	7	0	12	12	29			
15:45:00	6	4	0	0	10	3	3	0	0	6	2	6	0	1	8	24		94	
16:00:00	3	6	0	0	9	4	1	0	1	5	2	4	0	0	6	20		100	
16:15:00	3	1	1	1	5	7	2	0	2	9	1	5	0	0	6	20		93	
16:30:00	5	1	0	0	6	5	1	0	0	6	3	3	0	0	6	18		82	



16:45:00	4	1	0	0	5	4	1	0	0	5	3	5	0	0	8	18	76
17:00:00	6	3	0	0	9	5	1	0	0	6	3	5	0	0	8	23	79
17:15:00	3	3	0	0	6	3	1	0	0	4	2	4	0	0	6	16	75
17:30:00	7	4	0	0	11	1	0	0	0	1	1	5	0	0	6	18	75
17:45:00	1	1	0	0	2	1	7	0	1	8	5	5	0	0	10	20	77
18:00:00	3	0	0	0	3	0	0	0	1	0	0	2	0	0	2	5	59
18:15:00	2	3	0	0	5	1	2	0	0	3	2	4	0	0	6	14	57
18:30:00	3	3	0	0	6	2	0	0	0	2	1	6	0	0	7	15	54
18:45:00	4	4	0	0	8	6	2	0	0	8	4	1	0	0	5	21	55
Grand Total	106	64	1	2	171	101	64	0	7	165	77	147	0	13	224	560	-
Approach%	62%	37.4%	0.6%	-	-	61.2%	38.8%	0%	-	-	34.4%	65.6%	0%	-	-	-	-
Totals %	18.9%	11.4%	0.2%	-	30.5%	18%	11.4%	0%	-	29.5%	13.8%	26.3%	0%	-	40%	-	-
Heavy	0	1	0	-	-	0	1	0	-	-	0	0	0	-	-	-	-
Heavy %	0%	1.6%	0%	-	-	0%	1.6%	0%	-	-	0%	0%	0%	-	-	-	-
Bicycles	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bicycle %	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 ° C)

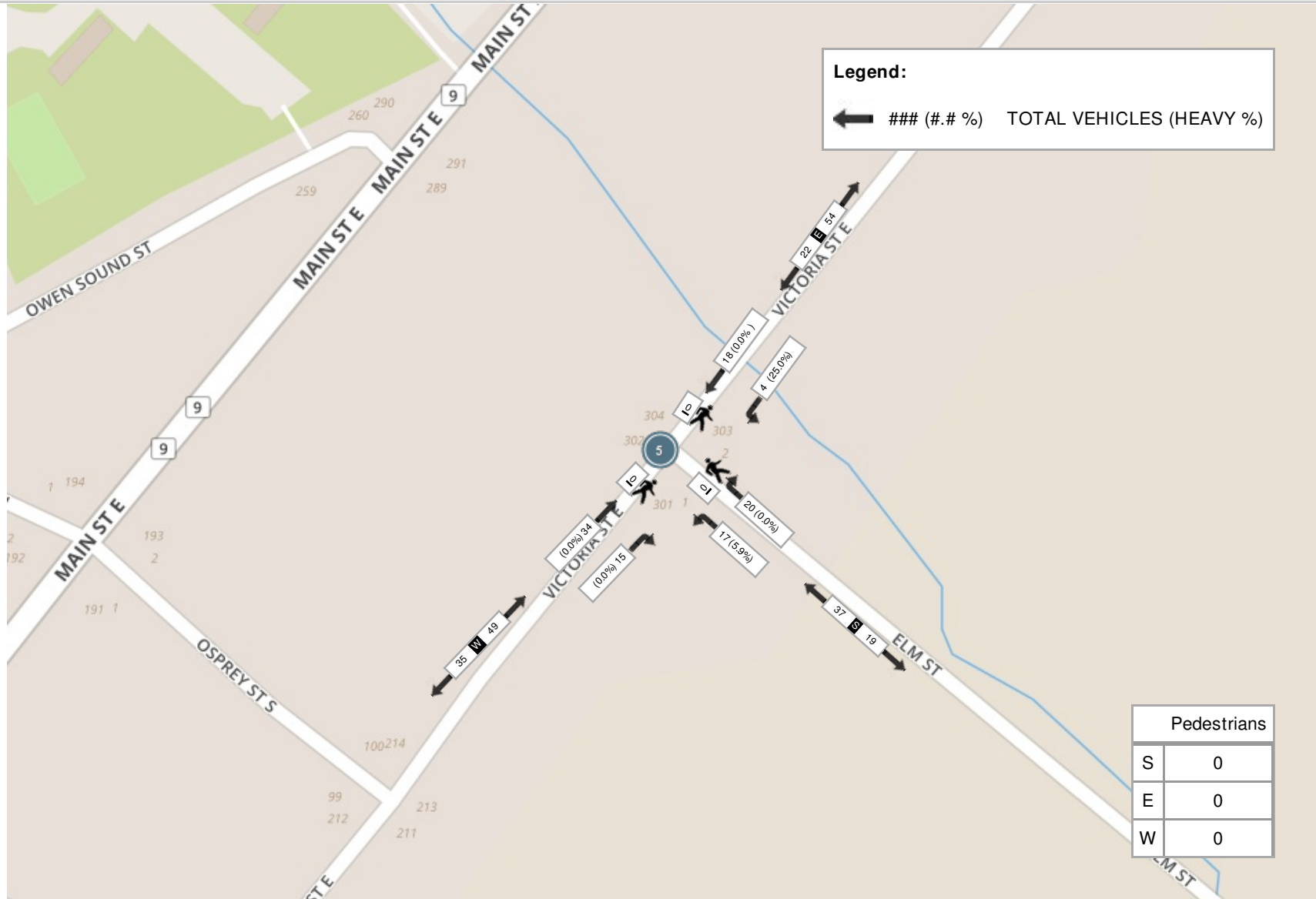
Start Time	E Approach VICTORIA ST					S Approach ELM ST					W Approach VICTORIA ST					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
08:30:00	7	0	0	0	7	6	7	0	0	13	6	13	0	0	19	39
08:45:00	4	0	0	0	4	3	3	0	0	6	5	12	0	0	17	27
09:00:00	6	1	0	0	7	5	4	0	0	9	2	4	0	0	6	22
09:15:00	1	3	0	0	4	6	3	0	0	9	2	5	0	0	7	20
Grand Total	18	4	0	0	22	20	17	0	0	37	15	34	0	0	49	108
Approach%	81.8%	18.2%	0%		-	54.1%	45.9%	0%		-	30.6%	69.4%	0%		-	-
Totals %	16.7%	3.7%	0%		20.4%	18.5%	15.7%	0%		34.3%	13.9%	31.5%	0%		45.4%	-
PHF	0.64	0.33	0		0.79	0.83	0.61	0		0.71	0.63	0.65	0		0.64	-
Heavy	0	1	0		1	0	1	0		1	0	0	0		0	-
Heavy %	0%	25%	0%		4.5%	0%	5.9%	0%		2.7%	0%	0%	0%		0%	-
Lights	18	3	0		21	19	16	0		35	14	31	0		45	-
Lights %	100%	75%	0%		95.5%	95%	94.1%	0%		94.6%	93.3%	91.2%	0%		91.8%	-
Mediums	0	0	0		0	1	0	0		1	1	3	0		4	-
Mediums %	0%	0%	0%		0%	5%	0%	0%		2.7%	6.7%	8.8%	0%		8.2%	-
Articulated Trucks	0	1	0		1	0	1	0		1	0	0	0		0	-
Articulated Trucks %	0%	25%	0%		4.5%	0%	5.9%	0%		2.7%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-



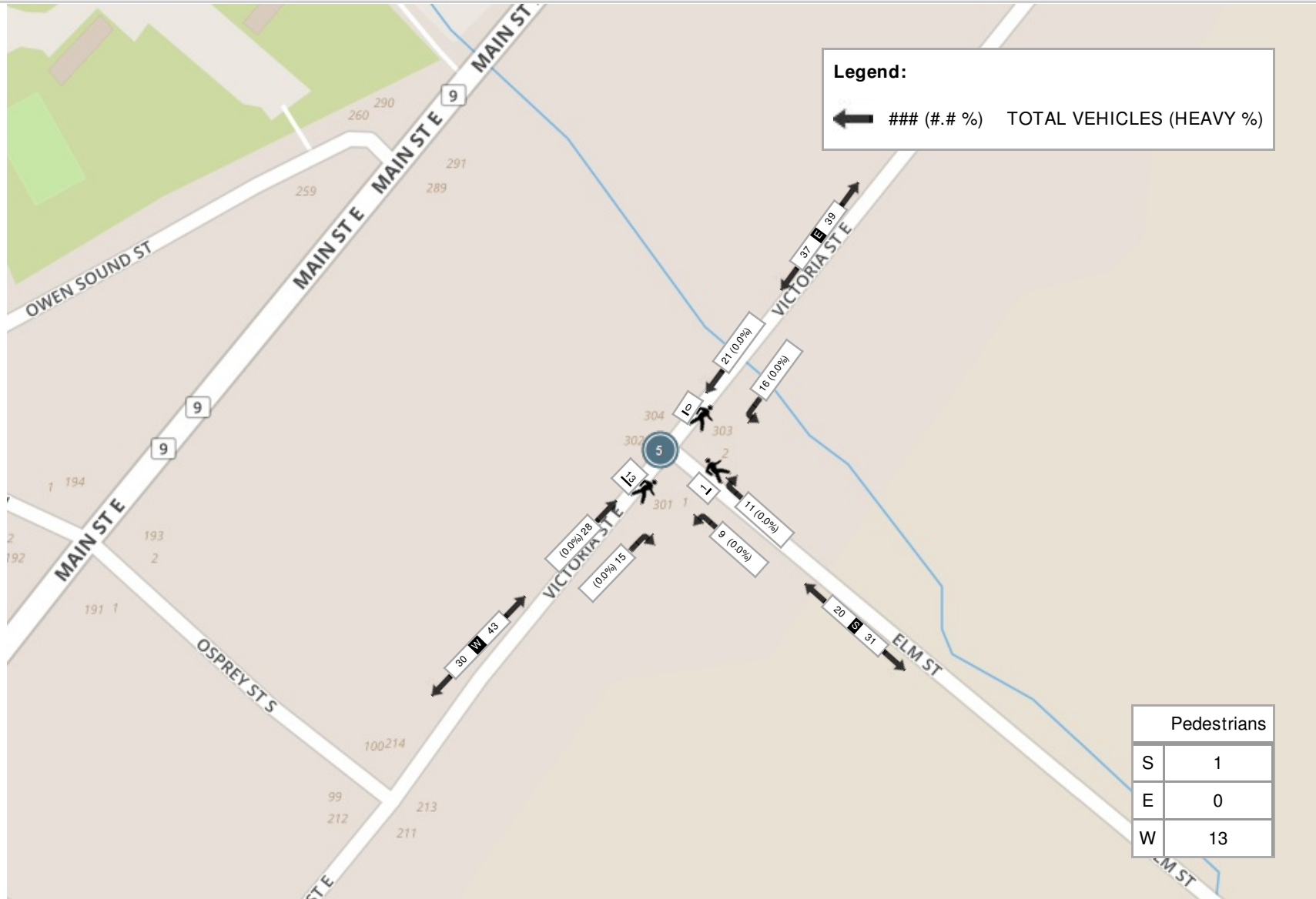
Peak Hour: 03:15 PM - 04:15 PM Weather: Overcast Clouds (-8.78 °C)

Start Time	E Approach VICTORIA ST					S Approach ELM ST					W Approach VICTORIA ST					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
15:15:00	3	3	0	0	6	1	3	0	0	4	6	11	0	0	17	27
15:30:00	9	3	0	0	12	3	2	0	0	5	5	7	0	12	12	29
15:45:00	6	4	0	0	10	3	3	0	0	6	2	6	0	1	8	24
16:00:00	3	6	0	0	9	4	1	0	1	5	2	4	0	0	6	20
Grand Total	21	16	0	0	37	11	9	0	1	20	15	28	0	13	43	100
Approach%	56.8%	43.2%	0%		-	55%	45%	0%		-	34.9%	65.1%	0%		-	-
Totals %	21%	16%	0%		37%	11%	9%	0%		20%	15%	28%	0%		43%	-
PHF	0.58	0.67	0		0.77	0.69	0.75	0		0.83	0.63	0.64	0		0.63	-
Heavy	0	0	0		0	0	0	0		0	0	0	0		0	-
Heavy %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Lights	17	15	0		32	9	7	0		16	13	27	0		40	-
Lights %	81%	93.8%	0%		86.5%	81.8%	77.8%	0%		80%	86.7%	96.4%	0%		93%	-
Mediums	4	1	0		5	2	2	0		4	2	1	0		3	-
Mediums %	19%	6.3%	0%		13.5%	18.2%	22.2%	0%		20%	13.3%	3.6%	0%		7%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	0	0		0	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0%	0%		0%	-
Pedestrians	-	-	-	0	-	-	-	-	1	-	-	-	-	13	-	-
Pedestrians%	-	-	-	0%		-	-	-	7.1%		-	-	-	92.9%		-

Peak Hour: 08:30 AM - 09:30 AM Weather: Scattered Clouds (-16.84 °C)



Peak Hour: 03:15 PM - 04:15 PM Weather: Overcast Clouds (-8.78 °C)



APPENDIX B

Level of Service Definitions

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






















APPENDIX C

Detailed Capacity Analysis Worksheet

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Existing Conditions - AM













01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	31	59	5	50	6	34	94	33	3	112	71
Future Volume (vph)	68	31	59	5	50	6	34	94	33	3	112	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.901			0.984			0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1656	0	1805	1773	0	1703	1620	0	1805	1759	1599
Flt Permitted	0.715			0.691			0.676			0.665		
Satd. Flow (perm)	1345	1656	0	1313	1773	0	1212	1620	0	1264	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		67			7			29				81
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			1102.7				925.0
Travel Time (s)		41.8			17.3			49.6				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	77	35	67	6	57	7	39	107	38	3	127	81
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	102	0	6	64	0	39	145	0	3	127	81
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Existing Conditions - AM

01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	10.1	10.1		10.1	10.1		28.1	28.1		28.1	28.1	28.1
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.57	0.57		0.57	0.57	0.57
v/c Ratio	0.28	0.26		0.02	0.17		0.06	0.16		0.00	0.13	0.09
Control Delay	20.1	10.2		16.4	16.6		8.1	7.3		7.7	8.6	2.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	20.1	10.2		16.4	16.6		8.1	7.3		7.7	8.6	2.8
LOS	C	B		B	B		A	A		A	A	A
Approach Delay		14.5			16.6			7.5			6.3	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	6.2	2.7		0.5	4.5		1.9	5.9		0.2	6.4	0.0
Queue Length 95th (m)	15.2	12.2		2.7	12.2		5.9	14.0		1.2	14.0	5.2
Internal Link Dist (m)		556.5			360.6			1078.7			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	744	946		726	984		1106	1481		1154	1606	1467
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.10	0.11		0.01	0.07		0.04	0.10		0.00	0.08	0.06
Intersection Summary												
Area Type: Other												
Cycle Length: 90												
Actuated Cycle Length: 49.7												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.28												
Intersection Signal Delay: 10.0 Intersection LOS: B												
Intersection Capacity Utilization 63.9% ICU Level of Service B												
Analysis Period (min) 15												










Splits and Phases: 1: Highway 10 & Main Street



HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

Existing Conditions - AM
01-17-2020

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	192	9	8	173	2	38
Future Volume (Veh/h)	192	9	8	173	2	38
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	200	9	8	180	2	40
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	209			400	204	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	209			400	204	
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			100	95	
cM capacity (veh/h)	1374			606	834	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	209	188	42			
Volume Left	0	8	2			
Volume Right	9	0	40			
cSH	1700	1374	819			
Volume to Capacity	0.12	0.01	0.05			
Queue Length 95th (m)	0.0	0.1	1.3			
Control Delay (s)	0.0	0.4	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay	1.1					
Intersection Capacity Utilization	25.6%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Existing Conditions - AM

01-17-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	182	3	9	161	2	6	1	20	1	0	3
Future Volume (Veh/h)	1	182	3	9	161	2	6	1	20	1	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	198	3	10	175	2	7	1	22	1	0	3
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	178			202			402	400	200	421	401	178
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	178			202			402	400	200	421	401	178
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			99	100	97	100	100	100
cM capacity (veh/h)	1409			1317			555	536	845	527	535	869
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	202	187	30	4								
Volume Left	1	10	7	1								
Volume Right	3	2	22	3								
cSH	1409	1317	740	747								
Volume to Capacity	0.00	0.01	0.04	0.01								
Queue Length 95th (m)	0.0	0.2	1.0	0.1								
Control Delay (s)	0.0	0.5	10.1	9.8								
Lane LOS	A	A	B	A								
Approach Delay (s)	0.0	0.5	10.1	9.8								
Approach LOS			B	A								
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			25.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Existing Conditions - AM

01-17-2020










												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	138	7	9	130	5	1	6	5	9	2	9
Future Volume (Veh/h)	14	138	7	9	130	5	1	6	5	9	2	9
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)	14	142	7	9	134	5	1	6	5	9	2	9
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	156			150			340	348	148	354	350	154
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	156			150			340	348	148	354	350	154
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 %	99			99			100	99	99	98	100	99
cM capacity (veh/h)	1416			1442			594	561	903	574	560	883
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	163	148	12	20								
Volume Left	14	9	1	9								
Volume Right	7	5	5	9								
cSH	1416	1442	670	679								
Volume to Capacity	0.01	0.01	0.02	0.03								
Queue Length 95th (m)	0.2	0.2	0.4	0.7								
Control Delay (s)	0.7	0.5	10.5	10.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.7	0.5	10.5	10.5								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			22.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Elm Street & Victoria Street /Victoria Street

Existing Conditions - AM






















01-17-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	34	15	4	18	17	20
Future Volume (Veh/h)	34	15	4	18	17	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	49	22	6	26	25	29
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			71		98	60
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			71		98	60
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			100		97	97
cM capacity (veh/h)			1395		888	1011
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	71	32	54			
Volume Left	0	6	25			
Volume Right	22	0	29			
cSH	1700	1395	950			
Volume to Capacity	0.04	0.00	0.06			
Queue Length 95th (m)	0.0	0.1	1.4			
Control Delay (s)	0.0	1.5	9.0			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.5	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			14.4%		ICU Level of Service	
Analysis Period (min)			15		A	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Existing Conditions - PM













01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	48	77	16	66	10	138	198	25	6	105	71
Future Volume (vph)	38	48	77	16	66	10	138	198	25	6	105	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.908			0.980			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	1712	0	1703	1862	0	1805	1827	0	1805	1743	1599
Flt Permitted	0.702			0.669			0.683			0.607		
Satd. Flow (perm)	1334	1712	0	1199	1862	0	1298	1827	0	1153	1743	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		85			9			10				78
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			1102.7				925.0
Travel Time (s)		41.8			17.3			49.6				41.6
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	2%	0%	6%	0%	0%	0%	2%	4%	0%	9%	1%
Adj. Flow (vph)	42	53	85	18	73	11	152	218	27	7	115	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	42	138	0	18	84	0	152	245	0	7	115	78
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Existing Conditions - PM

01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.8	32.8		32.8	32.8		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)	10.0	10.0		10.0	10.0		28.1	28.1		28.1	28.1	28.1
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.57	0.57		0.57	0.57	0.57
v/c Ratio	0.16	0.33		0.07	0.22		0.21	0.24		0.01	0.12	0.08
Control Delay	18.3	10.8		17.3	17.1		9.2	8.6		7.5	8.4	2.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	18.3	10.8		17.3	17.1		9.2	8.6		7.5	8.4	2.7
LOS	B	B		B	B		A	A		A	A	A
Approach Delay		12.6			17.2			8.8			6.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	3.3	4.2		1.4	5.9		8.1	12.7		0.3	5.8	0.0
Queue Length 95th (m)	9.9	15.9		5.6	15.3		17.7	24.7		2.0	13.1	5.2
Internal Link Dist (m)		556.5			360.6			1078.7			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	740	987		665	1037		1188	1673		1055	1596	1470
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.06	0.14		0.03	0.08		0.13	0.15		0.01	0.07	0.05
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 49.6												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.33												
Intersection Signal Delay: 9.9	Intersection LOS: A											
Intersection Capacity Utilization 63.9%	ICU Level of Service B											
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street













HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

Existing Conditions - PM

01-17-2020

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	183	4	18	260	8	22
Future Volume (Veh/h)	183	4	18	260	8	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	199	4	20	283	9	24
Pedestrians						4
Lane Width (m)						3.6
Walking Speed (m/s)						1.2
Percent Blockage						0
Right turn flare (veh)						
Median type	None		None			
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			207			528
vC1, stage 1 conf vol						205
vC2, stage 2 conf vol						
vCu, unblocked vol			207			528
tC, single (s)			4.1			6.4
tC, 2 stage (s)						6.2
tF (s)			2.2			3.5
p0 queue free %			99			98
cM capacity (veh/h)			1372			505
						838
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	203	303	33			
Volume Left	0	20	9			
Volume Right	4	0	24			
cSH	1700	1372	710			
Volume to Capacity	0.12	0.01	0.05			
Queue Length 95th (m)	0.0	0.4	1.2			
Control Delay (s)	0.0	0.6	10.3			
Lane LOS			A			
Approach Delay (s)	0.0	0.6	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			38.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Existing Conditions - PM

01-17-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	203	10	15	220	2	10	0	14	2	0	1
Future Volume (Veh/h)	2	203	10	15	220	2	10	0	14	2	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	221	11	16	239	2	11	0	15	2	0	1
Pedestrians								5			3	
Lane Width (m)								3.6			3.6	
Walking Speed (m/s)								1.2			1.2	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	244			237			508	512	232	520	516	243
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	244			237			508	512	232	520	516	243
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 %	100			99			98	100	98	100	100	100
cM capacity (veh/h)	1331			1336			468	459	809	453	456	799
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	234	257	26	3								
Volume Left	2	16	11	2								
Volume Right	11	2	15	1								
cSH	1331	1336	619	529								
Volume to Capacity	0.00	0.01	0.04	0.01								
Queue Length 95th (m)	0.0	0.3	1.1	0.1								
Control Delay (s)	0.1	0.6	11.1	11.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.6	11.1	11.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			31.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Existing Conditions - PM

01-17-2020










												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	7	163	5	6	193	1	6	4	6	13	2	3
Future Volume (Veh/h)	7	163	5	6	193	1	6	4	6	13	2	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	8	177	5	7	210	1	7	4	7	14	2	3
Pedestrians		2						1			3	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	214			183			427	424	180	432	426	216
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	214			183			427	424	180	432	426	216
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 %	99			100			99	99	99	97	100	100
cM capacity (veh/h)	1365			1403			531	517	867	523	516	826
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	190	218	18	19								
Volume Left	8	7	7	14								
Volume Right	5	1	7	3								
cSH	1365	1403	621	554								
Volume to Capacity	0.01	0.00	0.03	0.03								
Queue Length 95th (m)	0.1	0.1	0.7	0.9								
Control Delay (s)	0.4	0.3	11.0	11.7								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.4	0.3	11.0	11.7								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			23.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Elm Street & Victoria Street /Victoria Street

Existing Conditions - PM






















01-17-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	28	15	16	21	9	11
Future Volume (Veh/h)	28	15	16	21	9	11
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	33	17	19	24	10	13
Pedestrians	13				1	
Lane Width (m)	3.6				3.6	
Walking Speed (m/s)	1.2				1.2	
Percent Blockage	1				0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			51		118	42
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			51		118	42
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		99	99
cM capacity (veh/h)			1567		862	1033
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	50	43	23			
Volume Left	0	19	10			
Volume Right	17	0	13			
cSH	1700	1567	951			
Volume to Capacity	0.03	0.01	0.02			
Queue Length 95th (m)	0.0	0.3	0.6			
Control Delay (s)	0.0	3.3	8.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.3	8.9			
Approach LOS			A			
Intersection Summary						
Average Delay		3.0				
Intersection Capacity Utilization		18.7%		ICU Level of Service		A
Analysis Period (min)		15				

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2025 - AM













01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	43	108	5	58	7	51	103	36	3	122	78
Future Volume (vph)	74	43	108	5	58	7	51	103	36	3	122	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.893			0.984			0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1645	0	1805	1774	0	1703	1620	0	1805	1759	1599
Flt Permitted	0.709			0.649			0.668			0.657		
Satd. Flow (perm)	1334	1645	0	1233	1774	0	1197	1620	0	1248	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		123			7			28				89
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			1102.7				925.0
Travel Time (s)		41.8			17.3			49.6				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	84	49	123	6	66	8	58	117	41	3	139	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	84	172	0	6	74	0	58	158	0	3	139	89
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2025 - AM

01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	10.3	10.3		10.3	10.3		24.5	24.5		24.5	24.5	24.5
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.47	0.47		0.47	0.47	0.47
v/c Ratio	0.32	0.41		0.02	0.21		0.10	0.20		0.01	0.17	0.11
Control Delay	20.8	9.8		16.4	17.1		8.6	7.7		7.7	8.9	2.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	20.8	9.8		16.4	17.1		8.6	7.7		7.7	8.9	2.8
LOS	C	A		B	B		A	A		A	A	A
Approach Delay		13.4			17.0			7.9			6.5	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	6.8	3.8		0.5	5.3		2.9	6.6		0.2	7.1	0.0
Queue Length 95th (m)	16.3	16.1		2.7	13.6		8.1	15.6		1.2	15.5	5.5
Internal Link Dist (m)		556.5			360.6			1078.7			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	709	931		654	945		1049	1424		1094	1542	1413
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.12	0.18		0.01	0.08		0.06	0.11		0.00	0.09	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 51.9												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.41												
Intersection Signal Delay: 10.2					Intersection LOS: B							
Intersection Capacity Utilization 66.3%					ICU Level of Service C							
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street












HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

Future Background 2025 - AM

01-17-2020

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	210	10	9	189	2	42
Future Volume (Veh/h)	210	10	9	189	2	42
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	219	10	9	197	2	44
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			229			439
vC1, stage 1 conf vol						224
vC2, stage 2 conf vol						
vCu, unblocked vol			229			439
tC, single (s)			4.1			6.4
tC, 2 stage (s)						6.2
tF (s)			2.2			3.5
p0 queue free %			99			100
cM capacity (veh/h)			1351			575
						813
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	229	206	46			
Volume Left	0	9	2			
Volume Right	10	0	44			
cSH	1700	1351	799			
Volume to Capacity	0.13	0.01	0.06			
Queue Length 95th (m)	0.0	0.2	1.5			
Control Delay (s)	0.0	0.4	9.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			27.3%		ICU Level of Service	
					A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Background 2025 - AM

01-17-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	251	3	10	193	2	7	1	22	1	0	3
Future Volume (Veh/h)	1	251	3	10	193	2	7	1	22	1	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	273	3	11	210	2	8	1	24	1	0	3
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	213			277			514	512	276	535	513	213
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	213			277			514	512	276	535	513	213
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	97	100	100	100
cM capacity (veh/h)	1368			1235			467	463	767	440	462	831
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	277	223	33	4								
Volume Left	1	11	8	1								
Volume Right	3	2	24	3								
cSH	1368	1235	653	680								
Volume to Capacity	0.00	0.01	0.05	0.01								
Queue Length 95th (m)	0.0	0.2	1.3	0.1								
Control Delay (s)	0.0	0.5	10.8	10.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.0	0.5	10.8	10.3								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			27.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Background 2025 - AM










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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	203	8	10	159	5	1	7	5	10	2	10
Future Volume (Veh/h)	15	203	8	10	159	5	1	7	5	10	2	10
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)	15	209	8	10	164	5	1	7	5	10	2	10
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	186			218			442	450	215	456	452	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	186			218			442	450	215	456	452	184
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 %	99			99			100	99	99	98	100	99
cM capacity (veh/h)	1381			1362			507	491	829	489	490	850
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	232	179	13	22								
Volume Left	15	10	1	10								
Volume Right	8	5	5	10								
cSH	1381	1362	584	606								
Volume to Capacity	0.01	0.01	0.02	0.04								
Queue Length 95th (m)	0.3	0.2	0.5	0.9								
Control Delay (s)	0.6	0.5	11.3	11.2								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.5	11.3	11.2								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			27.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Elm Street & Victoria Street /Victoria Street

Future Background 2025 - AM






















01-17-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	37	16	4	20	19	22
Future Volume (Veh/h)	37	16	4	20	19	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	54	23	6	29	28	32
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			77		106	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			77		106	66
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			100		97	97
cM capacity (veh/h)			1388		878	1004
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	77	35	60			
Volume Left	0	6	28			
Volume Right	23	0	32			
cSH	1700	1388	941			
Volume to Capacity	0.05	0.00	0.06			
Queue Length 95th (m)	0.0	0.1	1.6			
Control Delay (s)	0.0	1.3	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.3	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			14.5%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2025 - PM













01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	58	113	17	82	11	199	217	27	7	115	78
Future Volume (vph)	42	58	113	17	82	11	199	217	27	7	115	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.901			0.982			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1656	0	1805	1767	0	1703	1646	0	1805	1759	1599
Flt Permitted	0.689			0.636			0.673			0.589		
Satd. Flow (perm)	1296	1656	0	1208	1767	0	1206	1646	0	1119	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		112			8			10				89
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			1102.7				925.0
Travel Time (s)		41.8			17.3			49.6				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	48	66	128	19	93	13	226	247	31	8	131	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	194	0	19	106	0	226	278	0	8	131	89
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2025 - PM

01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	10.4	10.4		10.4	10.4		23.1	23.1		23.1	23.1	23.1
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.46	0.46		0.46	0.46	0.46
v/c Ratio	0.18	0.45		0.08	0.29		0.41	0.37		0.02	0.16	0.11
Control Delay	18.4	12.2		17.0	18.2		12.3	10.6		8.0	9.0	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	18.4	12.2		17.0	18.2		12.3	10.6		8.0	9.0	2.9
LOS	B	B		B	B		B	B		A	A	A
Approach Delay		13.4			18.0			11.3			6.6	
Approach LOS		B			B			B			A	
Queue Length 50th (m)	3.8	6.5		1.5	7.9		13.0	15.1		0.4	6.6	0.0
Queue Length 95th (m)	10.6	20.0		5.6	18.0		28.4	30.4		2.2	15.1	5.6
Internal Link Dist (m)		556.5			360.6			1078.7			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	704	950		656	963		1081	1477		1004	1577	1443
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.07	0.20		0.03	0.11		0.21	0.19		0.01	0.08	0.06
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 50.6												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.45												
Intersection Signal Delay: 11.6						Intersection LOS: B						
Intersection Capacity Utilization 63.9%						ICU Level of Service B						
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street












HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

Future Background 2025 - PM

01-17-2020

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	200	4	20	284	9	24
Future Volume (Veh/h)	200	4	20	284	9	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	208	4	21	296	9	25
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			212		548	210
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			212		548	210
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	97
cM capacity (veh/h)			1370		493	828
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	212	317	34			
Volume Left	0	21	9			
Volume Right	4	0	25			
cSH	1700	1370	702			
Volume to Capacity	0.12	0.02	0.05			
Queue Length 95th (m)	0.0	0.4	1.2			
Control Delay (s)	0.0	0.6	10.4			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	10.4			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			40.2%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Background 2025 - PM

01-17-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	257	11	16	299	2	11	0	15	2	0	1
Future Volume (Veh/h)	2	257	11	16	299	2	11	0	15	2	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	279	12	17	325	2	12	0	16	2	0	1
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	328			292			652	652	286	666	657	328
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	328			292			652	652	286	666	657	328
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			97	100	98	99	100	100
cM capacity (veh/h)	1242			1219			378	383	757	363	381	717
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	293	344	28	3								
Volume Left	2	17	12	2								
Volume Right	12	2	16	1								
cSH	1242	1219	529	434								
Volume to Capacity	0.00	0.01	0.05	0.01								
Queue Length 95th (m)	0.0	0.3	1.3	0.2								
Control Delay (s)	0.1	0.5	12.2	13.4								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.5	12.2	13.4								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			37.0%	ICU Level of Service				A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Background 2025 - PM

01-17-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	213	5	7	269	1	7	4	7	14	2	3
Future Volume (Veh/h)	8	213	5	7	269	1	7	4	7	14	2	3
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)	8	220	5	7	277	1	7	4	7	14	2	3
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	295			226			536	548	224	557	550	296
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	295			226			536	548	224	557	550	296
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 %	99			99			98	99	99	97	100	100
cM capacity (veh/h)	1260			1353			445	435	819	422	434	737
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	233	285	18	19								
Volume Left	8	7	7	14								
Volume Right	5	1	7	3								
cSH	1260	1353	538	454								
Volume to Capacity	0.01	0.01	0.03	0.04								
Queue Length 95th (m)	0.2	0.1	0.8	1.0								
Control Delay (s)	0.3	0.2	11.9	13.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.3	0.2	11.9	13.3								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			27.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Elm Street & Victoria Street /Victoria Street

Future Background 2025 - PM






















01-17-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰	↱
Traffic Volume (veh/h)	31	16	17	23	10	12
Future Volume (Veh/h)	31	16	17	23	10	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	45	23	25	33	14	17
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			68	140		56
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			68	140		56
tC, single (s)			4.3	6.5		6.2
tC, 2 stage (s)						
tF (s)			2.4	3.6		3.3
p0 queue free %			98	98		98
cM capacity (veh/h)			1399	829		1016
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	68	58	31			
Volume Left	0	25	14			
Volume Right	23	0	17			
cSH	1700	1399	922			
Volume to Capacity	0.04	0.02	0.03			
Queue Length 95th (m)	0.0	0.4	0.8			
Control Delay (s)	0.0	3.4	9.0			
Lane LOS	A		A			
Approach Delay (s)	0.0	3.4	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			18.8%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2030 - AM













01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	46	112	6	62	7	54	111	39	4	132	84
Future Volume (vph)	80	46	112	6	62	7	54	111	39	4	132	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.894			0.985			0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1647	0	1805	1777	0	1703	1620	0	1805	1759	1599
Flt Permitted	0.706			0.644			0.662			0.650		
Satd. Flow (perm)	1328	1647	0	1224	1777	0	1187	1620	0	1235	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		127			7			28				95
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			1102.7				925.0
Travel Time (s)		41.8			17.3			49.6				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	91	52	127	7	70	8	61	126	44	5	150	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	91	179	0	7	78	0	61	170	0	5	150	95
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2030 - AM

01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	10.3	10.3		10.3	10.3		23.8	23.8		23.8	23.8	23.8
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.46	0.46		0.46	0.46	0.46
v/c Ratio	0.34	0.41		0.03	0.21		0.11	0.22		0.01	0.18	0.12
Control Delay	21.2	9.9		16.3	17.2		8.8	8.0		7.8	9.1	2.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	21.2	9.9		16.3	17.2		8.8	8.0		7.8	9.1	2.8
LOS	C	A		B	B		A	A		A	A	A
Approach Delay		13.7			17.1			8.2			6.7	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	7.4	4.1		0.5	5.6		3.0	7.3		0.3	7.7	0.0
Queue Length 95th (m)	17.4	16.5		3.0	14.1		8.6	17.0		1.7	16.8	5.8
Internal Link Dist (m)		556.5			360.6			1078.7			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	712	943		657	957		1052	1439		1095	1559	1428
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.13	0.19		0.01	0.08		0.06	0.12		0.00	0.10	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 51.3												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.41												
Intersection Signal Delay: 10.4					Intersection LOS: B							
Intersection Capacity Utilization 66.7%					ICU Level of Service C							
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street












HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

Future Background 2030 - AM

01-17-2020

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	226	11	9	204	2	45
Future Volume (Veh/h)	226	11	9	204	2	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	235	11	9	212	2	47
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			246		470	240
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			246		470	240
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		100	94
cM capacity (veh/h)			1332		552	796
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	246	221	49			
Volume Left	0	9	2			
Volume Right	11	0	47			
cSH	1700	1332	782			
Volume to Capacity	0.14	0.01	0.06			
Queue Length 95th (m)	0.0	0.2	1.6			
Control Delay (s)	0.0	0.4	9.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.4	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			28.0%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Background 2030 - AM

01-17-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	266	4	11	207	2	7	1	24	1	0	4
Future Volume (Veh/h)	1	266	4	11	207	2	7	1	24	1	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	289	4	12	225	2	8	1	26	1	0	4
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	228			294			549	546	292	570	547	228
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	228			294			549	546	292	570	547	228
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	97	100	100	100
cM capacity (veh/h)	1351			1217			442	442	751	415	442	815
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	294	239	35	5								
Volume Left	1	12	8	1								
Volume Right	4	2	26	4								
cSH	1351	1217	637	683								
Volume to Capacity	0.00	0.01	0.05	0.01								
Queue Length 95th (m)	0.0	0.2	1.4	0.2								
Control Delay (s)	0.0	0.5	11.0	10.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.0	0.5	11.0	10.3								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			29.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Background 2030 - AM

01-17-2020










												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	215	8	11	170	6	1	7	6	11	2	11
Future Volume (Veh/h)	16	215	8	11	170	6	1	7	6	11	2	11
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)	16	222	8	11	175	6	1	7	6	11	2	11
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	198			231			472	479	228	486	480	196
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198			231			472	479	228	486	480	196
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 %	99			99			100	99	99	98	100	99
cM capacity (veh/h)	1367			1348			483	472	815	466	471	838
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	246	192	14	24								
Volume Left	16	11	1	11								
Volume Right	8	6	6	11								
cSH	1367	1348	577	586								
Volume to Capacity	0.01	0.01	0.02	0.04								
Queue Length 95th (m)	0.3	0.2	0.6	1.0								
Control Delay (s)	0.6	0.5	11.4	11.4								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.5	11.4	11.4								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			28.8%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Elm Street & Victoria Street /Victoria Street

Future Background 2030 - AM






















01-17-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	40	18	5	21	20	24
Future Volume (Veh/h)	40	18	5	21	20	24
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	58	26	7	30	29	35
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			84			71
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			84			71
tC, single (s)			4.3			6.2
tC, 2 stage (s)						
tF (s)			2.4			3.3
p0 queue free %			99			96
cM capacity (veh/h)			1380			967
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	84	37	64			
Volume Left	0	7	29			
Volume Right	26	0	35			
cSH	1700	1380	934			
Volume to Capacity	0.05	0.01	0.07			
Queue Length 95th (m)	0.0	0.1	1.8			
Control Delay (s)	0.0	1.5	9.1			
Lane LOS			A			
Approach Delay (s)	0.0	1.5	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			15.4%		ICU Level of Service	
Analysis Period (min)			15		A	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2030 - PM













01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	63	120	19	88	12	211	233	29	7	124	84
Future Volume (vph)	45	63	120	19	88	12	211	233	29	7	124	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.902			0.982			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1658	0	1805	1767	0	1703	1646	0	1805	1759	1599
Flt Permitted	0.684			0.628			0.667			0.578		
Satd. Flow (perm)	1287	1658	0	1193	1767	0	1196	1646	0	1098	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		109			8			10				95
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			1102.7				925.0
Travel Time (s)		41.8			17.3			49.6				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	51	72	136	22	100	14	240	265	33	8	141	95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	208	0	22	114	0	240	298	0	8	141	95
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2030 - PM

01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	10.6	10.6		10.6	10.6		23.0	23.0		23.0	23.0	23.0
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.45	0.45		0.45	0.45	0.45
v/c Ratio	0.19	0.48		0.09	0.30		0.44	0.40		0.02	0.18	0.12
Control Delay	18.4	13.2		17.0	18.4		13.0	11.1		8.3	9.3	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	18.4	13.2		17.0	18.4		13.0	11.1		8.3	9.3	2.9
LOS	B	B		B	B		B	B		A	A	A
Approach Delay		14.2			18.1			12.0			6.8	
Approach LOS		B			B			B			A	
Queue Length 50th (m)	4.0	8.0		1.7	8.5		14.1	16.4		0.4	7.2	0.0
Queue Length 95th (m)	11.0	21.9		6.2	19.0		31.7	34.1		2.2	16.8	6.0
Internal Link Dist (m)		556.5			360.6			1078.7			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	698	949		647	962		1071	1475		983	1575	1442
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.07	0.22		0.03	0.12		0.22	0.20		0.01	0.09	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 50.7												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.48												
Intersection Signal Delay: 12.1						Intersection LOS: B						
Intersection Capacity Utilization 71.4%						ICU Level of Service C						
Analysis Period (min) 15												











Splits and Phases: 1: Highway 10 & Main Street



HCM Unsignalized Intersection Capacity Analysis 2: Russell Street & Main Street

Future Background 2030 - PM

01-17-2020

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	216	5	21	306	9	26
Future Volume (Veh/h)	216	5	21	306	9	26
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	225	5	22	319	9	27
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			230		590	228
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			230		590	228
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	97
cM capacity (veh/h)			1350		465	809
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	230	341	36			
Volume Left	0	22	9			
Volume Right	5	0	27			
cSH	1700	1350	683			
Volume to Capacity	0.14	0.02	0.05			
Queue Length 95th (m)	0.0	0.4	1.3			
Control Delay (s)	0.0	0.6	10.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			42.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Background 2030 - PM

01-17-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	274	12	18	317	2	12	0	16	2	0	1
Future Volume (Veh/h)	2	274	12	18	317	2	12	0	16	2	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	298	13	20	345	2	13	0	17	2	0	1
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	348			312			698	698	306	712	703	348
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	348			312			698	698	306	712	703	348
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			96	100	98	99	100	100
cM capacity (veh/h)	1221			1198			351	360	738	336	357	699
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	313	367	30	3								
Volume Left	2	20	13	2								
Volume Right	13	2	17	1								
cSH	1221	1198	500	406								
Volume to Capacity	0.00	0.02	0.06	0.01								
Queue Length 95th (m)	0.0	0.4	1.5	0.2								
Control Delay (s)	0.1	0.6	12.7	13.9								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.6	12.7	13.9								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			39.4%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Background 2030 - PM

01-17-2020










												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	227	6	7	285	1	7	5	7	15	2	4
Future Volume (Veh/h)	8	227	6	7	285	1	7	5	7	15	2	4
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)	8	234	6	7	294	1	7	5	7	15	2	4
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	312			241			568	580	239	589	582	312
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	312			241			568	580	239	589	582	312
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 %	99			99			98	99	99	96	100	99
cM capacity (veh/h)	1242			1336			423	417	804	401	416	721
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	248	302	19	21								
Volume Left	8	7	7	15								
Volume Right	6	1	7	4								
cSH	1242	1336	510	440								
Volume to Capacity	0.01	0.01	0.04	0.05								
Queue Length 95th (m)	0.2	0.1	0.9	1.2								
Control Delay (s)	0.3	0.2	12.3	13.6								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.3	0.2	12.3	13.6								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			28.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Elm Street & Victoria Street /Victoria Street

Future Background 2030 - PM






















01-17-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	33	18	19	25	11	13
Future Volume (Veh/h)	33	18	19	25	11	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	48	26	28	36	16	19
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			74		153	61
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			74		153	61
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			98		98	98
cM capacity (veh/h)			1392		813	1010
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	74	64	35			
Volume Left	0	28	16			
Volume Right	26	0	19			
cSH	1700	1392	909			
Volume to Capacity	0.04	0.02	0.04			
Queue Length 95th (m)	0.0	0.5	1.0			
Control Delay (s)	0.0	3.4	9.1			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.4	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			19.0%	ICU Level of Service	A	
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2035 - AM













01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	86	48	118	6	66	8	57	119	42	4	142	90
Future Volume (vph)	86	48	118	6	66	8	57	119	42	4	142	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.894			0.984			0.961				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1647	0	1805	1774	0	1703	1620	0	1805	1759	1599
Flt Permitted	0.702			0.639			0.655			0.642		
Satd. Flow (perm)	1321	1647	0	1214	1774	0	1174	1620	0	1220	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		134			7			29				102
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			1102.7				925.0
Travel Time (s)		41.8			17.3			49.6				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	98	55	134	7	75	9	65	135	48	5	161	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	189	0	7	84	0	65	183	0	5	161	102
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2035 - AM

01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	10.4	10.4		10.4	10.4		23.1	23.1		23.1	23.1	23.1
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.46	0.46		0.46	0.46	0.46
v/c Ratio	0.36	0.42		0.03	0.23		0.12	0.24		0.01	0.20	0.13
Control Delay	21.5	9.8		16.2	17.3		9.0	8.3		8.0	9.3	2.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	21.5	9.8		16.2	17.3		9.0	8.3		8.0	9.3	2.8
LOS	C	A		B	B		A	A		A	A	A
Approach Delay		13.8			17.2			8.5			6.8	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	8.0	4.3		0.5	6.1		3.2	8.0		0.3	8.3	0.0
Queue Length 95th (m)	18.4	17.1		3.0	14.9		9.2	18.7		1.7	18.2	6.0
Internal Link Dist (m)		556.5			360.6			1078.7			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	718	956		660	967		1053	1456		1094	1578	1445
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.14	0.20		0.01	0.09		0.06	0.13		0.00	0.10	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 50.6												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.42												
Intersection Signal Delay: 10.6					Intersection LOS: B							
Intersection Capacity Utilization 67.0%					ICU Level of Service C							
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street












HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

Future Background 2035 - AM

01-17-2020

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	244	11	10	220	3	48
Future Volume (Veh/h)	244	11	10	220	3	48
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	254	11	10	229	3	50
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			265			508
vC1, stage 1 conf vol						260
vC2, stage 2 conf vol						
vCu, unblocked vol			265			508
tC, single (s)			4.1			6.4
tC, 2 stage (s)						6.2
tF (s)			2.2			3.5
p0 queue free %			99			99
cM capacity (veh/h)			1311			524
						777
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	265	239	53			
Volume Left	0	10	3			
Volume Right	11	0	50			
cSH	1700	1311	756			
Volume to Capacity	0.16	0.01	0.07			
Queue Length 95th (m)	0.0	0.2	1.8			
Control Delay (s)	0.0	0.4	10.1			
Lane LOS			A			
Approach Delay (s)	0.0	0.4	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			29.7%		ICU Level of Service	
Analysis Period (min)			15		A	

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Background 2035 - AM

01-17-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	283	4	11	221	3	8	1	25	1	0	4
Future Volume (Veh/h)	1	283	4	11	221	3	8	1	25	1	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	308	4	12	240	3	9	1	27	1	0	4
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	244			313			584	581	311	606	582	244
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	244			313			584	581	311	606	582	244
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	96	100	100	99
cM capacity (veh/h)	1333			1197			420	423	733	392	422	799
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	313	255	37	5								
Volume Left	1	12	9	1								
Volume Right	4	3	27	4								
cSH	1333	1197	610	662								
Volume to Capacity	0.00	0.01	0.06	0.01								
Queue Length 95th (m)	0.0	0.2	1.5	0.2								
Control Delay (s)	0.0	0.5	11.3	10.5								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.0	0.5	11.3	10.5								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			30.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Background 2035 - AM

01-17-2020










												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	227	9	11	182	6	1	8	6	11	3	11
Future Volume (Veh/h)	18	227	9	11	182	6	1	8	6	11	3	11
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)	19	234	9	11	188	6	1	8	6	11	3	11
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	211			244			504	510	240	518	512	209
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	211			244			504	510	240	518	512	209
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 %	99			99			100	98	99	98	99	99
cM capacity (veh/h)	1352			1333			459	452	802	442	451	824
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	262	205	15	25								
Volume Left	19	11	1	11								
Volume Right	9	6	6	11								
cSH	1352	1333	548	557								
Volume to Capacity	0.01	0.01	0.03	0.04								
Queue Length 95th (m)	0.3	0.2	0.7	1.1								
Control Delay (s)	0.7	0.5	11.8	11.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.7	0.5	11.8	11.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			30.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: Elm Street & Victoria Street /Victoria Street

Future Background 2035 - AM






















01-17-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	43	19	5	23	22	25
Future Volume (Veh/h)	43	19	5	23	22	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	62	28	7	33	32	36
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			90		123	76
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			90		123	76
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			99		96	96
cM capacity (veh/h)			1372		858	991
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	90	40	68			
Volume Left	0	7	32			
Volume Right	28	0	36			
cSH	1700	1372	924			
Volume to Capacity	0.05	0.01	0.07			
Queue Length 95th (m)	0.0	0.1	1.9			
Control Delay (s)	0.0	1.4	9.2			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.4	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			15.5%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2035 - PM













01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	67	127	20	94	13	223	251	32	8	133	90
Future Volume (vph)	48	67	127	20	94	13	223	251	32	8	133	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.902			0.982			0.983				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1658	0	1805	1767	0	1703	1646	0	1805	1759	1599
Flt Permitted	0.679			0.621			0.661			0.566		
Satd. Flow (perm)	1277	1658	0	1180	1767	0	1185	1646	0	1075	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		109			8			10				102
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			1102.7				925.0
Travel Time (s)		41.8			17.3			49.6				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	55	76	144	23	107	15	253	285	36	9	151	102
Shared Lane Traffic (%)												
Lane Group Flow (vph)	55	220	0	23	122	0	253	321	0	9	151	102
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Background 2035 - PM

01-17-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	10.8	10.8		10.8	10.8		23.3	23.3		23.3	23.3	23.3
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.46	0.46		0.46	0.46	0.46
v/c Ratio	0.20	0.50		0.09	0.32		0.47	0.43		0.02	0.19	0.13
Control Delay	18.7	14.0		17.2	18.7		13.7	11.6		8.5	9.5	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	18.7	14.0		17.2	18.7		13.7	11.6		8.5	9.5	2.9
LOS	B	B		B	B		B	B		A	A	A
Approach Delay		14.9			18.4			12.5			6.9	
Approach LOS		B			B			B			A	
Queue Length 50th (m)	4.4	9.0		1.8	9.2		15.1	18.0		0.4	7.8	0.0
Queue Length 95th (m)	11.9	24.2		6.5	20.6		34.8	38.2		2.5	18.3	6.3
Internal Link Dist (m)		556.5			360.6			1078.7			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	686	941		634	953		1051	1461		954	1560	1430
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.08	0.23		0.04	0.13		0.24	0.22		0.01	0.10	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 51.2												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.50												
Intersection Signal Delay: 12.6					Intersection LOS: B							
Intersection Capacity Utilization 72.2%					ICU Level of Service C							
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street












HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

Future Background 2035 - PM

01-17-2020

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	232	5	23	330	10	28
Future Volume (Veh/h)	232	5	23	330	10	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	242	5	24	344	10	29
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			247		636	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			247		636	244
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	96
cM capacity (veh/h)			1331		437	792
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	247	368	39			
Volume Left	0	24	10			
Volume Right	5	0	29			
cSH	1700	1331	655			
Volume to Capacity	0.15	0.02	0.06			
Queue Length 95th (m)	0.0	0.4	1.5			
Control Delay (s)	0.0	0.7	10.8			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.7	10.8			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			44.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Background 2035 - PM

01-17-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	293	13	19	337	3	13	0	18	3	0	1
Future Volume (Veh/h)	3	293	13	19	337	3	13	0	18	3	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	318	14	21	366	3	14	0	20	3	0	1
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	370			333			744	744	326	762	750	370
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	370			333			744	744	326	762	750	370
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			96	100	97	99	100	100
cM capacity (veh/h)	1199			1177			327	338	719	310	335	679
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	335	390	34	4								
Volume Left	3	21	14	3								
Volume Right	14	3	20	1								
cSH	1199	1177	481	358								
Volume to Capacity	0.00	0.02	0.07	0.01								
Queue Length 95th (m)	0.1	0.4	1.8	0.3								
Control Delay (s)	0.1	0.6	13.0	15.2								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.6	13.0	15.2								
Approach LOS			B	C								
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			40.4%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Background 2035 - PM










01-17-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	242	6	8	303	1	8	5	8	16	3	4
Future Volume (Veh/h)	9	242	6	8	303	1	8	5	8	16	3	4
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)	9	249	6	8	312	1	8	5	8	16	3	4
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	330			256			606	617	254	627	620	330
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	330			256			606	617	254	627	620	330
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 %	99			99			98	99	99	96	99	99
cM capacity (veh/h)	1223			1320			398	397	788	377	395	705
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	264	321	21	23								
Volume Left	9	8	8	16								
Volume Right	6	1	8	4								
cSH	1223	1320	490	413								
Volume to Capacity	0.01	0.01	0.04	0.06								
Queue Length 95th (m)	0.2	0.1	1.1	1.4								
Control Delay (s)	0.3	0.2	12.7	14.2								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.3	0.2	12.7	14.2								
Approach LOS			B	B								
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			29.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 5: Elm Street & Victoria Street /Victoria Street






















Future Background 2035 - PM

01-17-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	36	19	20	27	11	14
Future Volume (Veh/h)	36	19	20	27	11	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	52	28	29	39	16	20
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			80		163	66
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			80		163	66
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			98		98	98
cM capacity (veh/h)			1384		801	1003
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	80	68	36			
Volume Left	0	29	16			
Volume Right	28	0	20			
cSH	1700	1384	902			
Volume to Capacity	0.05	0.02	0.04			
Queue Length 95th (m)	0.0	0.5	1.0			
Control Delay (s)	0.0	3.4	9.2			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.4	9.2			
Approach LOS			A			
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			19.2%	ICU Level of Service		A
Analysis Period (min)			15			













Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2025 - AM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	60	108	11	63	7	51	120	53	3	128	83
Future Volume (vph)	91	60	108	11	63	7	51	120	53	3	128	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.903			0.985			0.954				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1659	0	1805	1777	0	1703	1612	0	1805	1759	1599
Flt Permitted	0.705			0.637			0.665			0.634		
Satd. Flow (perm)	1326	1659	0	1210	1777	0	1192	1612	0	1205	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		104			6			36				94
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			797.9				925.0
Travel Time (s)		41.8			17.3			35.9				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	103	68	123	13	72	8	58	136	60	3	145	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	103	191	0	13	80	0	58	196	0	3	145	94
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2025 - AM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)	10.6	10.6		10.6	10.6		23.0	23.0		23.0	23.0	23.0
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.45	0.45		0.45	0.45	0.45
v/c Ratio	0.37	0.45		0.05	0.21		0.11	0.26		0.01	0.18	0.12
Control Delay	21.6	12.5		16.5	17.2		8.9	8.2		8.0	9.2	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	21.6	12.5		16.5	17.2		8.9	8.2		8.0	9.2	2.9
LOS	C	B		B	B		A	A		A	A	A
Approach Delay		15.7			17.1			8.4			6.8	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	8.5	7.0		1.0	5.9		2.9	8.3		0.2	7.4	0.0
Queue Length 95th (m)	19.2	20.3		4.4	14.4		8.5	19.6		1.3	16.8	5.9
Internal Link Dist (m)		556.5			360.6			773.9			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	719	947		656	967		1068	1448		1079	1576	1442
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.14	0.20		0.02	0.08		0.05	0.14		0.00	0.09	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 50.7												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.45												
Intersection Signal Delay: 11.3	Intersection LOS: B											
Intersection Capacity Utilization 67.3%	ICU Level of Service C											
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street



HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

















Future Total 2025 - AM
01-23-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰	
Traffic Volume (veh/h)	210	29	20	189	54	75
Future Volume (Veh/h)	210	29	20	189	54	75
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	219	30	21	197	56	78
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			249		473	234
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			249		473	234
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		90	90
cM capacity (veh/h)			1328		545	803
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	249	218	134			
Volume Left	0	21	56			
Volume Right	30	0	78			
cSH	1700	1328	670			
Volume to Capacity	0.15	0.02	0.20			
Queue Length 95th (m)	0.0	0.4	5.9			
Control Delay (s)	0.0	0.9	11.7			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.9	11.7			
Approach LOS			B			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			40.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Total 2025 - AM
01-23-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	270	3	10	245	2	7	1	22	1	0	3
Future Volume (Veh/h)	1	270	3	10	245	2	7	1	22	1	0	3
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	293	3	11	266	2	8	1	24	1	0	3
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	269			297			590	588	296	611	589	269
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			297			590	588	296	611	589	269
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	97	100	100	100
cM capacity (veh/h)	1305			1214			416	419	748	391	419	773
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	297	279	33	4								
Volume Left	1	11	8	1								
Volume Right	3	2	24	3								
cSH	1305	1214	614	621								
Volume to Capacity	0.00	0.01	0.05	0.01								
Queue Length 95th (m)	0.0	0.2	1.4	0.2								
Control Delay (s)	0.0	0.4	11.2	10.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.0	0.4	11.2	10.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			30.7%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Total 2025 - AM

01-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	15	222	24	10	211	5	51	7	5	10	2	10
Future Volume (Veh/h)	15	222	24	10	211	5	51	7	5	10	2	10
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)	15	229	25	10	218	5	53	7	5	10	2	10
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	240			255			525	532	244	538	542	238
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	240			255			525	532	244	538	542	238
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 %	99			99			88	98	99	98	100	99
cM capacity (veh/h)	1320			1321			446	441	799	430	435	793
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	269	233	65	22								
Volume Left	15	10	53	10								
Volume Right	25	5	5	10								
cSH	1320	1321	461	544								
Volume to Capacity	0.01	0.01	0.14	0.04								
Queue Length 95th (m)	0.3	0.2	3.9	1.0								
Control Delay (s)	0.5	0.4	14.1	11.9								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	0.4	14.1	11.9								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			31.5%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis











5: Elm Street & Victoria Street /Victoria Street

Future Total 2025 - AM
01-23-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	37	35	4	20	71	22
Future Volume (Veh/h)	37	35	4	20	71	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	54	51	6	29	103	32
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			105		120	80
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			105		120	80
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			100		88	97
cM capacity (veh/h)			1354		862	986
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	105	35	135			
Volume Left	0	6	103			
Volume Right	51	0	32			
cSH	1700	1354	888			
Volume to Capacity	0.06	0.00	0.15			
Queue Length 95th (m)	0.0	0.1	4.3			
Control Delay (s)	0.0	1.3	9.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.3	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			5.0			
Intersection Capacity Utilization			16.4%	ICU Level of Service	A	
Analysis Period (min)			15			






















HCM Unsignalized Intersection Capacity Analysis 6: Highway 10 & Site Access

Future Total 2025 - AM
01-23-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	168	54	190	235	11
Future Volume (Veh/h)	34	168	54	190	235	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	183	59	207	255	12
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	586	261	267			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	586	261	267			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	76	95			
cM capacity (veh/h)	451	778	1297			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	220	59	207	267		
Volume Left	37	59	0	0		
Volume Right	183	0	0	12		
cSH	693	1297	1700	1700		
Volume to Capacity	0.32	0.05	0.12	0.16		
Queue Length 95th (m)	10.9	1.1	0.0	0.0		
Control Delay (s)	12.6	7.9	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.6	1.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			38.6%	ICU Level of Service		A
Analysis Period (min)			15			













Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2025 - PM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	52	69	113	36	100	11	199	227	38	7	133	96
Future Volume (vph)	52	69	113	36	100	11	199	227	38	7	133	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.907			0.985			0.979				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1665	0	1805	1777	0	1703	1642	0	1805	1759	1599
Flt Permitted	0.676			0.629			0.661			0.577		
Satd. Flow (perm)	1272	1665	0	1195	1777	0	1185	1642	0	1096	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			7			13				109
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			797.9				925.0
Travel Time (s)		41.8			17.3			35.9				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	59	78	128	41	114	13	226	258	43	8	151	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	206	0	41	127	0	226	301	0	8	151	109
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2025 - PM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	10.7	10.7		10.7	10.7		23.0	23.0		23.0	23.0	23.0
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.45	0.45		0.45	0.45	0.45
v/c Ratio	0.22	0.49		0.16	0.34		0.42	0.40		0.02	0.19	0.14
Control Delay	18.9	14.3		18.1	18.8		12.8	11.1		8.3	9.4	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	18.9	14.3		18.1	18.8		12.8	11.1		8.3	9.4	2.9
LOS	B	B		B	B		B	B		A	A	A
Approach Delay		15.3			18.7			11.8			6.7	
Approach LOS		B			B			B			A	
Queue Length 50th (m)	4.7	9.0		3.2	9.8		13.1	16.4		0.4	7.8	0.0
Queue Length 95th (m)	12.2	23.1		9.5	21.0		29.9	34.4		2.2	17.8	6.4
Internal Link Dist (m)		556.5			360.6			773.9			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	689	945		647	965		1059	1470		980	1573	1442
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.09	0.22		0.06	0.13		0.21	0.20		0.01	0.10	0.08
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 50.8												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.49												
Intersection Signal Delay: 12.4	Intersection LOS: B											
Intersection Capacity Utilization 80.7%	ICU Level of Service D											
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street



HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

















Future Total 2025 - PM
01-23-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↘	
Traffic Volume (veh/h)	200	64	56	284	46	45
Future Volume (Veh/h)	200	64	56	284	46	45
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	208	67	58	296	48	47
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			275		654	242
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			275		654	242
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		88	94
cM capacity (veh/h)			1300		415	795
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	275	354	95			
Volume Left	0	58	48			
Volume Right	67	0	47			
cSH	1700	1300	544			
Volume to Capacity	0.16	0.04	0.17			
Queue Length 95th (m)	0.0	1.1	5.0			
Control Delay (s)	0.0	1.7	13.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.7	13.0			
Approach LOS			B			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			47.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

















Future Total 2025 - PM
01-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	317	11	16	336	2	11	0	15	2	0	1
Future Volume (Veh/h)	2	317	11	16	336	2	11	0	15	2	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	345	12	17	365	2	12	0	16	2	0	1
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	368			358			758	758	352	772	763	368
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	368			358			758	758	352	772	763	368
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			96	100	98	99	100	100
cM capacity (veh/h)	1201			1152			321	333	696	307	331	681
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	359	384	28	3								
Volume Left	2	17	12	2								
Volume Right	12	2	16	1								
cSH	1201	1152	463	376								
Volume to Capacity	0.00	0.01	0.06	0.01								
Queue Length 95th (m)	0.0	0.4	1.5	0.2								
Control Delay (s)	0.1	0.5	13.3	14.7								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.1	0.5	13.3	14.7								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.8									
Intersection Capacity Utilization			39.2%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street










Future Total 2025 - PM
01-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	273	60	7	307	1	38	4	7	14	2	3
Future Volume (Veh/h)	8	273	60	7	307	1	38	4	7	14	2	3
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)	8	281	62	7	316	1	39	4	7	14	2	3
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	334			344			664	677	314	686	708	334
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	334			344			664	677	314	686	708	334
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 %	99			99			89	99	99	96	99	100
cM capacity (veh/h)	1219			1225			365	367	730	345	352	701
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	351	324	50	19								
Volume Left	8	7	39	14								
Volume Right	62	1	7	3								
cSH	1219	1225	393	376								
Volume to Capacity	0.01	0.01	0.13	0.05								
Queue Length 95th (m)	0.2	0.1	3.5	1.3								
Control Delay (s)	0.2	0.2	15.5	15.1								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.2	0.2	15.5	15.1								
Approach LOS			C	C								
Intersection Summary												
Average Delay				1.6								
Intersection Capacity Utilization				32.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis











5: Elm Street & Victoria Street /Victoria Street

Future Total 2025 - PM
01-23-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	31	76	17	23	47	12
Future Volume (Veh/h)	31	76	17	23	47	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	45	110	25	33	68	17
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			155		183	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			155		183	100
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			98		91	98
cM capacity (veh/h)			1296		782	961
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	155	58	85			
Volume Left	0	25	68			
Volume Right	110	0	17			
cSH	1700	1296	812			
Volume to Capacity	0.09	0.02	0.10			
Queue Length 95th (m)	0.0	0.5	2.8			
Control Delay (s)	0.0	3.5	9.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.5	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay		3.5				
Intersection Capacity Utilization		18.8%	ICU Level of Service		A	
Analysis Period (min)		15				






















HCM Unsignalized Intersection Capacity Analysis 6: Highway 10 & Site Access

Future Total 2025 - PM
01-23-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	110	188	436	242	40
Future Volume (Veh/h)	29	110	188	436	242	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	120	204	474	263	43
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	1166	284	306			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1166	284	306			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	82	84	84			
cM capacity (veh/h)	179	754	1255			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	152	204	474	306		
Volume Left	32	204	0	0		
Volume Right	120	0	0	43		
cSH	450	1255	1700	1700		
Volume to Capacity	0.34	0.16	0.28	0.18		
Queue Length 95th (m)	11.8	4.6	0.0	0.0		
Control Delay (s)	17.0	8.4	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	17.0	2.5		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			3.8			
Intersection Capacity Utilization			44.0%	ICU Level of Service		A
Analysis Period (min)			15			

Lanes, Volumes, Timings
1: Highway 10 & Main Street













Future Total 2030 - AM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	62	112	11	67	7	54	127	56	4	137	89
Future Volume (vph)	97	62	112	11	67	7	54	127	56	4	137	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.903			0.986			0.954				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1659	0	1805	1780	0	1703	1612	0	1805	1759	1599
Flt Permitted	0.702			0.634			0.658			0.628		
Satd. Flow (perm)	1321	1659	0	1205	1780	0	1179	1612	0	1193	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		105			6			36				101
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			797.9				925.0
Travel Time (s)		41.8			17.3			35.9				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	110	70	127	13	76	8	61	144	64	5	156	101
Shared Lane Traffic (%)												
Lane Group Flow (vph)	110	197	0	13	84	0	61	208	0	5	156	101
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2030 - AM

01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)	10.7	10.7		10.7	10.7		23.0	23.0		23.0	23.0	23.0
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.45	0.45		0.45	0.45	0.45
v/c Ratio	0.40	0.46		0.05	0.22		0.11	0.28		0.01	0.20	0.13
Control Delay	22.0	12.7		16.4	17.2		9.1	8.6		8.2	9.5	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	22.0	12.7		16.4	17.2		9.1	8.6		8.2	9.5	2.9
LOS	C	B		B	B		A	A		A	A	A
Approach Delay		16.1			17.1			8.7			6.9	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	9.1	7.4		1.0	6.2		3.0	9.1		0.3	8.0	0.0
Queue Length 95th (m)	20.3	20.9		4.4	14.9		8.9	21.2		1.7	18.2	6.2
Internal Link Dist (m)		556.5			360.6			773.9			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	715	946		652	966		1054	1445		1066	1572	1440
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.15	0.21		0.02	0.09		0.06	0.14		0.00	0.10	0.07
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 50.8												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.46												
Intersection Signal Delay: 11.5	Intersection LOS: B											
Intersection Capacity Utilization 67.6%	ICU Level of Service C											
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street



HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

















Future Total 2030 - AM
01-23-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↱	↘↙	
Traffic Volume (veh/h)	226	29	20	204	54	78
Future Volume (Veh/h)	226	29	20	204	54	78
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	235	30	21	212	56	81
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			265		504	250
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			265		504	250
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		89	90
cM capacity (veh/h)			1311		523	786
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	265	233	137			
Volume Left	0	21	56			
Volume Right	30	0	81			
cSH	1700	1311	652			
Volume to Capacity	0.16	0.02	0.21			
Queue Length 95th (m)	0.0	0.4	6.3			
Control Delay (s)	0.0	0.8	12.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.8	12.0			
Approach LOS			B			
Intersection Summary						
Average Delay		2.9				
Intersection Capacity Utilization		41.8%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Total 2030 - AM
01-23-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	285	4	11	259	2	7	1	24	1	0	4
Future Volume (Veh/h)	1	285	4	11	259	2	7	1	24	1	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	310	4	12	282	2	8	1	26	1	0	4
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	285			315			627	624	313	648	625	285
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	285			315			627	624	313	648	625	285
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	96	100	100	99
cM capacity (veh/h)	1288			1195			392	399	731	368	399	758
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	315	296	35	5								
Volume Left	1	12	8	1								
Volume Right	4	2	26	4								
cSH	1288	1195	599	625								
Volume to Capacity	0.00	0.01	0.06	0.01								
Queue Length 95th (m)	0.0	0.2	1.5	0.2								
Control Delay (s)	0.0	0.4	11.4	10.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.0	0.4	11.4	10.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			32.2%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Total 2030 - AM

01-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	233	24	11	222	6	51	7	6	11	2	11
Future Volume (Veh/h)	16	233	24	11	222	6	51	7	6	11	2	11
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)	16	240	25	11	229	6	53	7	6	11	2	11
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	252			266			552	560	254	566	569	250
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	252			266			552	560	254	566	569	250
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 %	99			99			88	98	99	97	100	99
cM capacity (veh/h)	1306			1308			427	425	788	411	419	782
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	281	246	66	24								
Volume Left	16	11	53	11								
Volume Right	25	6	6	11								
cSH	1306	1308	445	527								
Volume to Capacity	0.01	0.01	0.15	0.05								
Queue Length 95th (m)	0.3	0.2	4.1	1.1								
Control Delay (s)	0.6	0.4	14.5	12.2								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.6	0.4	14.5	12.2								
Approach LOS			B	B								
Intersection Summary												
Average Delay			2.4									
Intersection Capacity Utilization			32.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis











5: Elm Street & Victoria Street /Victoria Street

Future Total 2030 - AM
01-23-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰	
Traffic Volume (veh/h)	37	35	4	20	71	22
Future Volume (Veh/h)	37	35	4	20	71	22
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	54	51	6	29	103	32
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			105		120	80
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			105		120	80
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			100		88	97
cM capacity (veh/h)			1354		862	986
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	105	35	135			
Volume Left	0	6	103			
Volume Right	51	0	32			
cSH	1700	1354	888			
Volume to Capacity	0.06	0.00	0.15			
Queue Length 95th (m)	0.0	0.1	4.3			
Control Delay (s)	0.0	1.3	9.8			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.3	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			5.0			
Intersection Capacity Utilization			16.4%	ICU Level of Service	A	
Analysis Period (min)			15			






















HCM Unsignalized Intersection Capacity Analysis 6: Highway 10 & Site Access

Future Total 2030 - AM
01-23-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	168	54	204	250	11
Future Volume (Veh/h)	34	168	54	204	250	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	183	59	222	272	12
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	618	278	284			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	618	278	284			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	76	95			
cM capacity (veh/h)	432	761	1278			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	220	59	222	284		
Volume Left	37	59	0	0		
Volume Right	183	0	0	12		
cSH	674	1278	1700	1700		
Volume to Capacity	0.33	0.05	0.13	0.17		
Queue Length 95th (m)	11.3	1.2	0.0	0.0		
Control Delay (s)	12.9	8.0	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	12.9	1.7		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			39.4%	ICU Level of Service		A
Analysis Period (min)			15			













Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2030 - PM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	73	120	37	106	12	211	244	40	7	142	102
Future Volume (vph)	55	73	120	37	106	12	211	244	40	7	142	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.907			0.984			0.979				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1665	0	1805	1775	0	1703	1642	0	1805	1759	1599
Flt Permitted	0.671			0.621			0.655			0.566		
Satd. Flow (perm)	1262	1665	0	1180	1775	0	1174	1642	0	1075	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		94			7			13				116
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			797.9				925.0
Travel Time (s)		41.8			17.3			35.9				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	63	83	136	42	120	14	240	277	45	8	161	116
Shared Lane Traffic (%)												
Lane Group Flow (vph)	63	219	0	42	134	0	240	322	0	8	161	116
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2030 - PM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	11.0	11.0		11.0	11.0		23.2	23.2		23.2	23.2	23.2
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.45	0.45		0.45	0.45	0.45
v/c Ratio	0.23	0.51		0.17	0.35		0.45	0.43		0.02	0.20	0.15
Control Delay	19.0	15.0		18.1	19.0		13.6	11.7		8.6	9.7	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	19.0	15.0		18.1	19.0		13.6	11.7		8.6	9.7	2.9
LOS	B	B		B	B		B	B		A	A	A
Approach Delay		15.9			18.8			12.5			6.9	
Approach LOS		B			B			B			A	
Queue Length 50th (m)	5.0	10.2		3.3	10.4		14.2	17.9		0.4	8.3	0.0
Queue Length 95th (m)	13.0	25.4		9.7	22.2		33.2	38.5		2.4	19.6	6.8
Internal Link Dist (m)		556.5			360.6			773.9			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	677	937		633	956		1040	1457		953	1559	1430
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.09	0.23		0.07	0.14		0.23	0.22		0.01	0.10	0.08
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 51.3												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.51												
Intersection Signal Delay: 12.9	Intersection LOS: B											
Intersection Capacity Utilization 81.4%	ICU Level of Service D											
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street



HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

















Future Total 2030 - PM
01-23-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰	
Traffic Volume (veh/h)	216	64	57	306	47	47
Future Volume (Veh/h)	216	64	57	306	47	47
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	225	67	59	319	49	49
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			292	696		258
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			292	696		258
tC, single (s)			4.1	6.4		6.2
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.3
p0 queue free %			95	88		94
cM capacity (veh/h)			1281	392		778
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	292	378	98			
Volume Left	0	59	49			
Volume Right	67	0	49			
cSH	1700	1281	521			
Volume to Capacity	0.17	0.05	0.19			
Queue Length 95th (m)	0.0	1.2	5.5			
Control Delay (s)	0.0	1.6	13.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.6	13.5			
Approach LOS						
B						
Intersection Summary						
Average Delay						
			2.5			
Intersection Capacity Utilization			50.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Total 2030 - PM
01-23-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	334	12	18	355	2	12	0	16	2	0	1
Future Volume (Veh/h)	2	334	12	18	355	2	12	0	16	2	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	2	363	13	20	386	2	13	0	17	2	0	1
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	389			377			804	804	370	818	809	389
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	389			377			804	804	370	818	809	389
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			96	100	97	99	100	100
cM capacity (veh/h)	1180			1133			298	312	679	285	310	663
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	378	408	30	3								
Volume Left	2	20	13	2								
Volume Right	13	2	17	1								
cSH	1180	1133	437	351								
Volume to Capacity	0.00	0.02	0.07	0.01								
Queue Length 95th (m)	0.0	0.4	1.8	0.2								
Control Delay (s)	0.1	0.6	13.8	15.3								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.6	13.8	15.3								
Approach LOS			B	C								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			41.7%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Total 2030 - PM










01-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	287	60	7	323	1	39	5	7	15	2	4
Future Volume (Veh/h)	8	287	60	7	323	1	39	5	7	15	2	4
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)	8	296	62	7	333	1	40	5	7	15	2	4
Pedestrians	1			1			1			17		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	0			0			0			1		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	351			359			698	709	329	718	740	352
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	351			359			698	709	329	718	740	352
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 %	99			99			88	99	99	95	99	99
cM capacity (veh/h)	1202			1210			346	352	716	328	338	686
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	366	341	52	21								
Volume Left	8	7	40	15								
Volume Right	62	1	7	4								
cSH	1202	1210	373	365								
Volume to Capacity	0.01	0.01	0.14	0.06								
Queue Length 95th (m)	0.2	0.1	3.8	1.5								
Control Delay (s)	0.2	0.2	16.2	15.5								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.2	0.2	16.2	15.5								
Approach LOS			C	C								
Intersection Summary												
Average Delay				1.7								
Intersection Capacity Utilization				33.2%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis











5: Elm Street & Victoria Street /Victoria Street

Future Total 2030 - PM
01-23-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	31	76	17	23	47	12
Future Volume (Veh/h)	31	76	17	23	47	12
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	45	110	25	33	68	17
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			155		183	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			155		183	100
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			98		91	98
cM capacity (veh/h)			1296		782	961
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	155	58	85			
Volume Left	0	25	68			
Volume Right	110	0	17			
cSH	1700	1296	812			
Volume to Capacity	0.09	0.02	0.10			
Queue Length 95th (m)	0.0	0.5	2.8			
Control Delay (s)	0.0	3.5	9.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	3.5	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay		3.5				
Intersection Capacity Utilization		18.8%	ICU Level of Service	A		
Analysis Period (min)		15				






















HCM Unsignalized Intersection Capacity Analysis 6: Highway 10 & Site Access

Future Total 2030 - PM
01-23-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	110	188	466	258	40
Future Volume (Veh/h)	29	110	188	466	258	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	120	204	507	280	43
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	1216	302	323			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1216	302	323			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	81	84	84			
cM capacity (veh/h)	167	738	1237			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	152	204	507	323		
Volume Left	32	204	0	0		
Volume Right	120	0	0	43		
cSH	429	1237	1700	1700		
Volume to Capacity	0.35	0.16	0.30	0.19		
Queue Length 95th (m)	12.6	4.7	0.0	0.0		
Control Delay (s)	17.9	8.5	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	17.9	2.4		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay				3.8		
Intersection Capacity Utilization				44.8%	ICU Level of Service	A
Analysis Period (min)				15		













Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2035 - AM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	103	65	118	12	72	8	57	136	59	4	148	95
Future Volume (vph)	103	65	118	12	72	8	57	136	59	4	148	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.903			0.985			0.955				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1659	0	1805	1778	0	1703	1613	0	1805	1759	1599
Flt Permitted	0.698			0.628			0.651			0.620		
Satd. Flow (perm)	1313	1659	0	1193	1778	0	1167	1613	0	1178	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		104			6			35				108
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			797.9				925.0
Travel Time (s)		41.8			17.3			35.9				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	117	74	134	14	82	9	65	155	67	5	168	108
Shared Lane Traffic (%)												
Lane Group Flow (vph)	117	208	0	14	91	0	65	222	0	5	168	108
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2035 - AM
01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effect Green (s)	10.9	10.9		10.9	10.9		23.0	23.0		23.0	23.0	23.0
Actuated g/C Ratio	0.21	0.21		0.21	0.21		0.45	0.45		0.45	0.45	0.45
v/c Ratio	0.42	0.48		0.06	0.24		0.12	0.30		0.01	0.21	0.14
Control Delay	22.4	13.4		16.3	17.4		9.4	9.0		8.5	9.7	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	22.4	13.4		16.3	17.4		9.4	9.0		8.5	9.7	2.9
LOS	C	B		B	B		A	A		A	A	A
Approach Delay		16.7			17.2			9.1			7.1	
Approach LOS		B			B			A			A	
Queue Length 50th (m)	9.7	8.4		1.1	6.8		3.2	9.9		0.3	8.7	0.0
Queue Length 95th (m)	21.2	22.5		4.6	16.0		9.6	23.1		1.7	19.8	6.4
Internal Link Dist (m)		556.5			360.6			773.9			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	708	943		643	962		1039	1440		1049	1567	1436
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.17	0.22		0.02	0.09		0.06	0.15		0.00	0.11	0.08
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 51												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.48												
Intersection Signal Delay: 11.8	Intersection LOS: B											
Intersection Capacity Utilization 68.0%	ICU Level of Service C											
Analysis Period (min) 15												

Splits and Phases: 1: Highway 10 & Main Street



HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

















Future Total 2035 - AM
01-23-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↶			↷	↶	↷
Traffic Volume (veh/h)	244	30	21	220	55	82
Future Volume (Veh/h)	244	30	21	220	55	82
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	254	31	22	229	57	85
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			285		542	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			285		542	270
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		89	89
cM capacity (veh/h)			1289		496	767
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	285	251	142			
Volume Left	0	22	57			
Volume Right	31	0	85			
cSH	1700	1289	629			
Volume to Capacity	0.17	0.02	0.23			
Queue Length 95th (m)	0.0	0.4	6.9			
Control Delay (s)	0.0	0.8	12.4			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.8	12.4			
Approach LOS			B			
Intersection Summary						
Average Delay		2.9				
Intersection Capacity Utilization		43.8%	ICU Level of Service	A		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

Future Total 2035 - AM
01-23-2020

















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	302	4	11	273	3	8	1	25	1	0	4
Future Volume (Veh/h)	1	302	4	11	273	3	8	1	25	1	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	1	328	4	12	297	3	9	1	27	1	0	4
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	301			333			660	658	331	683	658	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	301			333			660	658	331	683	658	300
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			98	100	96	100	100	99
cM capacity (veh/h)	1270			1177			373	382	715	348	382	743
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	333	312	37	5								
Volume Left	1	12	9	1								
Volume Right	4	3	27	4								
cSH	1270	1177	573	605								
Volume to Capacity	0.00	0.01	0.06	0.01								
Queue Length 95th (m)	0.0	0.2	1.7	0.2								
Control Delay (s)	0.0	0.4	11.7	11.0								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.0	0.4	11.7	11.0								
Approach LOS			B	B								
Intersection Summary												
Average Delay			0.9									
Intersection Capacity Utilization			33.0%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street

Future Total 2035 - AM

01-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	18	246	25	11	234	6	52	8	6	11	3	11
Future Volume (Veh/h)	18	246	25	11	234	6	52	8	6	11	3	11
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)	19	254	26	11	241	6	54	8	6	11	3	11
Pedestrians		1			1			1			17	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		0			0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	264			281			586	592	269	599	602	262
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	264			281			586	592	269	599	602	262
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 %	99			99			87	98	99	97	99	99
cM capacity (veh/h)	1293			1292			404	406	773	389	401	770
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	299	258	68	25								
Volume Left	19	11	54	11								
Volume Right	26	6	6	11								
cSH	1293	1292	422	500								
Volume to Capacity	0.01	0.01	0.16	0.05								
Queue Length 95th (m)	0.4	0.2	4.6	1.3								
Control Delay (s)	0.6	0.4	15.2	12.6								
Lane LOS	A	A	C	B								
Approach Delay (s)	0.6	0.4	15.2	12.6								
Approach LOS			C	B								
Intersection Summary												
Average Delay			2.5									
Intersection Capacity Utilization			34.3%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis











5: Elm Street & Victoria Street /Victoria Street

Future Total 2035 - AM
01-23-2020

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↱			↰	↰	
Traffic Volume (veh/h)	43	38	5	23	74	25
Future Volume (Veh/h)	43	38	5	23	74	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	62	55	7	33	107	36
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			117		136	90
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			117		136	90
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			99		87	96
cM capacity (veh/h)			1340		843	974
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	117	40	143			
Volume Left	0	7	107			
Volume Right	55	0	36			
cSH	1700	1340	873			
Volume to Capacity	0.07	0.01	0.16			
Queue Length 95th (m)	0.0	0.1	4.7			
Control Delay (s)	0.0	1.4	9.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.4	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization			17.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 6: Highway 10 & Site Access






















Future Total 2035 - AM
01-23-2020

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	168	54	218	266	11
Future Volume (Veh/h)	34	168	54	218	266	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	37	183	59	237	289	12
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	650	295	301			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	650	295	301			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	75	95			
cM capacity (veh/h)	413	744	1260			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	220	59	237	301		
Volume Left	37	59	0	0		
Volume Right	183	0	0	12		
cSH	656	1260	1700	1700		
Volume to Capacity	0.34	0.05	0.14	0.18		
Queue Length 95th (m)	11.8	1.2	0.0	0.0		
Control Delay (s)	13.2	8.0	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	13.2	1.6	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	4.1					
Intersection Capacity Utilization	40.2%			ICU Level of Service	A	
Analysis Period (min)	15					

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2035 - PM













01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	78	127	38	112	13	223	262	42	8	151	108
Future Volume (vph)	59	78	127	38	112	13	223	262	42	8	151	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	120.0		0.0	100.0		0.0	110.0		0.0	90.0		85.0
Storage Lanes	1		0	1		0	1		0	1		1
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.907			0.984			0.979				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	1665	0	1805	1774	0	1703	1642	0	1805	1759	1599
Flt Permitted	0.666			0.613			0.649			0.553		
Satd. Flow (perm)	1253	1665	0	1165	1774	0	1163	1642	0	1051	1759	1599
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		93			7			13				123
Link Speed (k/h)		50			80			80				80
Link Distance (m)		580.5			384.6			797.9				925.0
Travel Time (s)		41.8			17.3			35.9				41.6
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	1%	6%	2%	0%	4%	17%	6%	14%	9%	0%	8%	1%
Adj. Flow (vph)	67	89	144	43	127	15	253	298	48	9	172	123
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	233	0	43	142	0	253	346	0	9	172	123
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)		3.6			3.6			3.6				3.6
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	2.0
Trailing Detector (m)	0.0	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	0.0
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	2.0
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	0.0
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
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		Perm	NA	Perm
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
1: Highway 10 & Main Street

Future Total 2035 - PM

01-23-2020

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		6
Detector Phase	4	4		8	8		2	2		6	6	6
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		20.0	20.0		20.0	20.0	20.0
Minimum Split (s)	32.6	32.6		32.6	32.6		32.6	32.6		32.6	32.6	32.6
Total Split (s)	35.0	35.0		35.0	35.0		55.0	55.0		55.0	55.0	55.0
Total Split (%)	38.9%	38.9%		38.9%	38.9%		61.1%	61.1%		61.1%	61.1%	61.1%
Maximum Green (s)	27.5	27.5		27.5	27.5		47.4	47.4		47.4	47.4	47.4
Yellow Time (s)	5.9	5.9		5.9	5.9		5.9	5.9		5.9	5.9	5.9
All-Red Time (s)	1.6	1.6		1.6	1.6		1.7	1.7		1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		2.0	2.0		2.0	2.0	2.0
Total Lost Time (s)	7.5	7.5		7.5	7.5		9.6	9.6		9.6	9.6	9.6
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.5	4.5		4.5	4.5	4.5
Recall Mode	None	None		None	None		Ped	Ped		Ped	Ped	Ped
Walk Time (s)	15.0	15.0		15.0	15.0		15.0	15.0		15.0	15.0	15.0
Flash Dont Walk (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	0
Act Effct Green (s)	11.3	11.3		11.3	11.3		23.6	23.6		23.6	23.6	23.6
Actuated g/C Ratio	0.22	0.22		0.22	0.22		0.45	0.45		0.45	0.45	0.45
v/c Ratio	0.25	0.54		0.17	0.36		0.48	0.46		0.02	0.22	0.16
Control Delay	19.4	16.1		18.4	19.4		14.3	12.3		8.9	10.0	2.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	19.4	16.1		18.4	19.4		14.3	12.3		8.9	10.0	2.9
LOS	B	B		B	B		B	B		A	A	A
Approach Delay		16.8			19.2			13.1			7.1	
Approach LOS		B			B			B			A	
Queue Length 50th (m)	5.4	11.6		3.4	11.1		15.2	19.6		0.4	9.0	0.0
Queue Length 95th (m)	14.2	28.6		10.2	24.2		36.7	43.2		2.6	21.5	7.1
Internal Link Dist (m)		556.5			360.6			773.9			901.0	
Turn Bay Length (m)	120.0			100.0			110.0			90.0		85.0
Base Capacity (vph)	664	926		618	944		1018	1439		920	1540	1415
Starvation Cap Reductn	0	0		0	0		0	0		0	0	0
Spillback Cap Reductn	0	0		0	0		0	0		0	0	0
Storage Cap Reductn	0	0		0	0		0	0		0	0	0
Reduced v/c Ratio	0.10	0.25		0.07	0.15		0.25	0.24		0.01	0.11	0.09
Intersection Summary												
Area Type:	Other											
Cycle Length: 90												
Actuated Cycle Length: 52												
Natural Cycle: 70												
Control Type: Semi Act-Uncoord												
Maximum v/c Ratio: 0.54												
Intersection Signal Delay: 13.4					Intersection LOS: B							
Intersection Capacity Utilization 82.1%					ICU Level of Service E							
Analysis Period (min) 15												










Splits and Phases: 1: Highway 10 & Main Street



HCM Unsignalized Intersection Capacity Analysis

2: Russell Street & Main Street

















Future Total 2035 - PM
01-23-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	232	65	59	330	48	49
Future Volume (Veh/h)	232	65	59	330	48	49
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	242	68	61	344	50	51
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			310		742	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			310		742	276
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		86	93
cM capacity (veh/h)			1262		367	760
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	310	405	101			
Volume Left	0	61	50			
Volume Right	68	0	51			
cSH	1700	1262	497			
Volume to Capacity	0.18	0.05	0.20			
Queue Length 95th (m)	0.0	1.2	6.0			
Control Delay (s)	0.0	1.6	14.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.6	14.1			
Approach LOS			B			
Intersection Summary						
Average Delay		2.5				
Intersection Capacity Utilization		52.5%	ICU Level of Service	A		
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

3: Alice Street/Mill Street & Main Street

















Future Total 2035 - PM
01-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	352	13	19	375	3	13	0	18	3	0	1
Future Volume (Veh/h)	3	352	13	19	375	3	13	0	18	3	0	1
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
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
Hourly flow rate (vph)	3	383	14	21	408	3	14	0	20	3	0	1
Pedestrians		1						1			1	
Lane Width (m)		3.6						3.6			3.6	
Walking Speed (m/s)		1.2						1.2			1.2	
Percent Blockage		0						0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	412			398			850	851	391	868	856	412
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	412			398			850	851	391	868	856	412
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			95	100	97	99	100	100
cM capacity (veh/h)	1157			1112			277	292	661	261	290	644
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	400	432	34	4								
Volume Left	3	21	14	3								
Volume Right	14	3	20	1								
cSH	1157	1112	421	307								
Volume to Capacity	0.00	0.02	0.08	0.01								
Queue Length 95th (m)	0.1	0.5	2.1	0.3								
Control Delay (s)	0.1	0.6	14.3	16.9								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.6	14.3	16.9								
Approach LOS			B	C								
Intersection Summary												
Average Delay			1.0									
Intersection Capacity Utilization			42.8%	ICU Level of Service					A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

4: Osprey Street & Main Street










Future Total 2035 - PM
01-23-2020

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	301	61	8	340	1	39	5	8	16	3	4
Future Volume (Veh/h)	9	301	61	8	340	1	39	5	8	16	3	4
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)	9	310	63	8	351	1	40	5	8	16	3	4
Pedestrians	1			1			1			17		
Lane Width (m)	3.6			3.6			3.6			3.6		
Walking Speed (m/s)	1.2			1.2			1.2			1.2		
Percent Blockage	0			0			0			1		
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	369			374			734	746	344	756	776	370
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			374			734	746	344	756	776	370
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 %	99			99			88	99	99	95	99	99
cM capacity (veh/h)	1184			1195			326	335	703	308	321	670
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	382	360	53	23								
Volume Left	9	8	40	16								
Volume Right	63	1	8	4								
cSH	1184	1195	355	342								
Volume to Capacity	0.01	0.01	0.15	0.07								
Queue Length 95th (m)	0.2	0.2	4.1	1.7								
Control Delay (s)	0.3	0.2	16.9	16.3								
Lane LOS	A	A	C	C								
Approach Delay (s)	0.3	0.2	16.9	16.3								
Approach LOS			C	C								
Intersection Summary												
Average Delay				1.8								
Intersection Capacity Utilization				34.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis











5: Elm Street & Victoria Street /Victoria Street

Future Total 2035 - PM
01-23-2020

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	36	79	20	27	49	14
Future Volume (Veh/h)	36	79	20	27	49	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69
Hourly flow rate (vph)	52	114	29	39	71	20
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			166		206	109
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			166		206	109
tC, single (s)			4.3		6.5	6.2
tC, 2 stage (s)						
tF (s)			2.4		3.6	3.3
p0 queue free %			98		91	98
cM capacity (veh/h)			1284		756	950
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	166	68	91			
Volume Left	0	29	71			
Volume Right	114	0	20			
cSH	1700	1284	792			
Volume to Capacity	0.10	0.02	0.11			
Queue Length 95th (m)	0.0	0.6	3.1			
Control Delay (s)	0.0	3.5	10.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	3.5	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay		3.6				
Intersection Capacity Utilization		19.4%	ICU Level of Service		A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis 6: Highway 10 & Site Access

Future Total 2035 - PM
01-23-2020

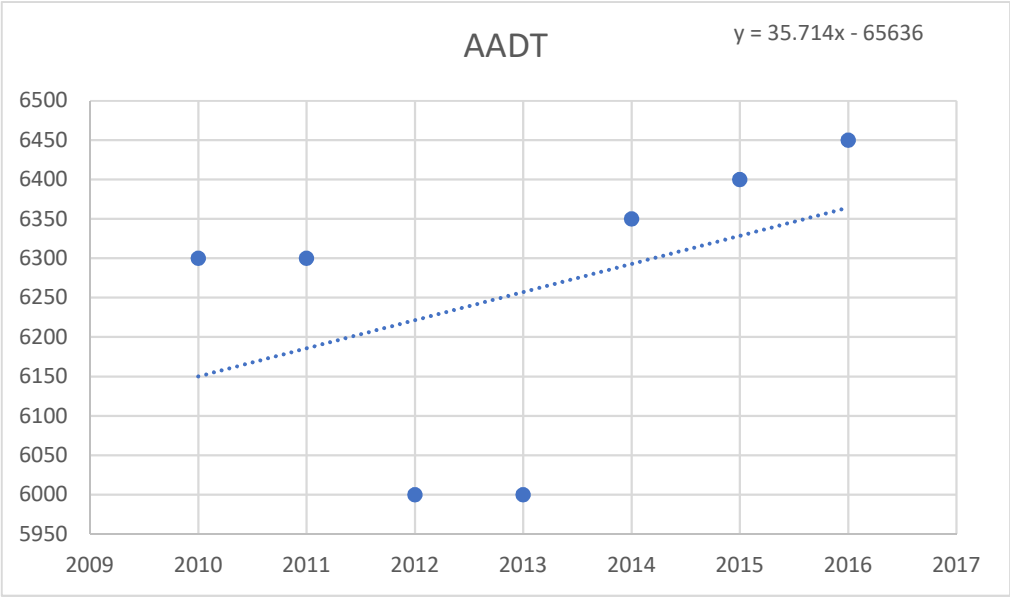
						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	29	110	188	499	276	40
Future Volume (Veh/h)	29	110	188	499	276	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	120	204	542	300	43
Pedestrians						
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	1272	322	343			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1272	322	343			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	83	83			
cM capacity (veh/h)	154	719	1216			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	152	204	542	343		
Volume Left	32	204	0	0		
Volume Right	120	0	0	43		
cSH	406	1216	1700	1700		
Volume to Capacity	0.37	0.17	0.32	0.20		
Queue Length 95th (m)	13.6	4.8	0.0	0.0		
Control Delay (s)	19.1	8.6	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	19.1	2.3		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay				3.7		
Intersection Capacity Utilization				45.8%	ICU Level of Service	A
Analysis Period (min)				15		

APPENDIX D

Growth Rate Analysis

MTO Data - Hwy 10 b/w Shelburn and Flesherton

Year	AADT		AADT
2010	6300		2010 6149.14
2011	6300		2016 6363.424
2012	6000		Growth Rate 0.57%
2013	6000		
2014	6350		
2015	6400		
2016	6450		





Ministry of
Transportation

Highway
Standards
Branch

Traffic
Office

Provincial Highways

Traffic Volumes

1988-2016

King's Highways / Secondary Highways / Tertiary Roads

Ministry Contact:

Traffic Office (905)-704-2960

Abstract:

This annual publication contains averaged traffic volume information and accident rate information for each of the sections of highway under MTO jurisdiction.

Key Words:

Annual Average Daily Traffic volume (AADT), Summer Average Daily Traffic volume (SADT), Summer Average Weekday Traffic volume (SAWDT), Winter Average Daily Traffic volume (WADT), Accident Rate (AR)

PREFACE

Traffic volume information is used by many people to assist them in assessing the viability of business proposals, land use options, marketing, advertising, and a host of other activities. This publication, **Provincial Highways Traffic Volumes 1988-2016**, provides traffic volumes on an annual and seasonal average basis for selected links in the provincial highway network. The traffic pattern type and accident rates on the selected links are also indicated.

Some highway routes which have not yet been assigned an official highway number, are included under the title Selected 7000 Series Highways. **The Highway 407 ETR is maintained by 407 ETR Concession Company Ltd. and is not included in this publication. For information contact the 407 ETR Traffic**

Department at (905) 265-4070. Site or time specific information not contained herein may be obtained from the Ministry of Transportation's Regional Traffic Sections, located in London, Toronto, Kingston, North Bay and Thunder Bay. Contact MTO INFO at 1-800-268-4686 for the appropriate regional phone number.

The statistics contained herein have been prepared based on data (both electronic and otherwise) obtained from sources considered to be reliable. The Ministry makes no representation or warranty, expressed or implied with respect to its accuracy or completeness. This publication also supersedes any previously published publications.

Highway	Location Description	Dist. (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT	AR
			2002	IR	16,200	19,800	17,400	14,200	0.6
			2003	IR	16,600	20,300	17,800	14,600	0.6
			2004	IR	16,900	20,200	18,000	14,900	1.1
			2005	IR	17,200	20,500	18,200	15,100	0.0
			2006	IR	17,600	21,200	19,200	14,900	2.1
			2007	IR	17,900	21,700	21,600	15,200	0.5
			2008	IR	18,200	22,000	21,600	15,600	0.0
			2009	IR	18,800	22,200	19,800	16,500	0.5
			2010	IR	19,200	22,500	20,100	16,800	0.0
			2011	IR	19,200	22,800	22,500	16,300	N/A
			2012	IR	19,200	22,800	22,300	16,500	N/A
			2013	IR	19,400	23,100	24,800	16,500	N/A
			2014	IR	20,300	24,200	24,200	17,300	N/A
			2015	IR	20,700	24,600	24,600	17,600	N/A
			2016	IR	21,000	25,000	25,000	17,900	N/A
10	SHELBURNE S LTS - START OF NA	1.0							
10	SHELBURNE N LTS - END OF NA	33.7	1988	LT	4,300	5,500	4,700	3,400	1.1
			1989	LT	4,500	5,800	4,950	3,650	1.4
			1990	LT	4,850	6,100	5,300	3,950	0.8
			1991	LT	5,150	6,400	5,700	4,250	1.0
			1992	LT	4,900	6,000	5,300	4,150	1.2
			1993	LT	5,050	6,200	5,200	4,200	0.6
			1994	LT	5,100	6,400	5,450	4,350	1.1
			1995	LT	5,250	6,500	5,600	4,400	0.8
			1996	LT	4,950	6,150	5,450	4,350	1.0
			1997	LT	5,550	6,900	6,100	4,900	0.9
			1998	LT	5,750	7,050	6,350	5,050	0.5
			1999	LT	5,900	7,250	6,450	5,150	0.8
			2000	LT	5,650	6,850	6,050	4,950	0.8
			2001	LT	5,750	7,000	6,150	5,000	0.6
			2002	LT	6,300	7,700	6,750	5,500	0.8
			2003	LT	5,900	7,200	6,300	5,200	0.9
			2004	LT	5,800	7,250	6,500	4,700	1.0

Highway	Location Description	Dist. (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT	AR
			2005	LT	5,950	7,400	6,600	4,800	0.8
			2006	LT	5,900	7,100	6,450	5,000	0.8
			2007	LT	6,100	7,400	7,350	5,150	1.0
			2008	LT	5,900	7,150	7,000	5,050	0.5
			2009	LT	6,250	7,100	6,900	5,650	0.5
			2010	LT	6,300	7,150	6,900	5,700	0.3
			2011	LT	6,300	7,500	7,350	5,350	N/A
			2012	LT	6,000	8,050	7,700	4,450	N/A
			2013	LT	6,000	8,050	8,200	4,450	N/A
			2014	LT	6,350	8,550	8,650	4,700	N/A
			2015	LT	6,400	8,600	8,700	4,750	N/A
			2016	LT	6,450	8,650	8,800	4,800	N/A
10	CAMPBELL ST-FLESHERTON - START OF NA	0.5							
10	MARGARET ST - END OF NA	9.0	1988	LT	4,150	5,300	4,550	3,300	1.0
			1989	LT	4,350	5,600	4,800	3,550	0.6
			1990	LT	4,550	5,700	5,000	3,700	0.5
			1991	LT	4,550	5,700	5,000	3,750	0.9
			1992	LT	4,650	5,700	5,100	3,950	0.5
			1993	LT	4,800	5,800	5,100	4,100	0.3
			1994	LT	4,900	6,000	5,300	4,150	0.6
			1995	LT	5,050	6,200	5,450	4,400	0.7
			1996	LT	5,050	6,250	5,550	4,450	0.7
			1997	LT	5,350	6,650	5,900	4,700	1.0
			1998	LT	5,450	6,700	6,000	4,750	0.5
			1999	LT	5,700	7,000	6,200	5,000	0.7
			2000	LT	5,900	7,150	6,350	5,150	1.1
			2001	LT	6,050	7,400	6,450	5,250	0.8
			2002	LT	6,300	7,700	6,750	5,500	0.6
			2003	LT	6,650	8,100	7,100	5,850	0.6
			2004	LT	6,600	7,900	7,000	5,800	0.9
			2005	LT	6,650	7,950	7,050	5,800	0.7
			2006	LT	6,600	7,950	7,200	5,600	0.8
			2007	LT	6,700	8,100	8,100	5,700	0.6

APPENDIX E

Glenelg TIS (Crozier, September 2018) Excerpts

TRAFFIC IMPACT STUDY

**2358737 ONTARIO INC.
TOWNSHIP OF SOUTHGATE**

GLENELG RESIDENTIAL DEVELOPMENT

PREPARED BY:

**C.F. CROZIER & ASSOCIATES INC.
40 HURON STREET
COLLINGWOOD, ONTARIO
L9Y 4R3**

SEPTEMBER 2018

CFCA FILE NO. 1060-4171

The material in this report reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. C.F. Crozier & Associates Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.



2 INTRODUCTION

2.1 Background

CF Crozier & Associates Inc. (Crozier) was retained by 2358737 Ontario Inc. ("the Developer") to complete a Traffic Impact Study (TIS) to support a Zoning By-law Amendment, Official Plan Amendment and Draft Plan Application for a proposed residential development located in the west end of the Community of Dundalk, Township of Southgate, County of Grey.

2.2 Purpose

This TIS is being prepared to support the Zoning By-law Amendment, Official Plan Amendment and Draft Plan Application for the proposed residential development (referred to as "Glenelg") in the Community of Dundalk.

The purpose of the study was to assess the impacts of the proposed development on the boundary road network and to recommend any mitigation measures, if warranted.

The study reviews the following main aspects of the proposed residential development from a transportation engineering perspective:

- Existing, future background, and future total traffic operations at the study intersections
- Forecasted trip generation of the proposed development
- Auxiliary lane requirements at the proposed site accesses
- Sight distance requirements at the proposed site accesses

The Terms of Reference for the study were confirmed with staff from Triton Engineering, who are the engineering reviewers for the Township of Southgate, with correspondence included in **Appendix A**.

2.3 Development Proposal

The site statistics proposed on the Draft Plan have been summarized in **Table 1** below. Access to the site will be provided by two accesses to Glenelg Street, spaced approximately 220 metres apart. The two internal roads connecting to Glenelg Street are described as Street "A" and Street "B" on the Draft Plan. Street "B" is located approximately 130 metres west of the intersection of Dundalk Street and Glenelg Street/Grey Street.

The development also proposes an internal walkway and pedestrian connection to the open space, park space and the existing Grey County CP Rail Trail.

It has been assumed that for the purposes of this analysis, the entire development will be built in one phase.

Table 1: Development Site Statistics

Development Type	Unit Type	Conceptual Site Plan (October 25, 2017)
Residential	Single Family Detached	127
	Townhomes	26

The Draft Plan prepared by MHBC Planning (September 24, 2018) has been included as **Figure 1**.

“B” or better under 2028 future background conditions, with minimal delays and reserve capacity for increases in traffic volumes.

5 SITE GENERATED TRAFFIC

The proposed development will result in additional vehicles on the boundary road network that previously did not exist. The proposed development will also result in additional turning movements at the boundary road intersections.

5.1 Trip Generation

The trip generation of the single detached residential lots was forecasted using the fitted curve equations provided in the ITE Trip Generation Manual, 10th Edition, under the Land Use Category 210 “Single Family Detached Dwelling”.

The trip generation of the townhouse residential lots was forecasted using the fitted curve equations provided in the ITE Trip Generation Manual, 10th Edition, under the Land Use Category 220 “Multifamily Housing (Low-Rise)”.

The trip generation of Glenelg is summarized in **Table 8**. Relevant excerpts from the ITE Trip Generation Manual, 10th Edition are included in **Appendix I**.

Table 8: Glenelg Trip Generation

Use	Trip Type	Peak Hour	Number of Trips		
			Inbound	Outbound	Total
L.U. 210: Single Family Detached Housing (Glenelg: 127 Units)	Primary	Weekday A.M.	23	71	94
	Primary	Weekday P.M.	81	47	128
L.U. 220: Multifamily Housing (Low-Rise) (Glenelg: 26 Units)	Primary	Weekday A.M.	3	10	13
	Primary	Weekday P.M.	11	7	18
Total	Primary	Weekday A.M.	26	81	107
	Primary	Weekday P.M.	92	54	146

5.2 Trip Distribution and Assignment

The trip distribution utilized in the Flato North and East development was used as a basis for the Glenelg development. This distribution was compared with recent Transportation Tomorrow Survey (TTS) data for the Township of Melancthon. The TTS is a comprehensive survey of transportation characteristics in the Golden Horseshoe, Simcoe County and Grey County areas. In order to obtain survey data most applicable to the Subject Property, TTS data was filtered for the Township of Melancthon. TTS data is not available for the Community of Dundalk, accordingly, the Township of Melancthon (abutting the Dundalk to the south and east) was selected as it is considered most representative of the subject area.

The TTS data was found to be consistent with the distribution utilized in the Flato East and Flato North TIS, and thus was used for this analysis. TTS Data has been included in **Appendix J**. The trip distribution is as follows:

- 10 % to/from the north on Ida Street
- 10% to/from the west on Ida Street
- 10% to/from the east on Grey Road 9
- 50% to/from the south on Highway 10
- 20% to/from Dundalk (downtown)

Of the 20 percent remaining in Dundalk, five percent were assumed to travel south on Dundalk Street and then turn right to travel west on Main Street West. The remaining 15 percent were assumed to travel east on Grey Street South and use Proton Street North to access the main downtown commercial corridor.

The development was analyzed under a consolidated access configuration to obtain a conservative analysis. The future operations of the site accesses to Glenelg Street are expected to be better than listed herein as traffic volumes will be diffused across both accesses.

The trips generated by the proposed development were assigned to the boundary road network per the distributions illustrated in **Figure 9**. The corresponding trip assignment is illustrated in **Figure 10**.

6 TOTAL FUTURE CONDITIONS

6.1 Basis of Assessment

The traffic impacts arising from the proposed development were assessed on the basis of the site generated traffic, illustrated in **Figure 10** being superimposed on the future background traffic volumes in **Figures 7 and 8**. The resulting total traffic volumes for the weekday a.m. and p.m. peak hours are illustrated in **Figures 11 and 12** for the 2023 through 2028 horizon years.

6.2 Auxiliary Lane Assessment

Traffic volumes at the intersections of Ida Street and Glenelg Street, Glenelg Street and the Site Access, and Dundalk Street and Main Street West do not meet the threshold to warrant auxiliary left-turn lanes. Accordingly, the future total traffic volumes were analyzed under existing lane configurations. The intersection of Glenelg Street and the Site Access was analyzed with shared through/turn lanes on all approaches.

The left-turn lane warrant charts for 60 km/h design speed roads have been included in **Appendix K** for reference.

The requirement for a westbound right-turn lane at the site entrance was also analyzed. According to the TAC GDGCR, a right-turn lane is required when the volume of vehicles compared with the through traffic volume causes undue hazard. In the 2028 horizon year, 20 and 74 vehicles are forecasted to make a westbound right-turn at the site entrance. This can be compared with the westbound through volumes of 12 and 29 in the a.m. and p.m. peak hours, respectively. Considering these volumes in combination with the traffic modelling results, it is demonstrated that a right-turn lane is not required to facilitate right turns at the site entrance. The intersection is anticipated to operate at an excellent level of service, and the through movements are not expected to be impeded.

6.3 Intersection Operations

The 2023 through 2028 future total traffic operations of the boundary road network are summarized in **Table 9 and Table 10**. The detailed capacity analysis is included in **Appendix F**, and LOS definitions are included in **Appendix E**.



LEGAL DESCRIPTION

PART OF LOTS 227 AND 228
CONCESSION 2, SOUTHWEST OF THE TORONTO AND SYDENHAM ROAD
ALL OF LOT Y AND PART OF THE UNNAMED STREET,
LYING NORTHEAST OF PART LOT 3, BLOCK S, PLAN 480
GEOGRAPHIC TOWNSHIP OF PROTON
TOWNSHIP OF SOUTHGATE
COUNTY OF GREY

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED
TO SUBMIT THIS PLAN FOR APPROVAL.

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN
AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY
SHOWN.

KEY PLAN

LEGEND

- PROJECT BOUNDARY LINE
- RIGHT OF WAY LINE
- BLOCK LINE
- LOT LINE
- 0.3m RESERVE
- PARCEL FABRIC

REVISION No.	DATE	ISSUED / REVISION	BY
ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT R.S.O. 1990 C.P.13 AS AMENDED			
A. AS SHOWN	E. AS SHOWN	J. AS SHOWN	
B. AS SHOWN	F. AS SHOWN	K. ALL MUNICIPAL SERVICES AS REQUIRED	
C. AS SHOWN	G. AS SHOWN	L. AS SHOWN	
D. 127 SINGLE DETACHED LOTS & 56 TOWNHOUSE UNITS	H. MUNICIPAL WATER SUPPLY I. LOAM/SILT LOAM		

**PLANNING
URBAN DESIGN
& LANDSCAPE
ARCHITECTURE
MHBC PLANNING**

113 COLLIER STREET
BARRIE, ON, L4M 3H2
P: 705.728.0045 F: 705.728.2010
WWW.MHBCPLAN.COM

STAMP

DATE
SEPT. 24, 2018

FILE No.
15184H

SCALE
**1:1,000
(ARCH D)**

DRAWN BY
M.M.

CHECKED BY
K.M.

OTHER

PROJECT

231 GLENELG STREET
FLATO WEST MEADOWS INC.
3621 HIGHWAY 7 EAST, SUITE 503
MARKHAM, ON L3R 0G6
P:(905) 479-9292 F:(905) 429-9165
WWW.FLATOGROUP.COM

FILE NAME

DRAFT PLAN OF SUBDIVISION

DWG No.

1 of 1

SCALE BAR

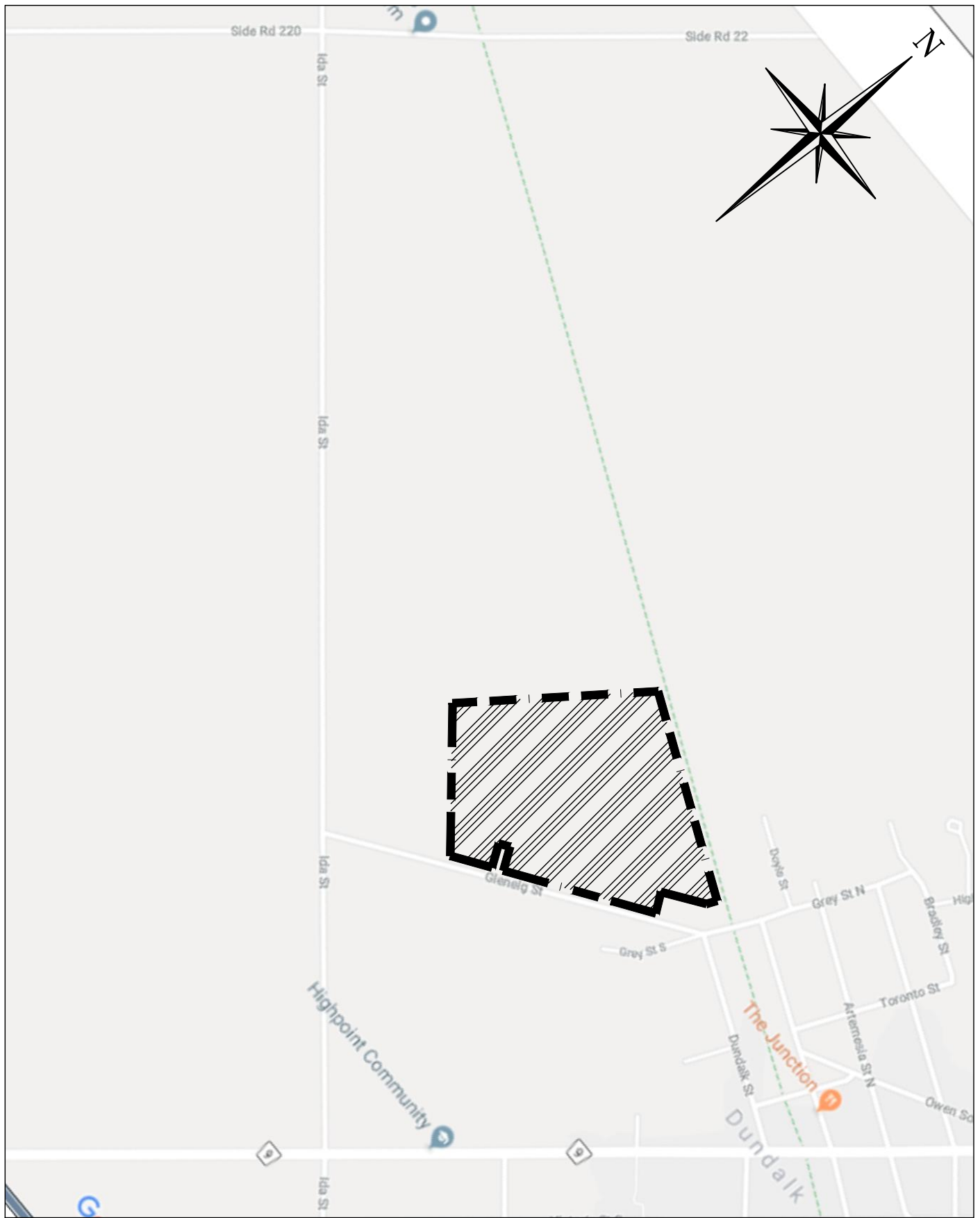
0 5 10 15 20 25 37.5 50 75 100m

MEASUREMENTS SHOWN ON THIS PLAN ARE IN METRES AND CAN BE
CONVERTED TO FEET BY DIVIDING BY 0.3048

N:\Southgate\231 Glenelg Street - 15184H\Drawings\Draft Plan\CAD\DraftPlan_2018-09-24.dwg

LAND USE SUMMARY			
LAND USE	LOTS / BLOCKS	UNITS	AREA
SINGLE DETACHED - 12.2m LOTS	001-127	127	5.38ha
SINGLE DETACHED - FUTURE LOTS	128	-	0.08ha
TOWNHOUSES - 6.5m UNITS	129-132	26	0.62ha
PARK	133	-	0.88ha
WALKWAYS	134-137	-	0.07ha
STORMWATER AREA	138	-	1.52ha
OPEN SPACE	139	-	3.30ha
FUTURE RIGHT OF WAY	140-141	-	0.13ha
0.3m RESERVES	142-146	-	<0.01ha
RIGHT OF WAY	-	-	2.62ha
TOTALS		153	14.60ha

J:\1000\1060-Plato Dev\4171-Glenelg\CAD\CIVIL\1 SHEET\4171-700.dwg, FIG. 1, 2018-09-25 2:46:33 PM, imatur



Legend



= SUBJECT
PROPERTY

Project

**GLENELG
TOWNSHIP OF SOUTHGATE**

Drawing

SITE LOCATION



CROZIER
CONSULTING ENGINEERS

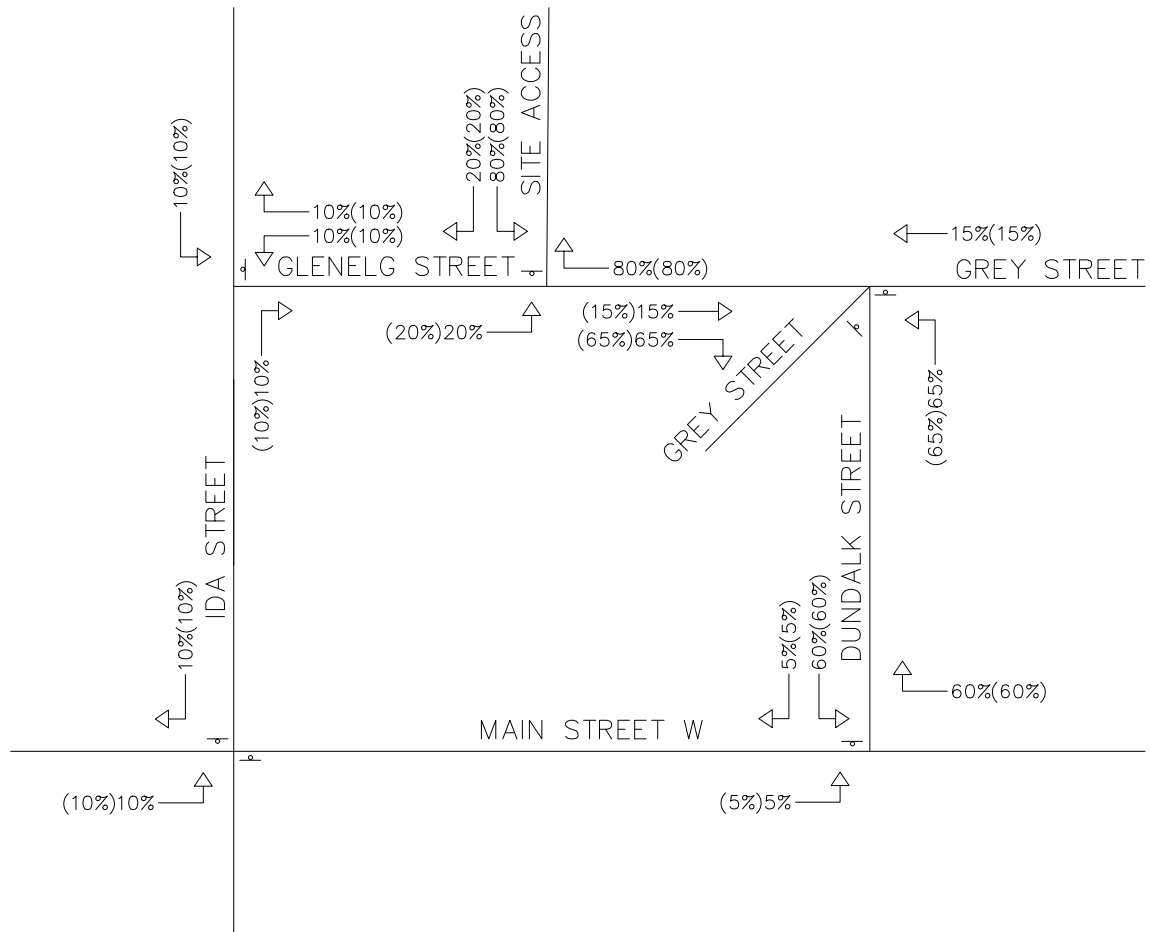
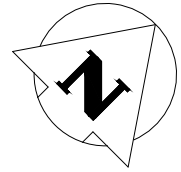
THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE 301,
COLLINGWOOD, ON L9Y 4R3
705 446-3510 T
705 446-3520 F
WWW.CROZIER.CA
INFO@CROZIER.CA

Drawn By	B.K.	Design By	B.P.	Project	1060-4171
Scale	N.T.S.	Date	09/26/2018	Check By	B.N.R.
					Drawing

FIG. 2

NOTE:

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



LEGEND:

↓ STOP CONTROL
XX%(YY%) WEEKDAY AM(PM)

Project

**GLENELG
TOWNSHIP OF SOUTHGATE**

Title

TRIP DISTRIBUTION



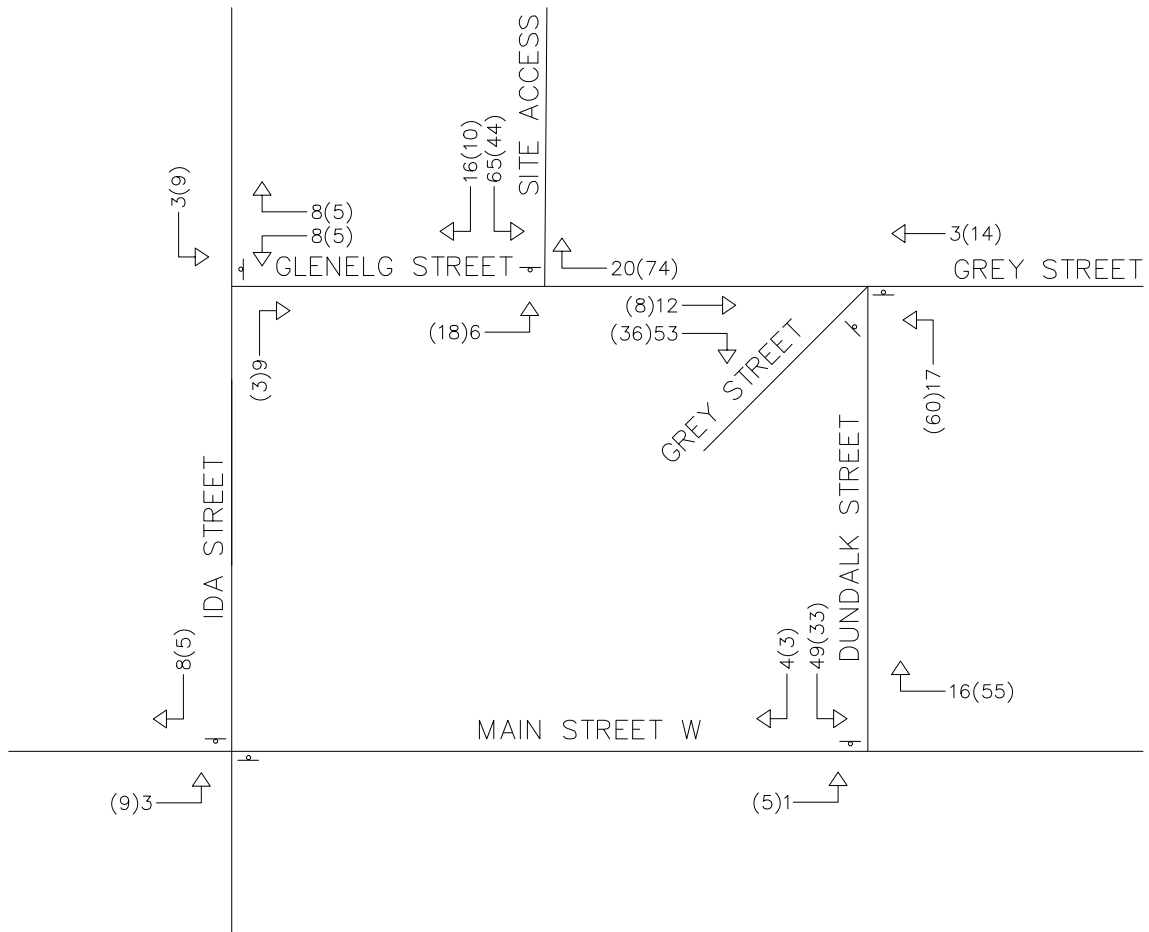
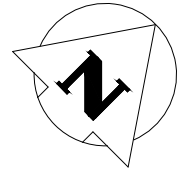
**CROZIER
& ASSOCIATES**
Consulting Engineers

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Drawn	A.J.D.	Design	T.W.	Project No.	1060-4171
Check	T.W.	Check	M.F.	Scale	N.T.S.
				Dwg.	FIG. 7

NOTE:

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



LEGEND:

↓ STOP CONTROL

XX(YY) WEEKDAY AM(PM)

Project

**GLENELG
TOWNSHIP OF SOUTHGATE**

Title

TRIP ASSIGNMENT



**CROZIER
& ASSOCIATES**
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Drawn A.J.D.

Design T.W.

Project No.

1060-4171

Check T.W.

Check M.F.

Scale

N.T.S

Dwg.

FIG. 8

APPENDIX F

ITE Trip Generation Excerpts



Trip Generation Manual

10th Edition • Volume 2: Data
Residential (Land Uses 200–299)

SEPTEMBER 2017

Land Use: 210

Single-Family Detached Housing

Description

Single-family detached housing includes all single-family detached homes on individual lots. A typical site surveyed is a suburban subdivision.

Additional Data

The number of vehicles and residents had a high correlation with average weekday vehicle trip ends. The use of these variables was limited, however, because the number of vehicles and residents was often difficult to obtain or predict. The number of dwelling units was generally used as the independent variable of choice because it was usually readily available, easy to project, and had a high correlation with average weekday vehicle trip ends.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Single-family detached units had the highest trip generation rate per dwelling unit of all residential uses because they were the largest units in size and had more residents and more vehicles per unit than other residential land uses; they were generally located farther away from shopping centers, employment areas, and other trip attractors than other residential land uses; and they generally had fewer alternative modes of transportation available because they were typically not as concentrated as other residential land uses.

Time-of-day distribution data for this land use are presented in Appendix A. For the six general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:00 and 5:00 p.m., respectively. For the two sites with Saturday data, the overall highest vehicle volume was counted between 3:00 and 4:00 p.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 10:15 and 11:15 a.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, Connecticut, Delaware, Illinois, Indiana, Maryland, Minnesota, Montana, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Vermont, and Virginia.

Source Numbers

100, 105, 114, 126, 157, 167, 177, 197, 207, 211, 217, 267, 275, 293, 300, 319, 320, 356, 357, 367, 384, 387, 407, 435, 522, 550, 552, 579, 598, 601, 603, 614, 637, 711, 716, 720, 728, 735, 868, 903, 925, 936

Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 173

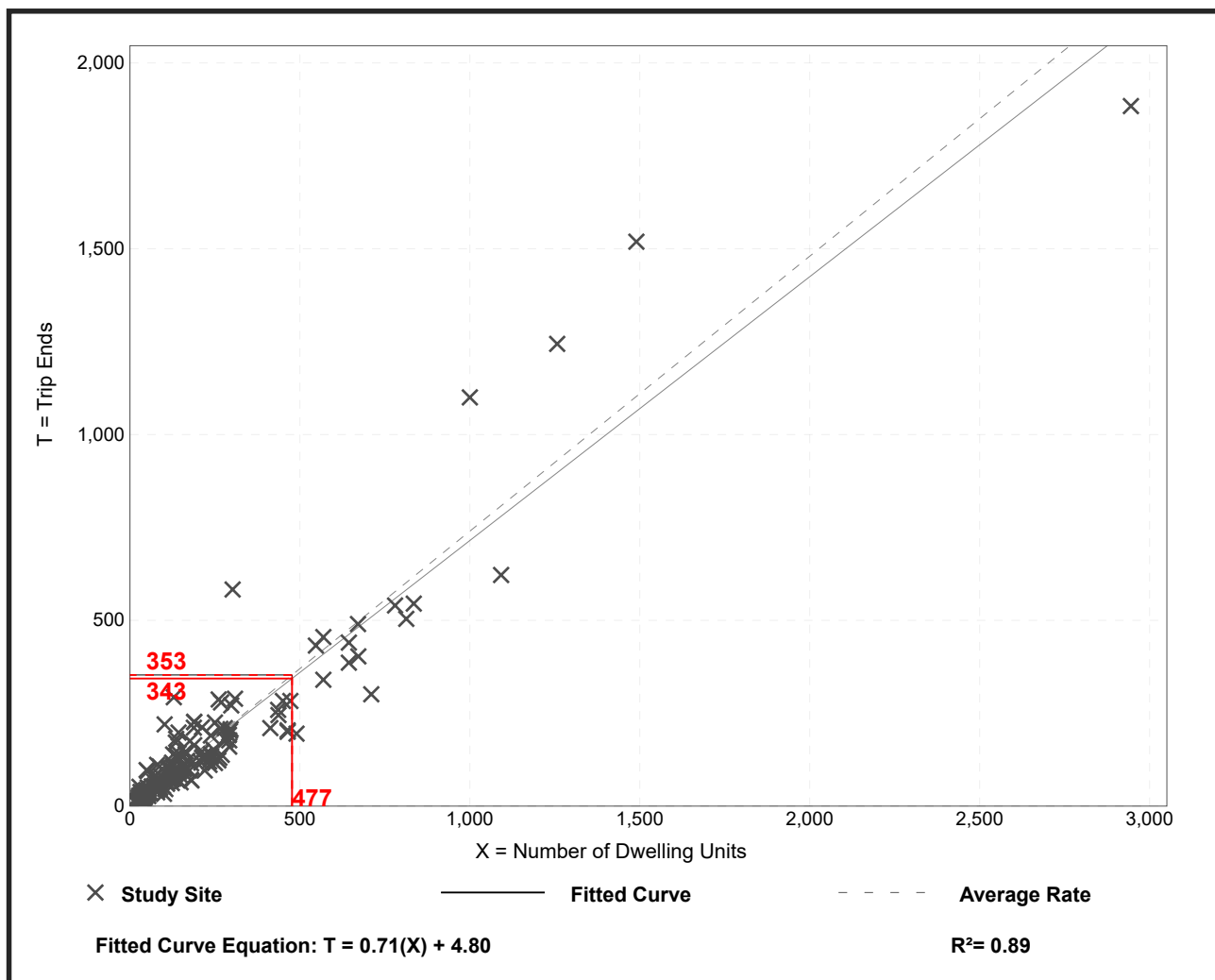
Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

Data Plot and Equation



Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 190

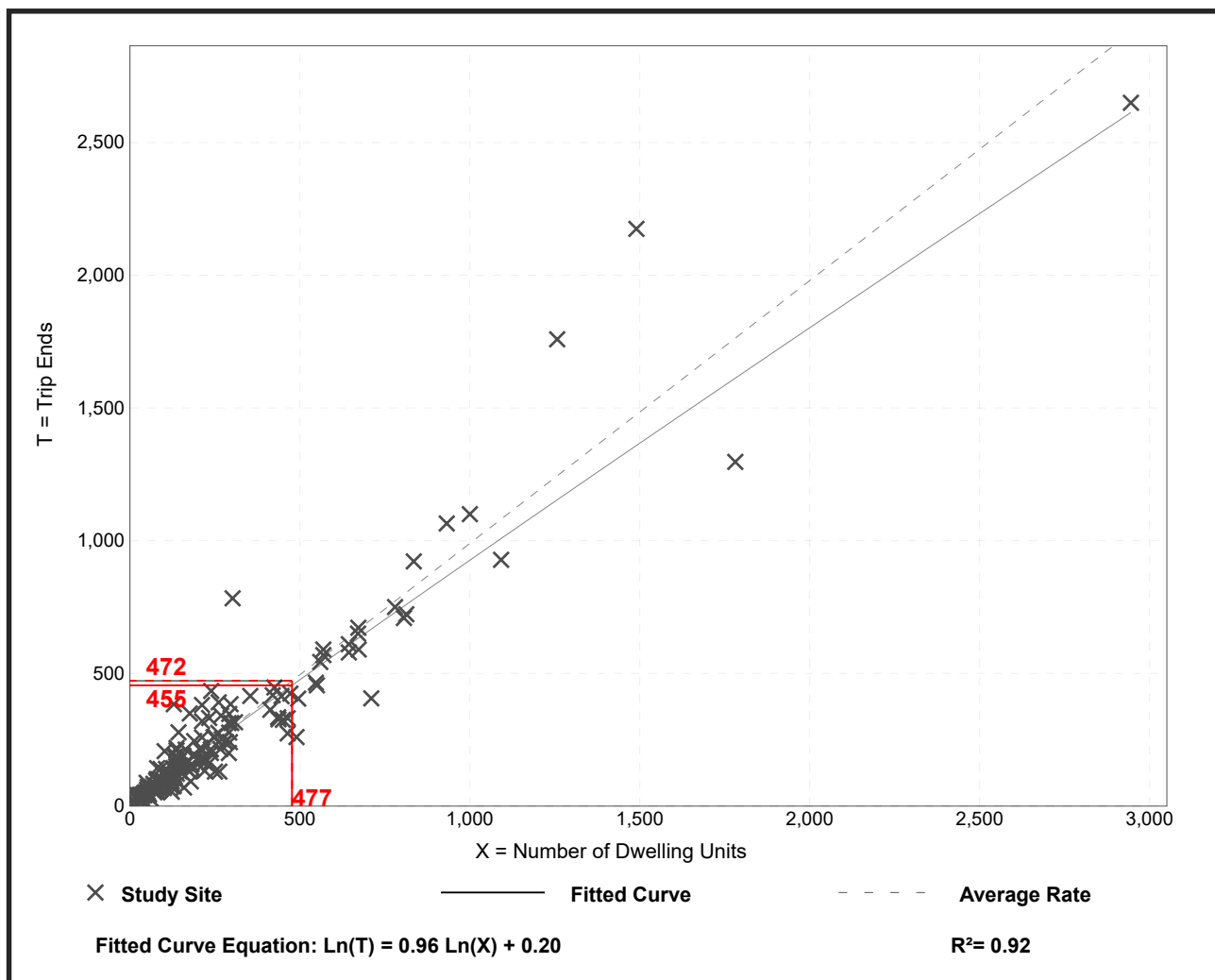
Avg. Num. of Dwelling Units: 242

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

Data Plot and Equation



Land Use: 220

Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have one or two levels (floors). Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), and off-campus student apartment (Land Use 225) are related land uses.

Additional Data

In prior editions of *Trip Generation Manual*, the low-rise multifamily housing sites were further divided into rental and condominium categories. An investigation of vehicle trip data found no clear differences in trip making patterns between the rental and condominium sites within the ITE database. As more data are compiled for future editions, this land use classification can be reinvestigated.

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

This land use included data from a wide variety of units with different sizes, price ranges, locations, and ages. Consequently, there was a wide variation in trips generated within this category. Other factors, such as geographic location and type of adjacent and nearby development, may also have had an effect on the site trip generation.

Time-of-day distribution data for this land use are presented in Appendix A. For the 10 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:15 and 8:15 a.m. and 4:45 and 5:45 p.m., respectively. For the one site with Saturday data, the overall highest vehicle volume was counted between 9:45 and 10:45 a.m. For the one site with Sunday data, the overall highest vehicle volume was counted between 11:45 a.m. and 12:45 p.m.

For the one dense multi-use urban site with 24-hour count data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 7:00 and 8:00 a.m. and 6:15 and 7:15 p.m., respectively.

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

The average numbers of person trips per vehicle trip at the five general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.13 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 7 and 9 a.m.
- 1.21 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, District of Columbia, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Minnesota, New Jersey, New York, Ontario, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Virginia, and Washington.

It is expected that the number of bedrooms and number of residents are likely correlated to the number of trips generated by a residential site. Many of the studies included in this land use did not indicate the total number of bedrooms. To assist in the future analysis of this land use, it is important that this information be collected and included in trip generation data submissions.

Source Numbers

168, 187, 188, 204, 211, 300, 305, 306, 319, 320, 321, 357, 390, 412, 418, 525, 530, 571, 579, 583, 864, 868, 869, 870, 896, 903, 918, 946, 947, 948, 951

Multifamily Housing (Low-Rise) (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 42

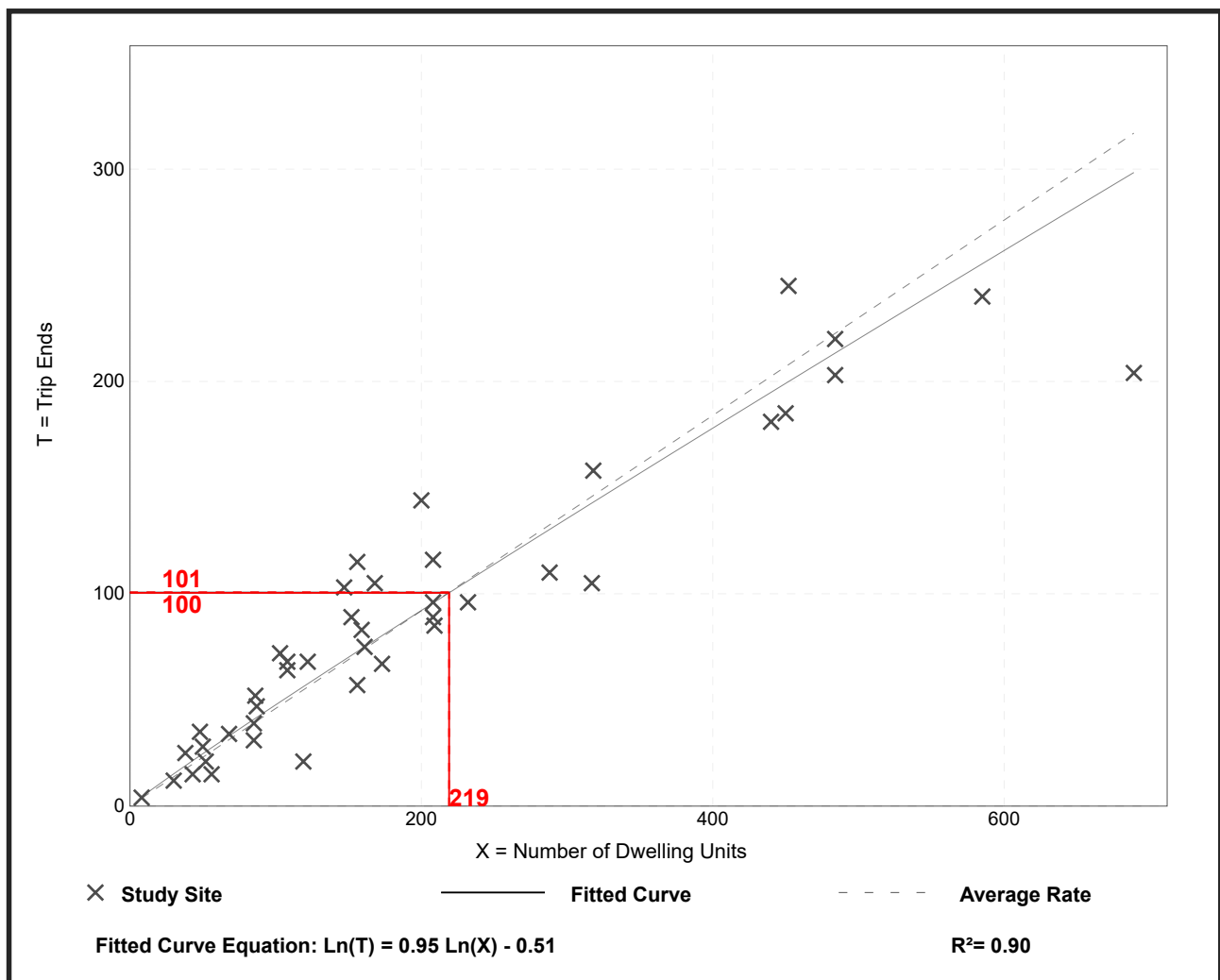
Avg. Num. of Dwelling Units: 199

Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.46	0.18 - 0.74	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) (220)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.

Setting/Location: General Urban/Suburban

Number of Studies: 50

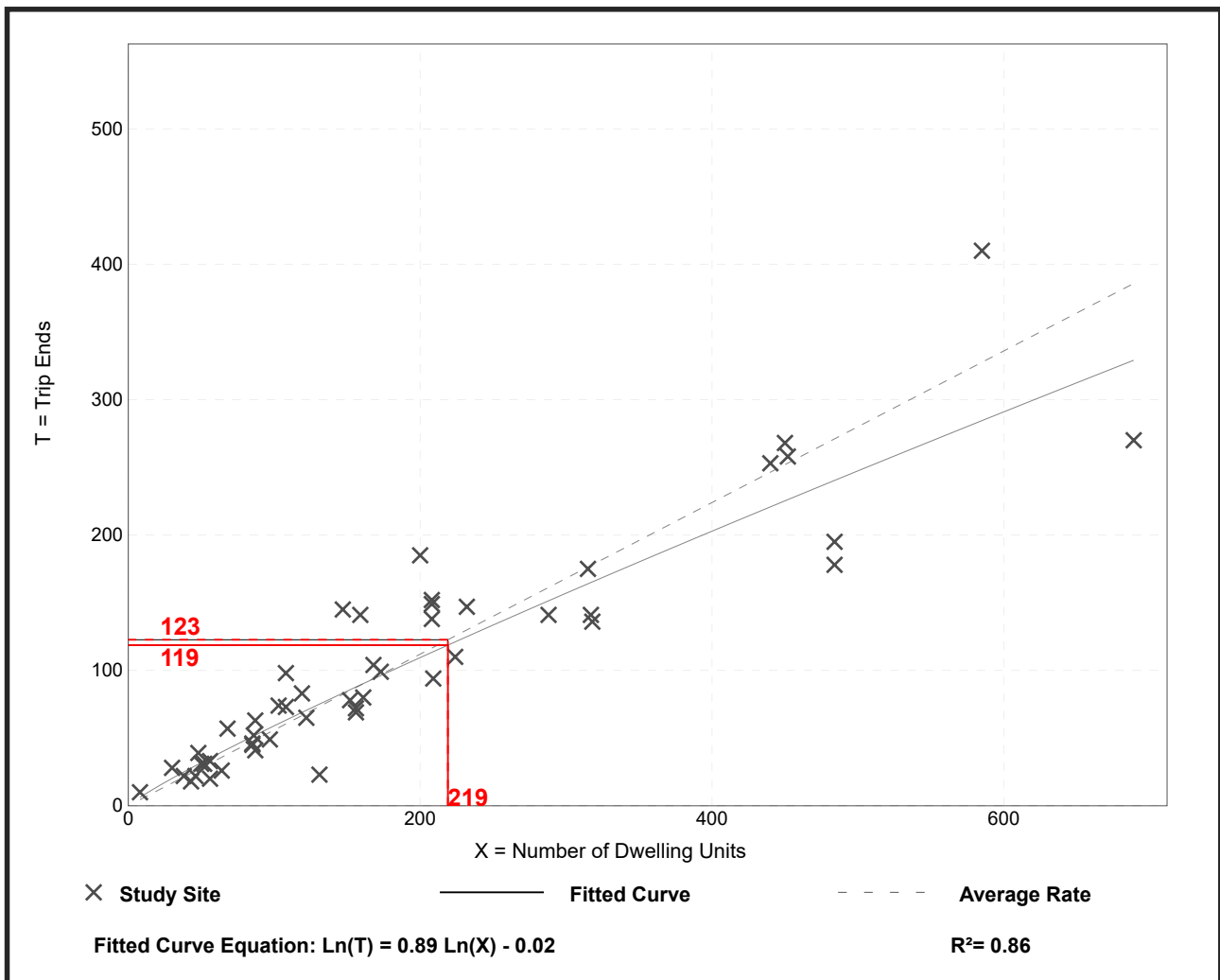
Avg. Num. of Dwelling Units: 187

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.56	0.18 - 1.25	0.16

Data Plot and Equation





Trip Generation Manual

10th Edition • Volume 2: Data
Retail (Land Uses 800–899)

SEPTEMBER 2017

Land Use: 820

Shopping Center

Description

A shopping center is an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, and type of store. A shopping center also provides on-site parking facilities sufficient to serve its own parking demands. Factory outlet center (Land Use 823) is a related use.

Additional Data

Shopping centers, including neighborhood centers, community centers, regional centers, and super regional centers, were surveyed for this land use. Some of these centers contained non-merchandising facilities, such as office buildings, movie theaters, restaurants, post offices, banks, health clubs, and recreational facilities (for example, ice skating rinks or indoor miniature golf courses).

Many shopping centers, in addition to the integrated unit of shops in one building or enclosed around a mall, include outparcels (peripheral buildings or pads located on the perimeter of the center adjacent to the streets and major access points). These buildings are typically drive-in banks, retail stores, restaurants, or small offices. Although the data herein do not indicate which of the centers studied included peripheral buildings, it can be assumed that some of the data show their effect.

The vehicle trips generated at a shopping center are based upon the total GLA of the center. In cases of smaller centers without an enclosed mall or peripheral buildings, the GLA could be the same as the gross floor area of the building.

Time-of-day distribution data for this land use are presented in Appendix A. For the 10 general urban/suburban sites with data, the overall highest vehicle volumes during the AM and PM on a weekday were counted between 11:45 a.m. and 12:45 p.m. and 12:15 and 1:15 p.m., respectively.

The average numbers of person trips per vehicle trip at the 27 general urban/suburban sites at which both person trip and vehicle trip data were collected were as follows:

- 1.31 during Weekday, AM Peak Hour of Generator
- 1.43 during Weekday, Peak Hour of Adjacent Street Traffic, one hour between 4 and 6 p.m.
- 1.46 during Weekday, PM Peak Hour of Generator

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in Alberta (CAN), British Columbia (CAN), California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, Vermont, Virginia, Washington, West Virginia, and Wisconsin.

Source Numbers

105, 110, 154, 156, 159, 186, 190, 198, 199, 202, 204, 211, 213, 239, 251, 259, 260, 269, 294, 295, 299, 300, 301, 304, 305, 307, 308, 309, 310, 311, 314, 315, 316, 317, 319, 358, 365, 376, 385, 390, 400, 404, 414, 420, 423, 428, 437, 440, 442, 444, 446, 507, 562, 580, 598, 629, 658, 702, 715, 728, 868, 870, 871, 880, 899, 908, 912, 915, 926, 936, 944, 946, 960, 961, 962, 973, 974, 978

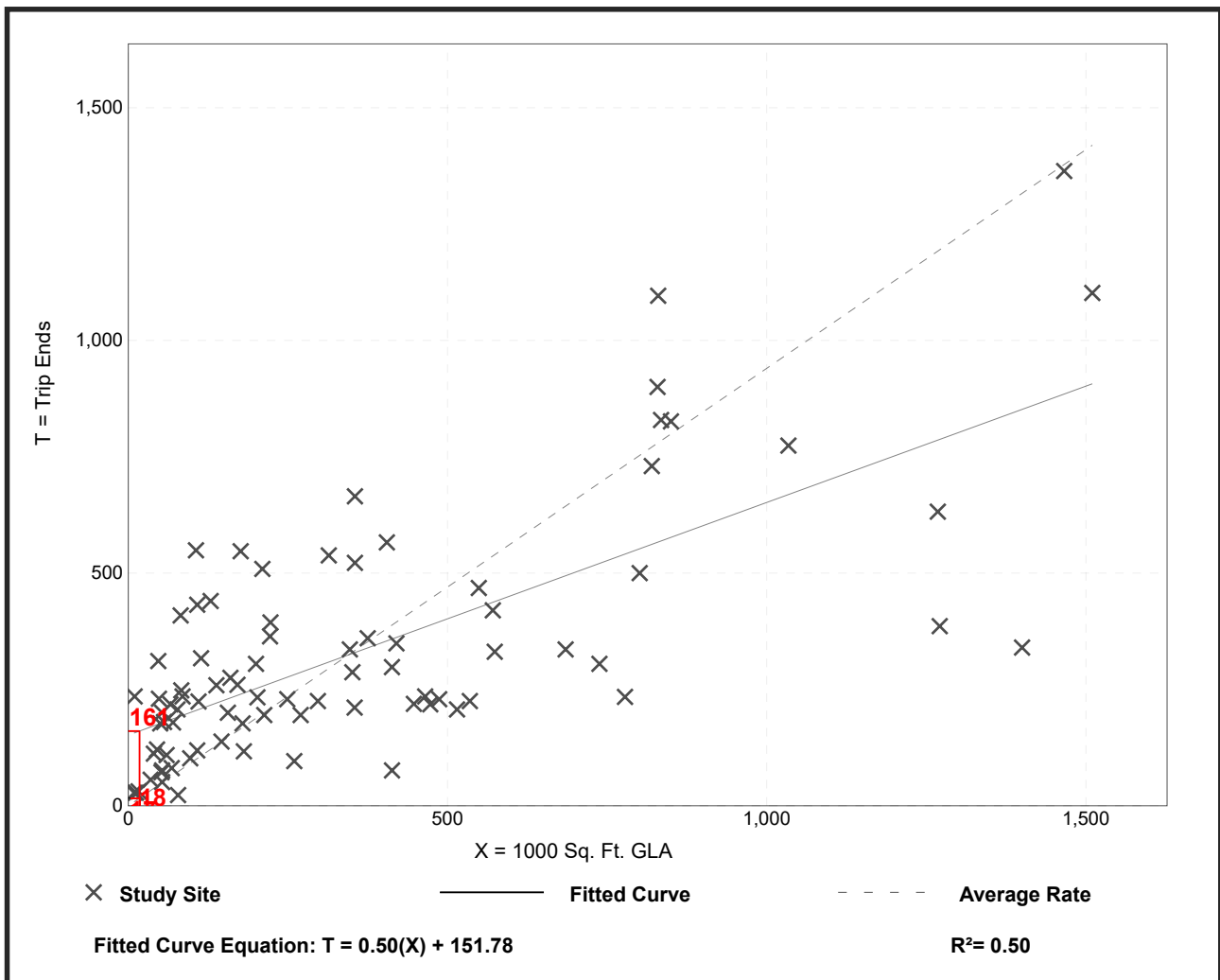
Shopping Center (820)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 7 and 9 a.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 84
 Avg. 1000 Sq. Ft. GLA: 351
 Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
0.94	0.18 - 23.74	0.87

Data Plot and Equation



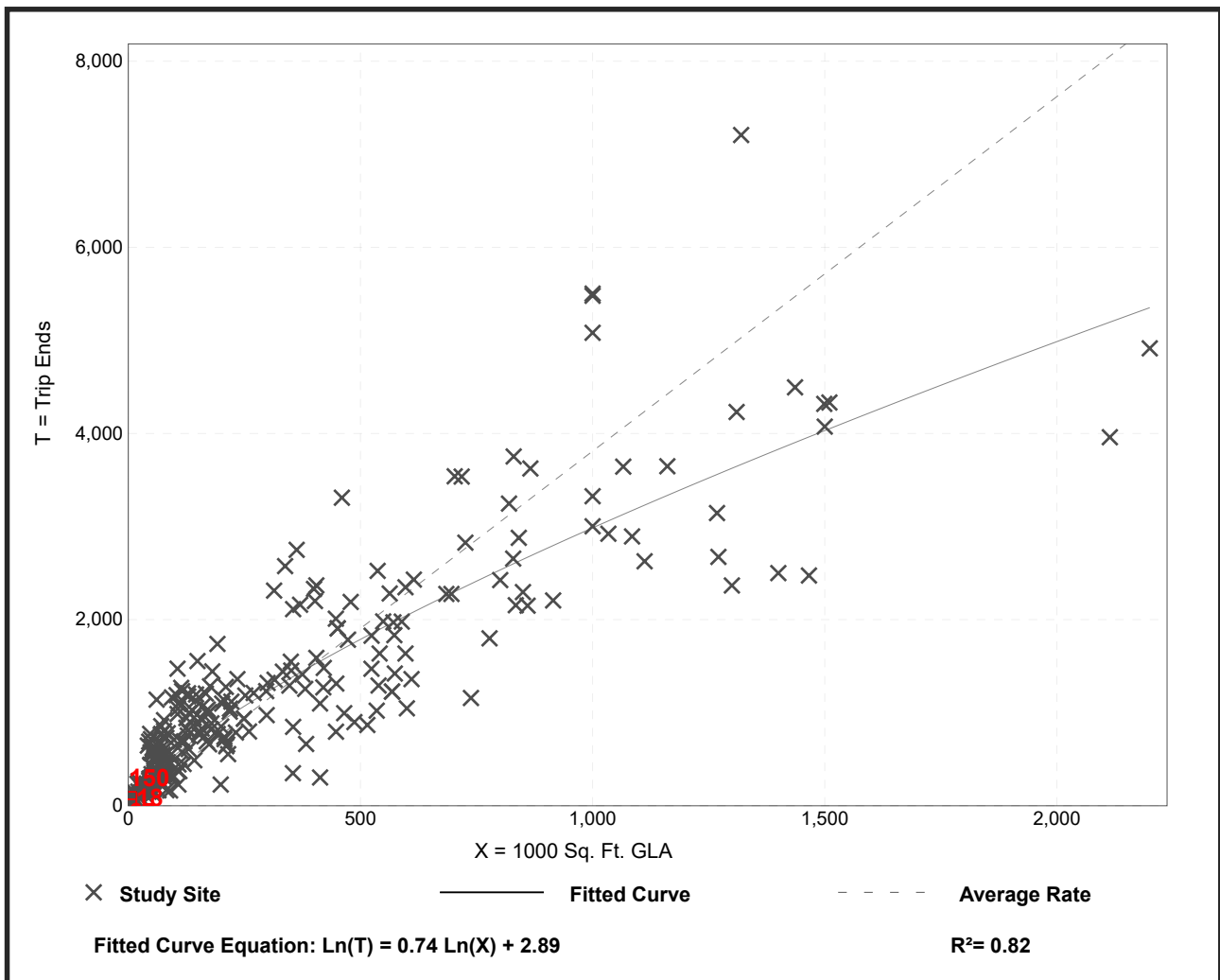
Shopping Center (820)

Vehicle Trip Ends vs: 1000 Sq. Ft. GLA
 On a: Weekday,
 Peak Hour of Adjacent Street Traffic,
 One Hour Between 4 and 6 p.m.
 Setting/Location: General Urban/Suburban
 Number of Studies: 261
 Avg. 1000 Sq. Ft. GLA: 327
 Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.81	0.74 - 18.69	2.04

Data Plot and Equation





Trip Generation Handbook

3rd Edition

SEPTEMBER 2017

**Table E.9 (Cont'd) Pass-By and Non-Pass-By Trips Weekday, PM
Peak Period Land Use Code 820—Shopping Center**

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
921	Albany, NY	July & Aug. 1985	196	4:00–6:00 p.m.	23	42	35	77	—	60,950	Raymond Keyes Assoc.
108	Overland Park, KS	July 1988	111	4:30–5:30 p.m.	26	61	13	74	—	34,000	—
118	Overland Park, KS	Aug. 1988	123	4:30–5:30 p.m.	25	55	20	75	—	—	—
256	Greece, NY	June 1988	120	4:00–6:00 p.m.	38	62	—	62	—	23,410	Sear Brown
160	Greece, NY	June 1988	78	4:00–6:00 p.m.	29	71	—	71	—	57,306	Sear Brown
550	Greece, NY	June 1988	117	4:00–6:00 p.m.	48	52	—	52	—	40,763	Sear Brown
51	Boca Raton, FL	Dec. 1987	110	4:00–6:00 p.m.	33	34	33	67	—	42,225	Kimley-Horn and Assoc. Inc.
1,090	Ross Twp, PA	July 1988	411	2:00–8:00 p.m.	34	56	10	66	—	51,500	Wilbur Smith and Assoc.
97	Upper Dublin Twp, PA	Winter 1988/89	—	4:00–6:00 p.m.	41	—	—	59	—	34,000	McMahon Associates
118	Tredyffrin Twp, PA	Winter 1988/89	—	4:00–6:00 p.m.	24	—	—	76	—	10,000	Booz Allen & Hamilton
122	Lawnside, NJ	Winter 1988/89	—	4:00–6:00 p.m.	37	—	—	63	—	20,000	Pennoni Associates
126	Boca Raton, FL	Winter 1988/89	—	4:00–6:00 p.m.	43	—	—	57	—	40,000	McMahon Associates
150	Willow Grove, PA	Winter 1988/89	—	4:00–6:00 p.m.	39	—	—	61	—	26,000	Booz Allen & Hamilton
153	Broward Cnty., FL	Winter 1988/89	—	4:00–6:00 p.m.	50	—	—	50	—	85,000	McMahon Associates
153	Arden, DE	Winter 1988/89	—	4:00–6:00 p.m.	30	—	—	70	—	26,000	Orth-Rodgers & Assoc. Inc.
154	Doylestown, PA	Winter 1988/89	—	4:00–6:00 p.m.	32	—	—	68	—	29,000	Orth-Rodgers & Assoc. Inc.
164	Middletown Twp, PA	Winter 1988/89	—	4:00–6:00 p.m.	33	—	—	67	—	25,000	Booz Allen & Hamilton
166	Haddon Twp, NJ	Winter 1988/89	—	4:00–6:00 p.m.	20	—	—	80	—	6,000	Pennoni Associates
205	Broward Cnty., FL	Winter 1988/89	—	4:00–6:00 p.m.	55	—	—	45	—	62,000	McMahon Associates

**Table E.9 (Cont'd) Pass-By and Non-Pass-By Trips Weekday, PM Peak Period
Land Use Code 820—Shopping Center**

SIZE (1,000 SQ. FT. GLA)	LOCATION	WEEKDAY SURVEY DATE	NO. OF INTERVIEWS	TIME PERIOD	PASS-BY TRIP (%)	NON-PASS-BY TRIP (%)			ADJ. STREET PEAK HOUR VOLUME	AVERAGE 24-HOUR TRAFFIC	SOURCE
						PRIMARY	DIVERTED	TOTAL			
237	W. Windsor Twp, NJ	Winter 1988/89	—	4:00–6:00 p.m.	48	—	—	52	—	46,000	Booz Allen & Hamilton
242	Willow Grove, PA	Winter 1988/89	—	4:00–6:00 p.m.	37	—	—	63	—	26,000	McMahon Associates
297	Whitehall, PA	Winter 1988/89	—	4:00–6:00 p.m.	33	—	—	67	—	26,000	Orth-Rodgers & Assoc. Inc.
360	Broward Cnty., FL	Winter 1988/89	—	4:00–6:00 p.m.	44	—	—	56	—	73,000	McMahon Associates
370	Pittsburgh, PA	Winter 1988/89	—	4:00–6:00 p.m.	19	—	—	81	—	33,000	Wilbur Smith
150	Portland, OR	—	519	4:00–6:00 p.m.	68	6	26	32	—	25,000	Kittelson and Associates
150	Portland, OR	—	655	4:00–6:00 p.m.	65	7	28	35	—	30,000	Kittelson and Associates
760	Calgary, Alberta	Oct.-Dec. 1987	15,436	4:00–6:00 p.m.	20	39	41	80	—	—	City of Calgary DOT
178	Bordentown, NJ	Apr. 1989	154	2:00–6:00 p.m.	35	—	—	65	—	37,980	Raymond Keyes Assoc.
144	Manalapan, NJ	July 1990	176	3:30–6:15 p.m.	32	44	24	68	—	69,347	Raymond Keyes Assoc.
549	Natick, MA	Feb. 1989	—	4:45–5:45 p.m.	33	26	41	67	—	48,782	Raymond Keyes Assoc.

Average Pass-By Trip Percentage: 34

“—” means no data were provided

APPENDIX G

June 2016 TIS Excerpts and TTS Data

TRAFFIC IMPACT STUDY

DUNDALK MEADOWS
TOWNSHIP OF SOUTHGATE

FLATO DUNDALK MEADOWS INC.

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
40 HURON STREET
COLLINGWOOD, ONTARIO
L9Y 4R3

ORIGINAL – DECEMBER 2015

ADDENDUM – FEBRUARY 2016

ADDENDUM – JUNE 2016

CFCA FILE NO. 1060-4066

The material in this report reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. C.F. Crozier & Associates Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

capacity ratio is 0.00.

The intersection of Main Street and Osprey Street is operating at LOS "B" under existing traffic conditions. This intersection is operating well and will experience a control delay of 11.6 seconds or less and volume-to-capacity ratio of 0.04 or less.

The traffic metrics listed above indicate that there are no traffic operational issues at the analyzed intersections. This is a result of the low volume of vehicles at the minor street approach of the intersections.

4.0 Future Background Conditions

4.1 Horizon Years

As described in Section 3.4, Dundalk West Development, west of the Subject Property, is on schedule to be completed and fully occupied by 2020. As a result, the horizon years will consider the full build-out state of the 70 single-detached units as part of the future background traffic. It is otherwise anticipated that the date of full buildout of the Subject Property as well as the Flato North property will be 2030. Thus, the horizon years in the study will consist of 2020 (0% site traffic), 2025 (50% site traffic), 2030 (100% site traffic), 2035 and 2040.

4.2 Growth Rate

Traffic growth rates were calculated based on historical data provided by the Ontario Ministry of Transportation (MTO) publication "Provincial Highways Traffic Volumes, 1998-2010". AADT volumes for the Highway 10 segment adjacent to the Subject Property for the years 2007-2010 were used to calculate an average annual compounded growth rate of 1.08 percent in Highway 10 traffic volumes. For the purposes of conservative analysis, a 1.5 percent growth rate was applied to traffic volumes at all subject intersections.

For the purpose of the traffic operations analysis herein the turning movement counts in March 2016 were modelled as if taken in 2015, and was subject to the same growth as the November 2015 turning movement counts for consistency.

4.3 Future Roadway Improvements

No capacity improvements associated with the subject development have been identified for the boundary roads within the study horizons.

4.4 Background Trip Generation

As previously mentioned, the Draft Plan approved 70-unit Dundalk West Development is currently undergoing detailed design and is anticipated for completion in 2016. As a result, the trips generated by this development will contribute to the future background traffic on the boundary road network and is thus included in the future background traffic analyses.

Table 2 outlines the trip generation per Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition, Land Use Category (LUC) 210 "Single-Family Detached Housing".

Table 2
Future Background Trip Generation

Use	Roadway Peak Hour	Number of Trips		
		Inbound	Outbound	Total
Single-Family Detached Units (LUC 210)	Weekday A.M.	15	44	59
	Weekday P.M.	48	28	76

The trips generated by Dundalk West Development during future background scenarios were distributed on the basis of Transportation Tomorrow Survey Data (TTS) data. The TTS is a comprehensive survey of transportation characteristics of households in the Golden Horseshoe, Simcoe County and Grey County areas. In order to obtain survey data most applicable to the Subject Property, TTS data was filtered as follows:

As data specific to the subject area of Dundalk was unavailable, travel behavior data from the residents of the Township of Melancthon, a town 12 kilometres south of Dundalk, was considered most representative of the subject area and thus used as a surrogate site. The Township of Melancthon was selected as origin and destination for outbound and inbound trips, respectively.

- For the a.m. trips, data was filtered in association with the time at which traffic counts were conducted; i.e., 6:00 a.m. – 10:00 a.m. Similarly, for p.m. trips the time range of 2:00 p.m. – 6:00 p.m. was selected.
- TTS results were restricted to trips made by automobiles with Melancthon as an origin or destination. Trip distribution was determined based on the shortest path of each origin-destination pair. Refer to Appendix D for the TTS Data.
- It was noted that there are no main routes east or west of the Township of Melancthon and thus, all vehicles travelling in these directions would be required to travel approximately five kilometers south to Shelburne in order to travel east or west. As a result, engineering judgement and assessment of existing commuter travel patterns at the subject intersection were used to estimate the proportion of traffic internal trips within Dundalk.

Following the above rationale, this resulted in approximately 30 percent of trips travelling to and from the west via Main Street, approximately 10 percent to and from the east via Main Street, 10 percent of trips to and from the north along Highway 10 and the remaining 50 percent to and from the south on Highway 10. Trips to and from the east, north and south were equally distributed between Osprey Street and Alice Street as based on the Draft Plan approved access to Elm Street.

The trips generated by the proposed development were assigned to the boundary road network per the distributions in Figure 7. The trip assignments for the primary trips are illustrated in Figure 8.

Refer to Figures 5 and 6 for background development trip distribution and trip assignments, respectfully.

The intersection of Main Street and Osprey Street will operate at LOS "B" and "C" through the 2040 future background a.m. and p.m. peak conditions, respectively. In addition, this intersection is expected to experience a control delay of 16.2 seconds or less and volume-to-capacity ratio of 0.08 or less through the 2040 future background scenarios.

5.0 Site Generated Traffic

5.1 Trip Generation

The Subject Property will result in additional vehicles on the boundary road network that previously did not exist. The Subject Property will also result in additional turning movements at the boundary road intersection.

The trip generation of the residential townhomes and single-family units was forecasted using the fitted curve equations provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 8th Edition, under Land Use Category 230 "Residential Condominium/Townhomes" and Land Use Category 210 "Single-Family Detached Housing", respectively. Per the initial draft plan dated December 4, 2015 from MHBC Planning the Subject Property is comprised of 194 townhome units and 302 single-family detached units. In addition, per the initial conservatively anticipated 300 single detached unit Flato North development, Land Use Category 210 was also used to estimate the trips generated by this development.

Per the ITE Trip Generation Manual, the proposed residential development is forecasted to generate a total of 309 and 388 trips during the weekday a.m. and p.m. peak periods, respectively for the subject property. In addition, 220 and 283 trips are anticipated post-development of the newly acquired lands.

The updated Draft Plan dated June 3, 2016 (Figure 2) consists of 190 townhouse and 311 single detached residential units. Per the ITE Trip Generation Manual, the updated unit count is forecasted to generate approximately 5 additional trips during the weekday a.m. and p.m. peak periods. The resultant additional trips will not materially affect traffic operations within the boundary road network. As such, the operational analysis undertaken with the above noted trip generation and the results of same remain valid. Moreover the analysis considers the initial upper bound limit of for the north lands.

The forecasted trips as based on the initial December 4, 2015 Draft Plan are tabulated in Table 8.

Table 8
Trip Generation

Subject Property	Use	Roadway Peak Hour	Number of Trips		
			Inbound	Outbound	Total
Flato East	Residential Townhouse Units (Cat 230)	Weekday A.M.	15	73	88
		Weekday P.M.	70	34	104
	Single-Family Detached Units (Cat 210)	Weekday A.M.	55	166	221
		Weekday P.M.	179	105	284
Flato North	Single-Family Detached Units (Cat 210)	Weekday A.M.	55	165	220
		Weekday P.M.	178	105	283
Total		Weekday A.M.	125	404	529
		Weekday P.M.	427	244	671

5.2 Trip Distribution and Assignment

The primary trips generated by the Subject Property were distributed to the boundary roadways based on Transportation Tomorrow Survey (TTS) data as described in Section 4.4. As the Subject Property proposes a site access to Highway 10, as well as the newly acquired Flato North lands proposing a site access to Russell Street, the site generated trips were distributed across the accesses based on anticipated points of access.

Following the above rationale, this resulted in approximately 15 percent of trips travelling to and from the west via the Elm Street access, 15 percent to and from the west via the Russell Street access and five percent each to and from the east and north via the Russell Street access. The remaining five percent each to and from the east and north were distributed via left turn at the Highway 10 site access while the remaining 50 percent of trips to and from the south were distributed via right turn at the Highway 10 site access.

The trips generated by the proposed development were assigned to the boundary road network per the distributions in Figure 12 in addition to the assumed phasing of the Subject Property and Flato North at which 50 percent of the residential units are expected to be completed and occupied by 2025 with full buildout and occupancy expected by 2030. The trip assignments for the primary trips are illustrated in Figure 13.

USER : Alexander Fleming - CF Crozier and Associates
 DATE : Jan 18 2016 (09:56:04)
 DATA : 2011 TTS V1.0 Trips
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 FILTER 1 : pd_orig => Melancthon
 ROW : pd_dest
 COLUMN : mode_prime

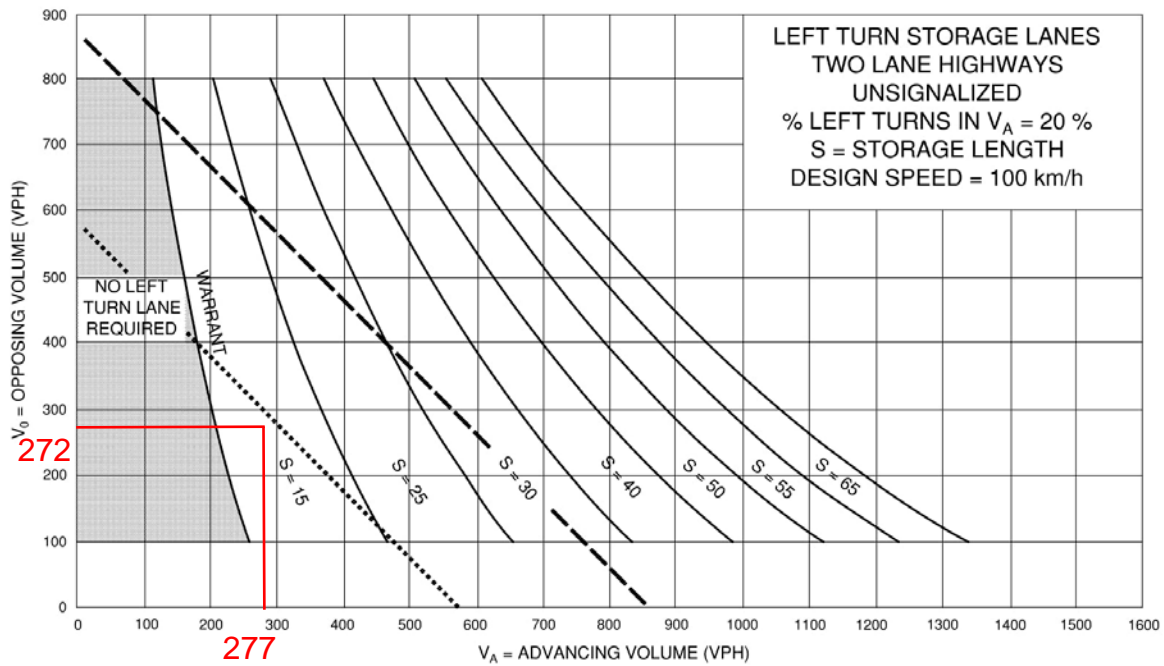
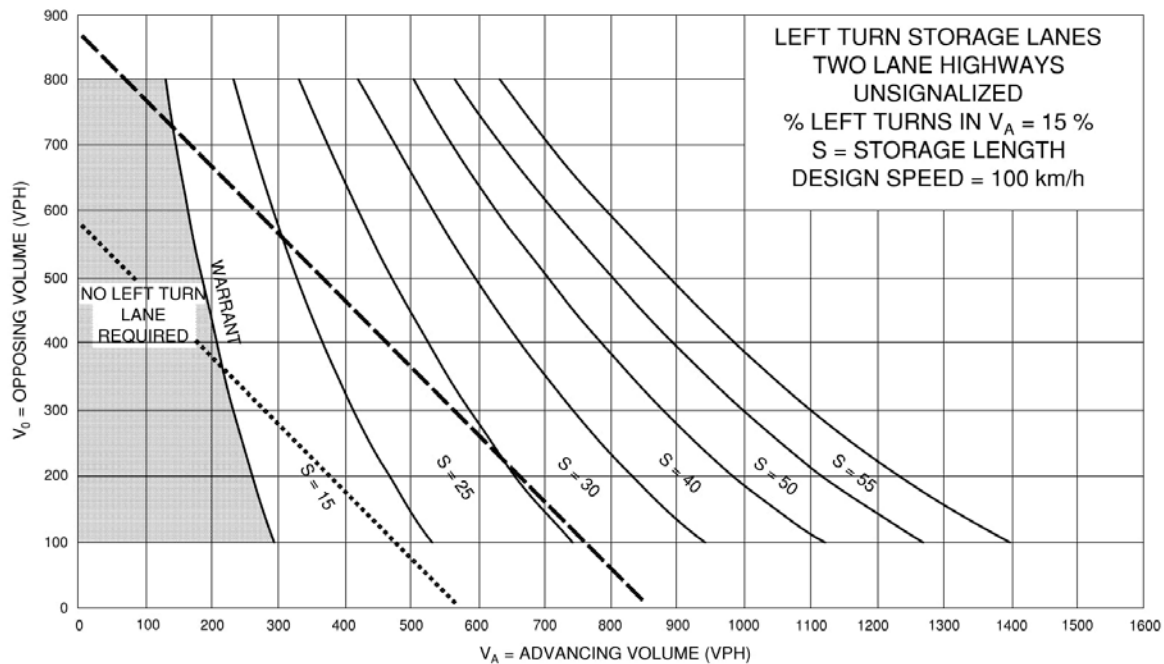
Origin	Other	Auto passenger	Schoolbus	Auto driver	%
PD 1 of Toronto	0	65	0	0	0.0%
Oshawa	0	0	0	37	1.5%
Newmarket	0	37	0	37	1.5%
Caledon	0	0	0	37	1.5%
Brampton	0	0	0	30	1.2%
Wellesley	15	0	0	0	0.0%
Guelph	0	21	0	0	0.0%
Orangeville	0	0	0	180	7.2%
Innisfil	0	26	0	26	1.0%
New Tecumseth	0	0	0	148	5.9%
Adjala-Tosorontio	0	0	0	37	1.5%
Clearview	0	15	0	156	6.2%
Grey	0	0	0	73	2.9%
Collingwood	0	37	37	51	2.0%
Mulmur	0	28	0	26	1.0%
Shelburne	0	183	183	828	33.1%
Amaranth	0	73	0	325	13.0%
Melancthon	0	73	0	514	20.5%

USER : Alexander Fleming - CF Crozier and Associates
 DATE : Jan 18 2016 (11:26:42)
 DATA : 2011 TTS V1.0 Trips
 TABLE : pd_orig (Melancthon)
 FILTER 1 : pd_orig => Melancthon
 ROW : pd_dest
 COLUMN : mode_prime

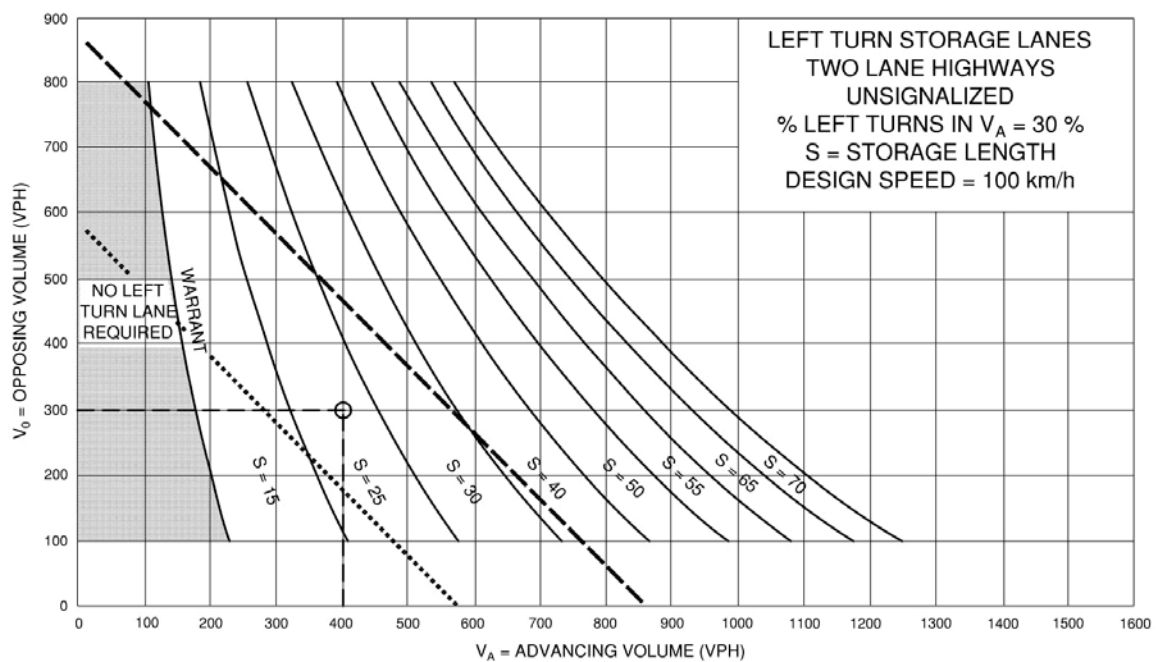
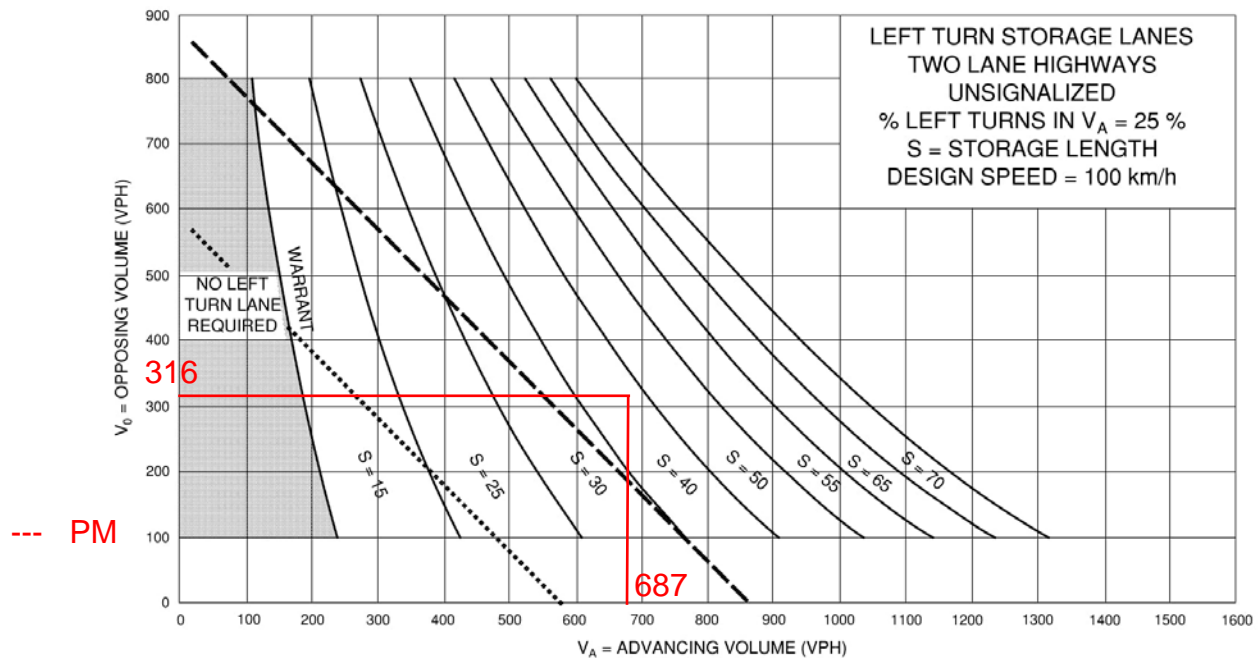
Destination	Other	Auto passenger	Schoolbus	Auto driver	%
PD 1 of Toronto	0	65	0	0	0.0%
Oshawa	0	0	0	37	1.5%
Newmarket	0	37	0	37	1.5%
Caledon	0	0	0	37	1.5%
Brampton	0	0	0	30	1.2%
Wellesley	15	0	0	0	0.0%
Guelph	0	21	0	0	0.0%
Orangeville	0	0	0	180	7.2%
Innisfil	0	26	0	26	1.0%
New Tecumseth	0	0	0	148	5.9%
Adjala-Tosorontio	0	0	0	37	1.5%
Clearview	0	15	0	156	6.2%
Grey	0	0	0	73	2.9%
Collingwood	0	37	37	51	2.0%
Mulmur	0	28	0	26	1.0%
Shelburne	0	183	183	828	33.1%
Amaranth	0	73	0	325	13.0%
Melancthon	0	73	0	514	20.5%

APPENDIX H

MTO Left-Turn Lane Warrant Charts

Exhibit 9A-23

--- AM

Exhibit 9A-24

APPENDIX I

TAC GDGCR Excerpts

Stopping sight distance is the sum of the distance travelled during the perception and reaction time and the braking distance.

$$SSD = 0.278Vt + 0.039 \frac{V^2}{a} \quad (2.5.2)$$

Where:

SSD = Stopping sight distance (m)

t = Brake reaction time, 2.5 s

V = Design speed (km/h)

a = Deceleration rate (m/s²)

Table 2.5.2 gives the minimum stopping sight distances on level grade, on wet pavement, for a range of design speeds. These values are used for vertical curve design, intersection geometry and the placement of traffic control devices. The stopping sight distances quoted in **Table 2.5.2** may need to be increased for a variety of reasons related to grade and vehicle type as noted below.

Table 2.5.2: Stopping Sight Distance on level roadways for Automobiles⁵⁴

Design speed (km/h)	Brake reaction distance (m)	Braking distance on level (m)	Stopping sight distance	
			Calculated (m)	Design (m)
20	13.9	4.6	18.5	20
30	20.9	10.3	31.2	35
40	27.8	18.4	46.2	50
50	34.8	28.7	63.5	65
60	41.7	41.3	83.0	85
70	48.7	56.2	104.9	105
80	55.6	73.4	129.0	130
90	62.6	92.9	155.5	160
100	69.5	114.7	184.2	185
110	76.5	138.8	215.3	220
120	83.4	165.2	248.6	250
130	90.4	193.8	284.2	285

Note: Brake reaction distance predicated on a time of 2.5 s; deceleration rate of 3.4 m/s² used to determine calculated sight distance.

Table 9.9.3: Time Gap for Case B1, Left Turn from Stop

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	7.5
Single-unit truck	9.5
Combination truck (WB 19 and WB 20)	11.5
Longer truck	To be established by road authority

Notes: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with grades of 3% or less. The table values should be adjusted as follows:

- For multi-lane highways: For left turns onto two-lane highways with more than two lanes, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.
- For minor approach grades: If the approach grade is an upgrade that exceeds 3%, add 0.2 s for each percent grade for left turns.
- Some road authorities use higher values for certain specialized vehicles (e.g., Alberta uses 22 s for very long log trucks).

The intersection sight distance along the major road (distance b in **Figure 9.9.2**) is determined by:

$$ISD = 0.278 V_{\text{major}} t_g \quad (9.9.1)$$

Where:

ISD = intersection sight distance (length of the leg of sight triangle along the major road) (m)

V_{major} = design speed of the major road (km/h)

t_g = time gap for minor road vehicle to enter the major road (s)

For example, a passenger car turning left onto a two-lane major road should be provided sight distance equivalent to a time gap of 7.5 s in major-road traffic. If the design speed of the major road is 100 km/h, this corresponds to a sight distance of $0.278(100)(7.5) = 208.5$ or 210 m, rounded for design.

A passenger car turning left onto a four-lane undivided roadway will need to cross two near lanes, rather than one. This increases the recommended gap in major-road traffic from 7.5 to 8.0 s. The corresponding value of sight distance for this example would be 223 m. If the minor-road approach to such an intersection is located on a 4% upgrade, then the time gap selected for intersection sight distance design for left turns should be increased from 8.0 to 8.8 s, equivalent to an increase of 0.2 s for each percent grade.

The design values for intersection sight distance for passenger cars are shown in **Table 9.9.4**. **Figure 9.9.4** includes design values, based on the time gaps for the design vehicles included in **Table 9.9.3**.

No adjustment of the recommended sight distance values for the major-road grade is generally needed because both the major- and minor-road vehicle will be on the same grade when departing from the intersection. However, if the minor-road design vehicle is a heavy truck and the intersection is located near a sag vertical curve with grades over 3%, then an adjustment to extend the recommended sight distance based on the major-road grade should be considered.

The time gaps in **Table 9.9.3** can be decreased by 1.0 s for right-turn maneuvers without undue interference with major-road traffic. These adjusted time gaps for the right turn from the minor road are shown in **Table 9.9.5**. Design values based on these adjusted time gaps are shown in **Table 9.9.6** for passenger cars. **Figure 9.9.5** includes the design values for the design vehicles for each of the time gaps in **Table 9.9.5**.

Table 9.9.5: Time Gap for Case B2—Right Turn from Stop and Case B3—Crossing Maneuver

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	6.5
Single-unit truck	8.5
Combination truck (WB 19 and WB 20)	10.5

Note: Time gaps are for a stopped vehicle to turn left onto a two-lane highway with no median and with grades of 3% or less. The table values should be adjusted as follows:

- For multi-lane highways: For left turns onto two-lane highways with more than two lanes, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane, from the left, in excess of one, to be crossed by the turning vehicle.
- For minor approach grades: If the approach grade is an upgrade that exceeds 3%, add 0.1 s for each percent grade for left turns.

Case F – Left Turns from the Major Road

All locations along a major highway from which vehicles are permitted to turn left across opposing traffic, including intersections and driveways, should have sufficient sight distance to accommodate the left-turn maneuver. Left-turning drivers need sufficient sight distance to decide when to turn left across the lane(s) used by opposing traffic. Sight distance design should be based on a left turn by a stopped vehicle, since a vehicle that turns left without stopping would need less sight distance. The sight distance along the major road to accommodate left turns is the distance traversed at the design speed of the major road in the travel time for the design vehicle given in **Table 9.9.11**.

Table 9.9.11: Time Gap for Case F, Left Turns from the Major Road

Design Vehicle	Time Gap (t_g)(s) at Design Speed of Major Road
Passenger car	5.5
Single-unit truck	6.5
Combination truck (WB 19 and WB 20)	7.5

Note: Adjustment for multi-lane highways: For turning vehicles that cross more than one opposing lane, add 0.5 s for passenger cars and 0.7 s for trucks for each additional lane to be crossed.

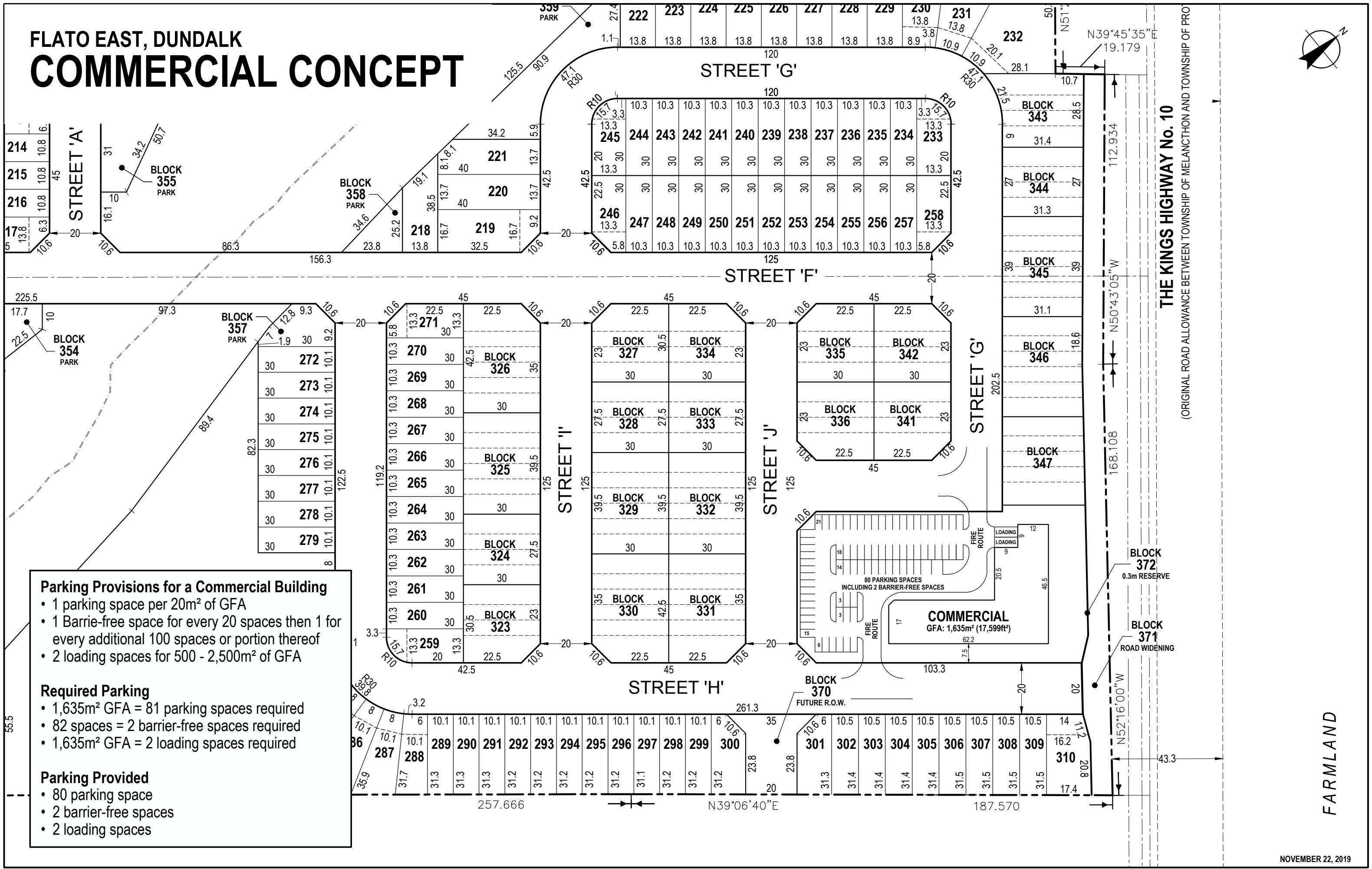
The table also contains appropriate adjustment factors for the number of major-road lanes to be crossed by the turning vehicle. The unadjusted time gap in **Table 9.9.11** for passenger cars was used to develop the sight distances in **Table 9.9.12** and is illustrated in **Figure 9.9.8**.

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FLATO EAST, DUNDALK
COMMERCIAL CONCEPT



Parking Provisions for a Commercial Building

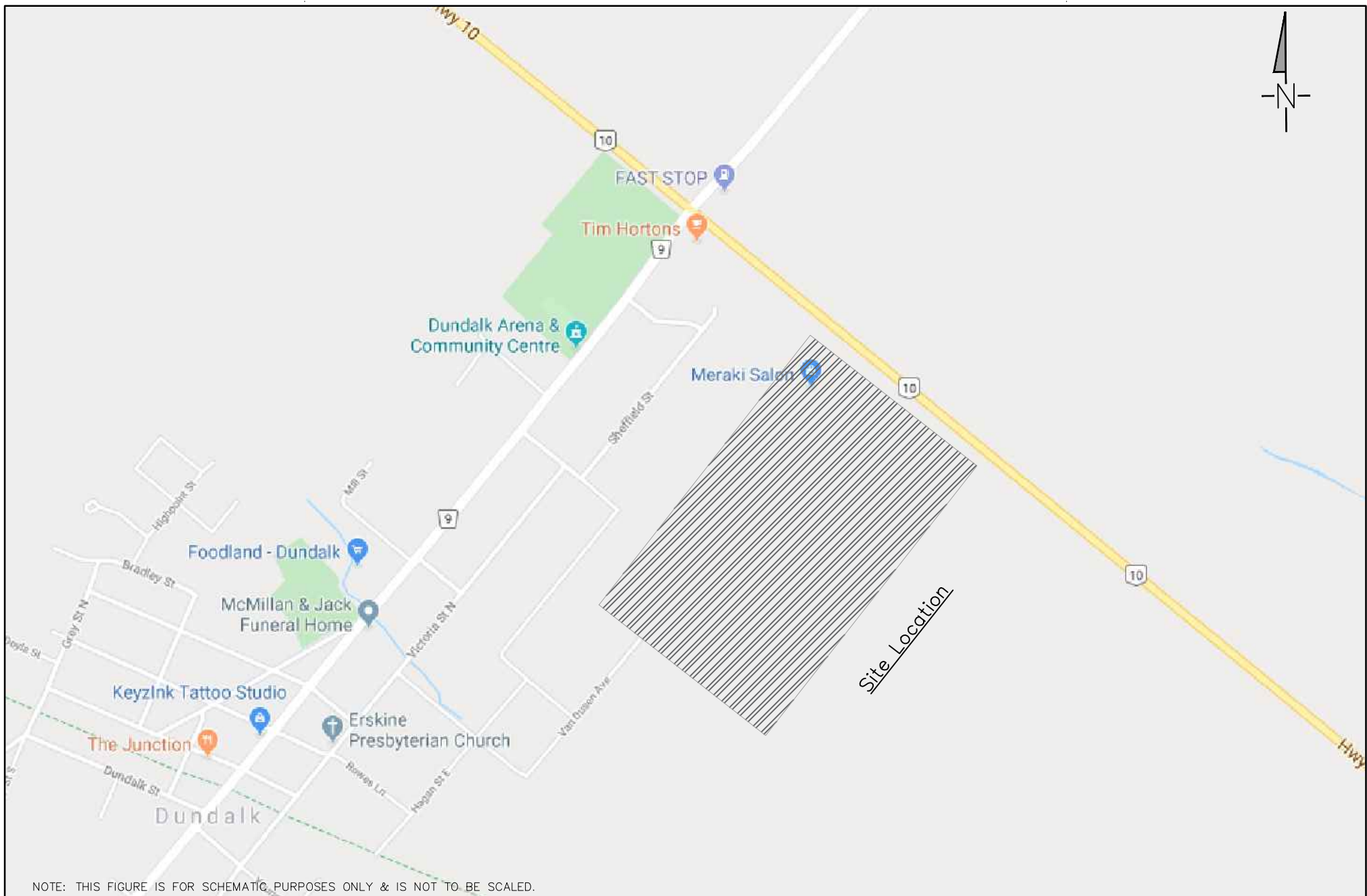
- 1 parking space per 20m² of GFA
- 1 Barrie-free space for every 20 spaces then 1 for every additional 100 spaces or portion thereof
- 2 loading spaces for 500 - 2,500m² of GFA

Required Parking

- 1,635m² GFA = 81 parking spaces required
- 82 spaces = 2 barrier-free spaces required
- 1,635m² GFA = 2 loading spaces required

Parking Provided

- 80 parking space
- 2 barrier-free spaces
- 2 loading spaces



Legend



= SUBJECT
LANDS

Project

Edgewood Greens
Dundalk, Township of Southgate

Drawing

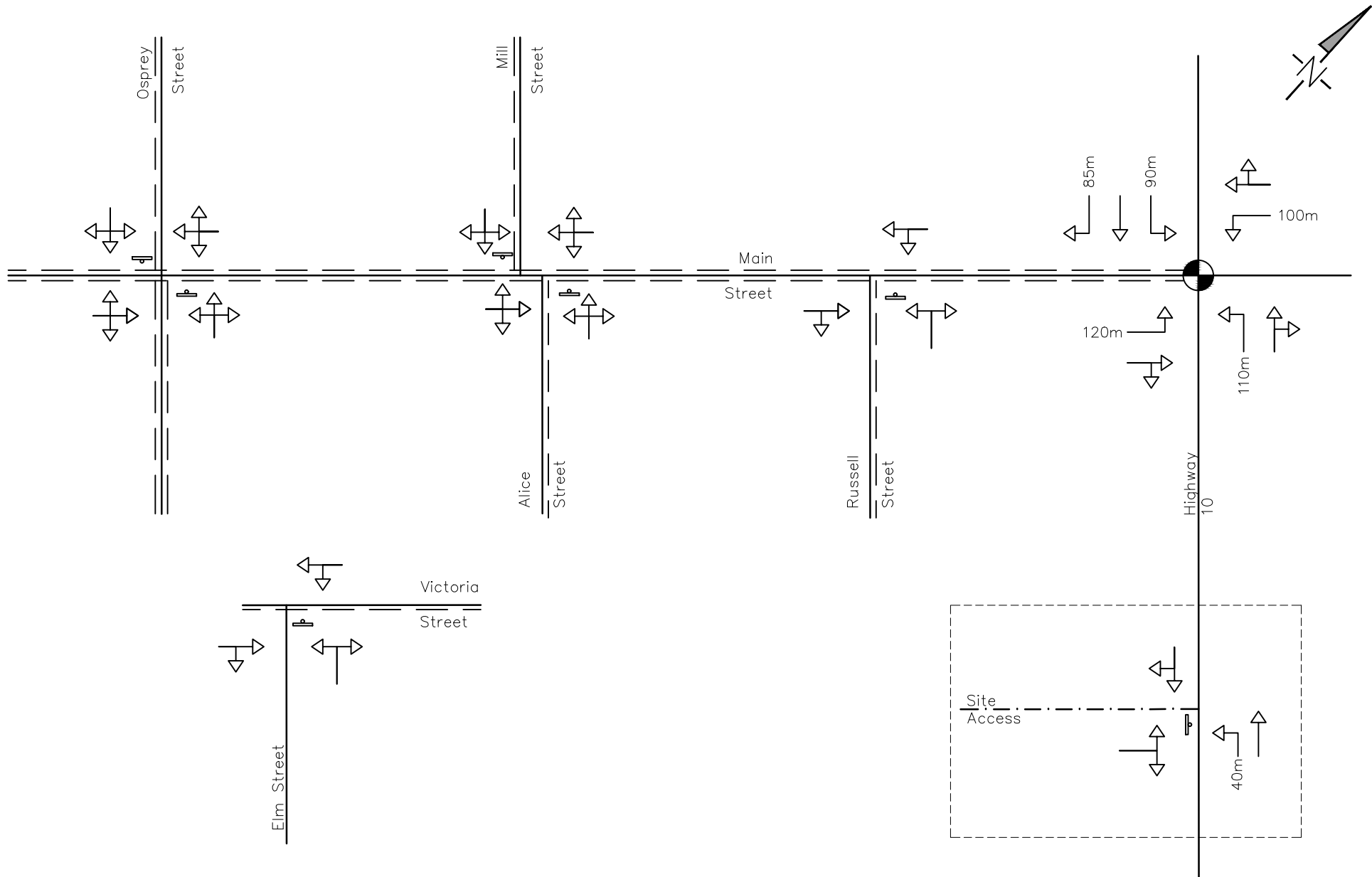
Site Location









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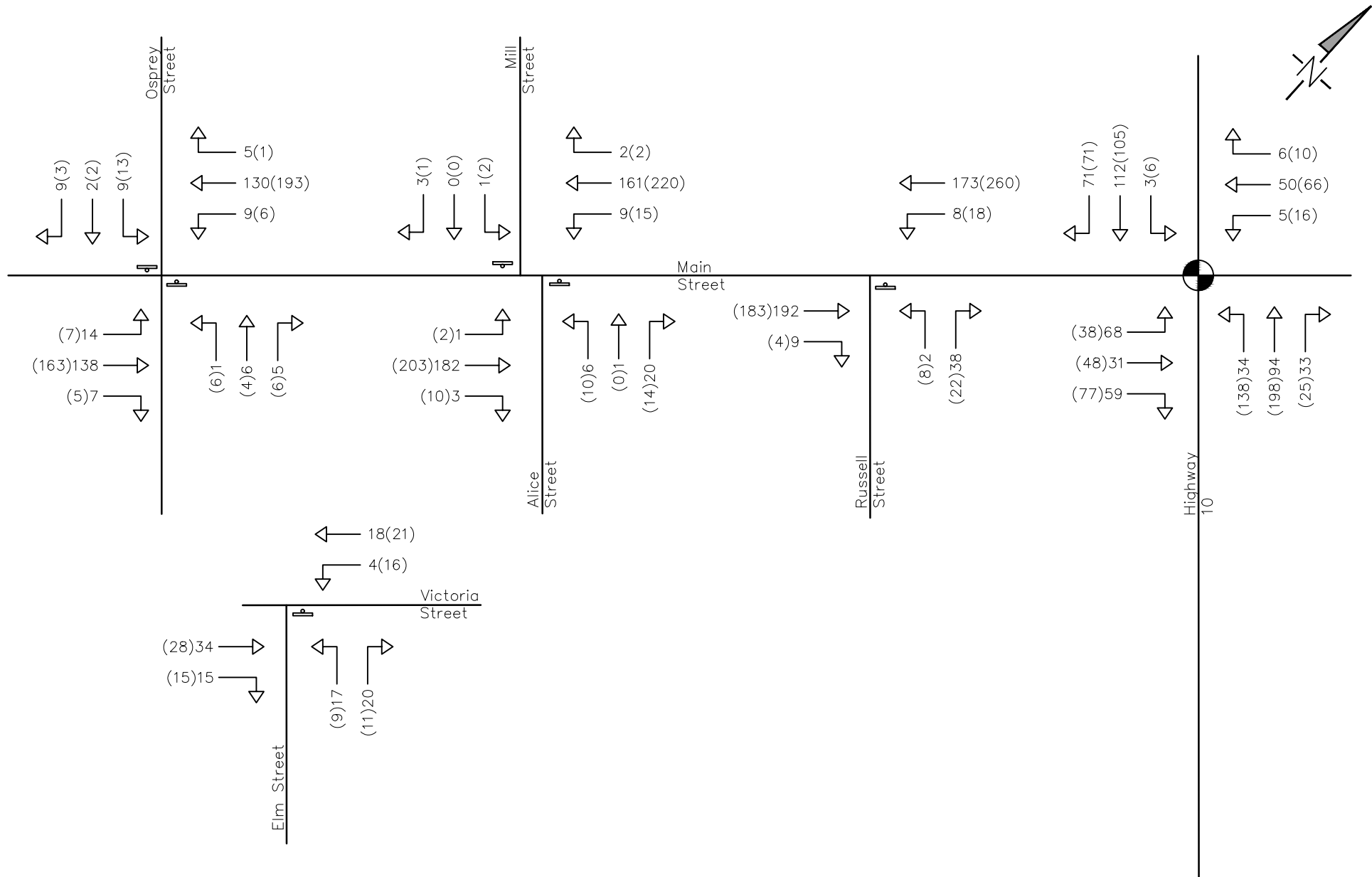
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Scale	N.T.S.	Date	JAN. 20, 2020	Check By	M.F.
					Drawing FIG. 3



NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

<div>Legend</div> <div><div> SIGNAL CONTROL</div><div> STOP CONTROL</div><div> PEDESTRIAN SIDEWALK</div><div> Future Access</div><div> Future Conditions Area</div></div>	<div>Project</div> <div>Edgewood Greens Dundalk, Township of Southgate</div>	<div> CROZIER CONSULTING ENGINEERS</div> <div>THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA</div>
	<div>Drawing</div> <div>Boundary Road Network</div>	
	<div>Drawn By</div> S.K. <div>Design By</div> S.K. <div>Project</div> 1060-5384	
	<div>Scale</div> N.T.S. <div>Date</div> JAN. 21, 2020 <div>Check By</div> M.F. <div>Drawing</div> FIG. 4	



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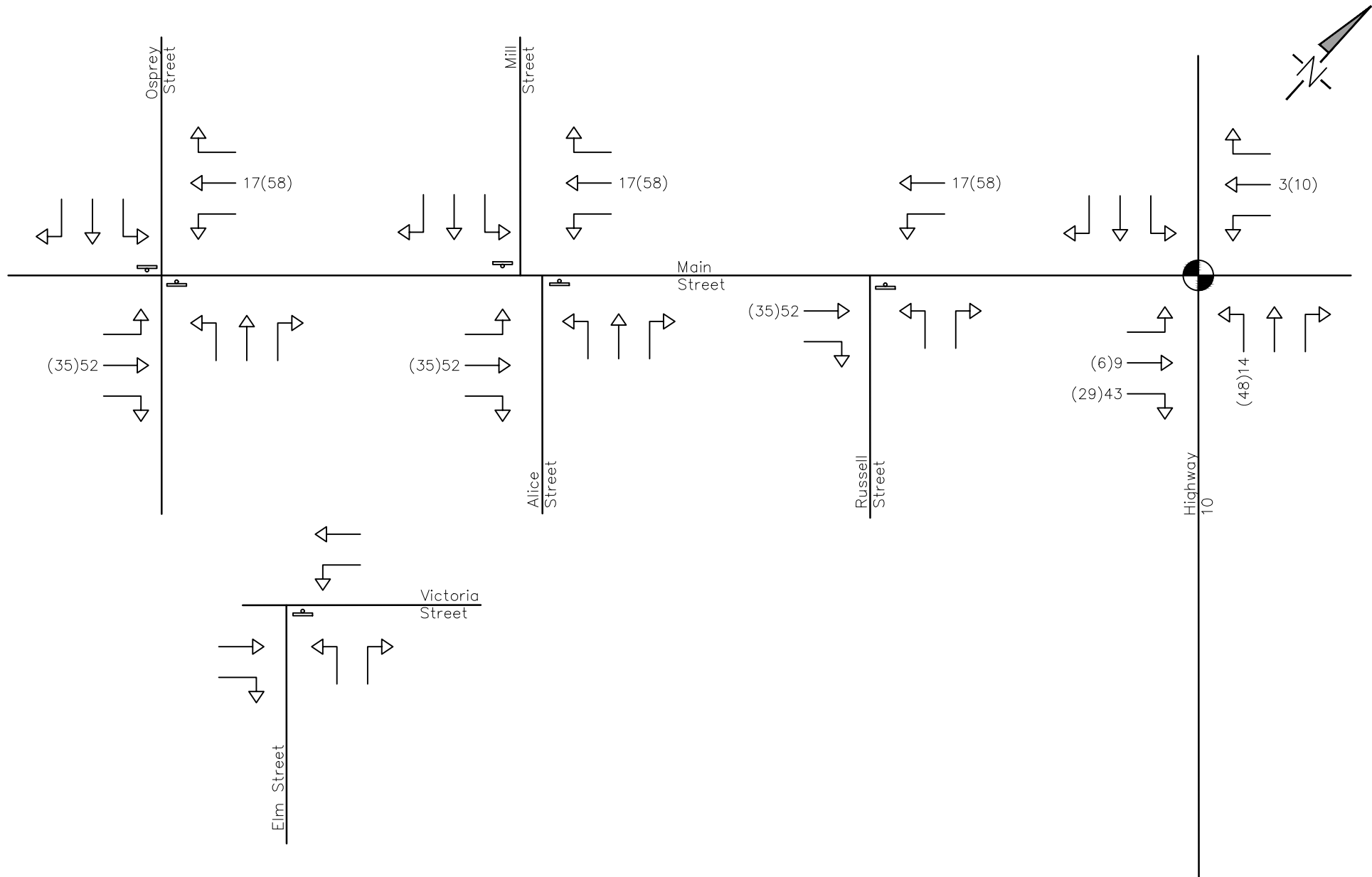
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	Drawing 2019 Existing Traffic Volumes





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					Drawing
					FIG. 5



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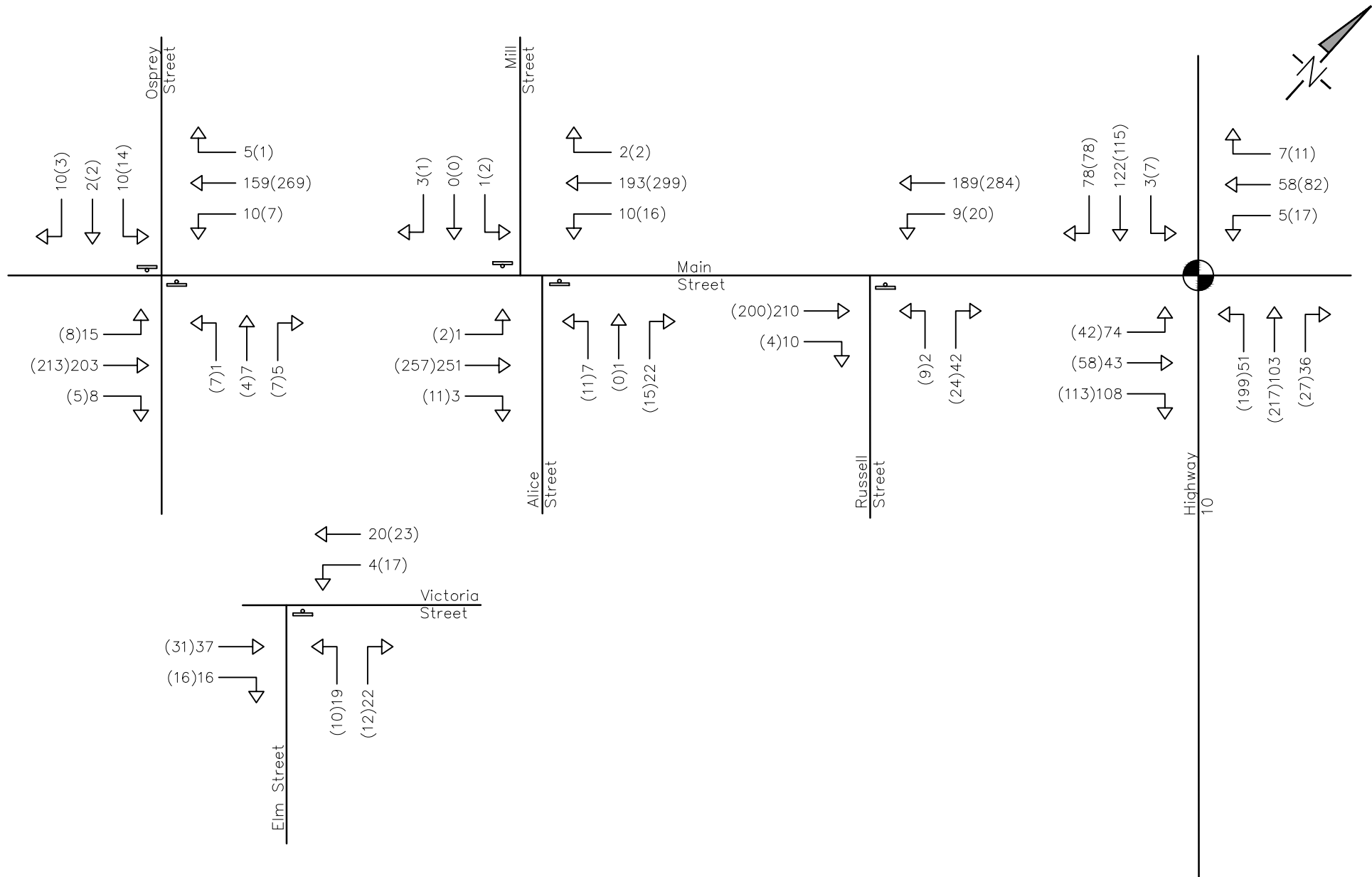
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	Drawing Glenelg Trip Assignment



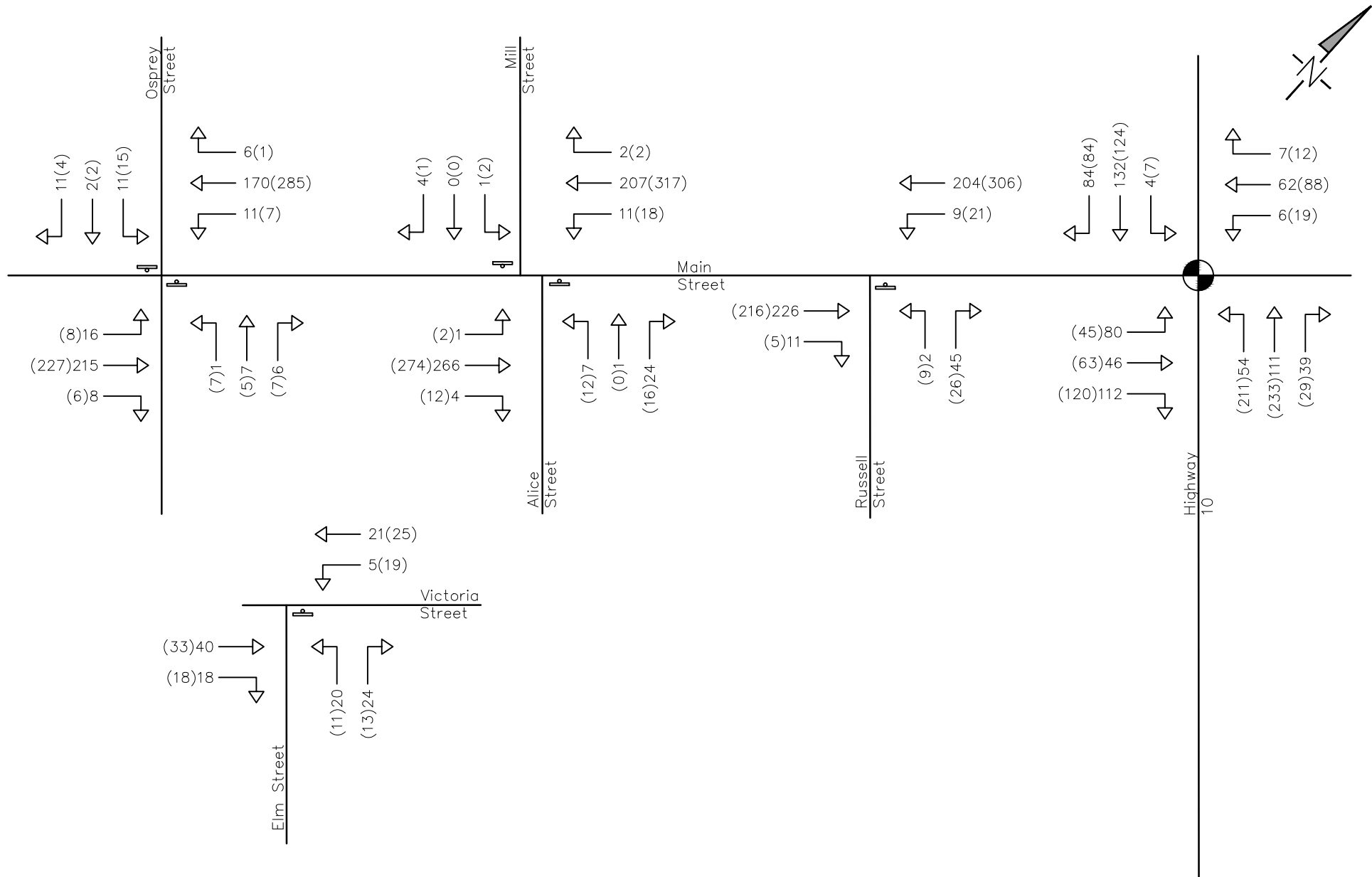
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					FIG. 6



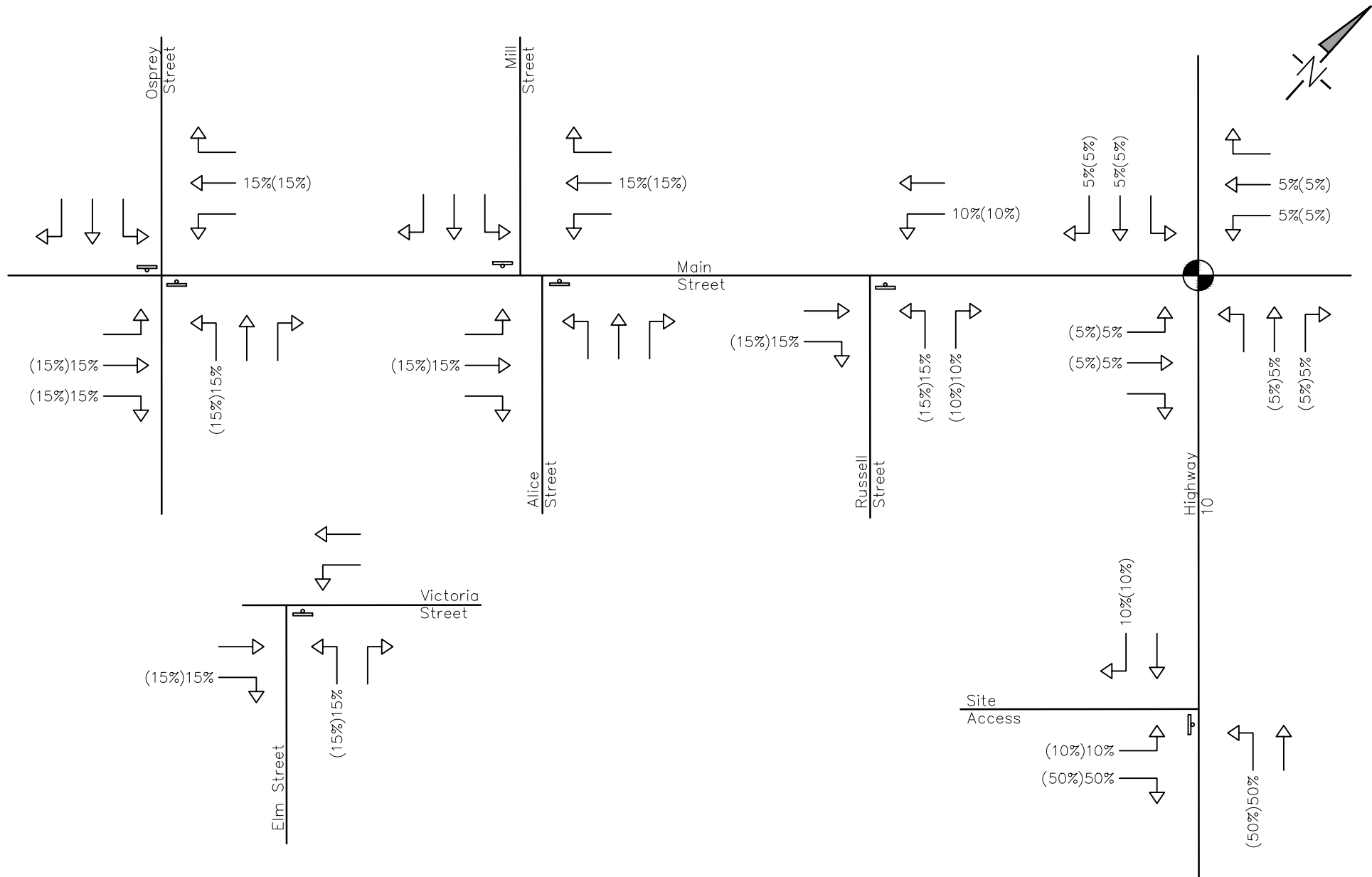
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Drawing					FIG. 8



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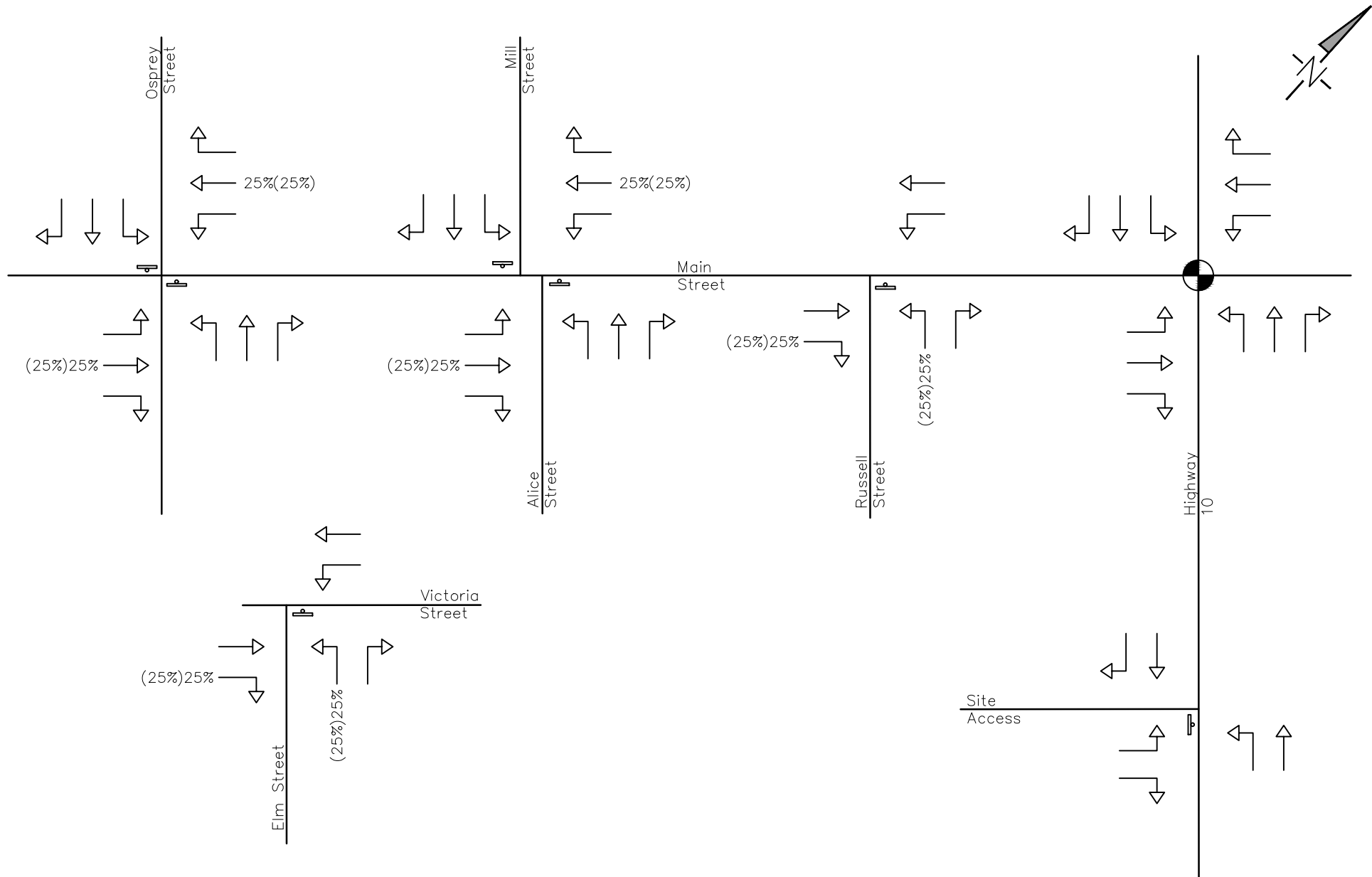
Legend SIGNAL CONTROL STOP CONTROL xx(YY) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES	Project Edgewood Greens Dundalk, Township of Southgate
	Drawing Residential Trip Distribution





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				Drawing	FIG. 10



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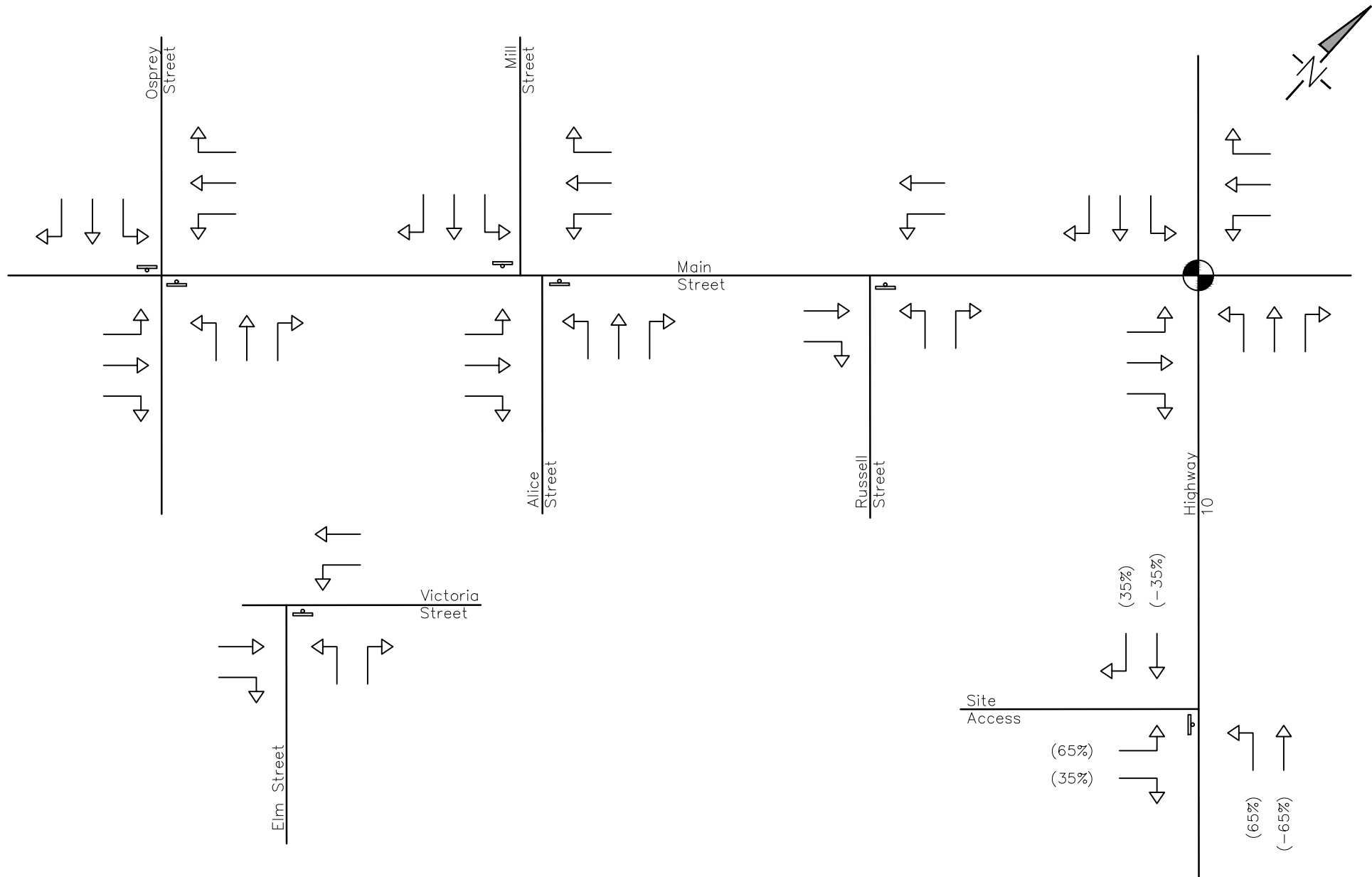
Legend  SIGNAL CONTROL  STOP CONTROL xx(yy) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES	Project Edgewood Greens Dundalk, Township of Southgate
	Drawing Commercial Primary Trip Distribution






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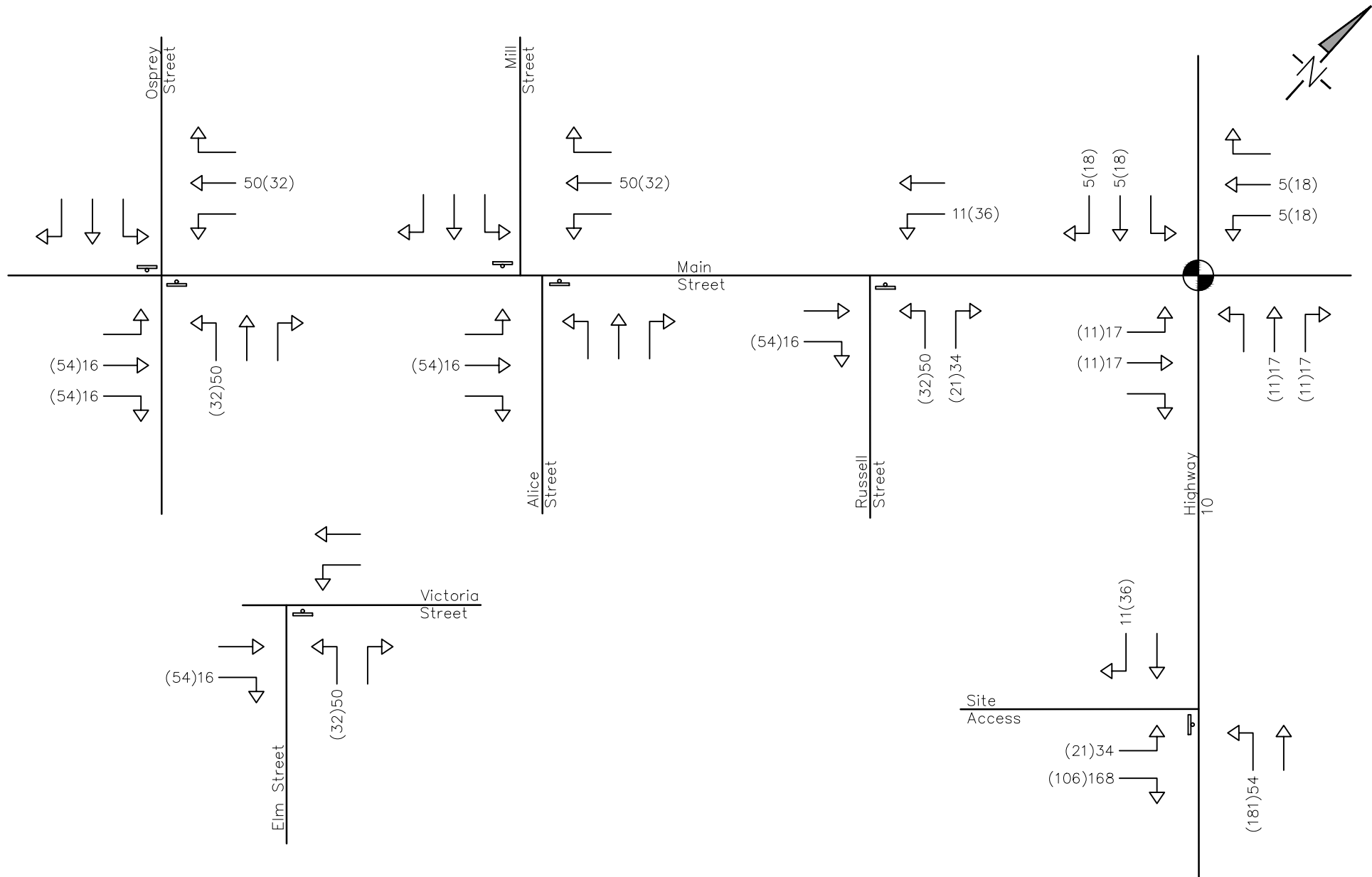
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					Drawing FIG. 11



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<div>Legend</div> <div><div> SIGNAL CONTROL</div><div> STOP CONTROL</div><div><div>xx(yy)</div><div>A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES</div></div></div>	<div>Project</div> <div>Edgewood Greens Dundalk, Township of Southgate</div>	<div><div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div><div><div>THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA</div></div></div>																							
	<div>Drawing</div> <div>Commercial Pass-by Trip Distribution</div>		<table><tr><td>Drawn By</td><td>S.K.</td><td>Design By</td><td>S.K.</td><td>Project</td><td>1060-5384</td></tr><tr><td>Scale</td><td>N.T.S.</td><td>Date</td><td>JAN. 20, 2020</td><td>Check By</td><td>M.F.</td></tr><tr><td colspan="5"></td><td>Drawing</td></tr><tr><td colspan="5"></td><td>FIG. 12</td></tr></table>	Drawn By	S.K.	Design By	S.K.	Project	1060-5384	Scale	N.T.S.	Date	JAN. 20, 2020	Check By	M.F.						Drawing				
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Scale	N.T.S.	Date	JAN. 20, 2020	Check By	M.F.																				
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					FIG. 12																				



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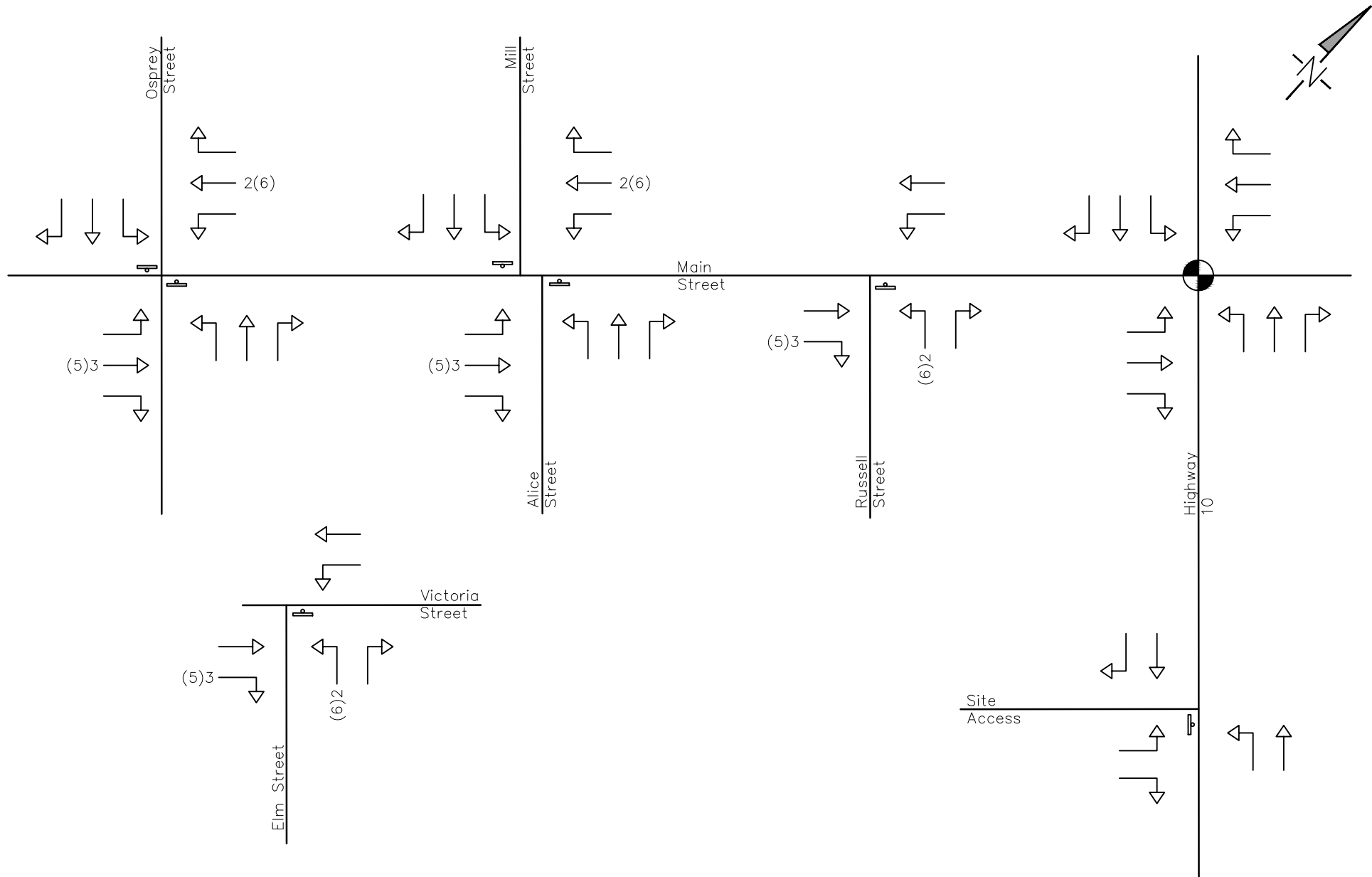
Legend SIGNAL CONTROL STOP CONTROL xx(yy) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES	Project Edgewood Greens Dundalk, Township of Southgate
	Drawing Residential Trip Assignment






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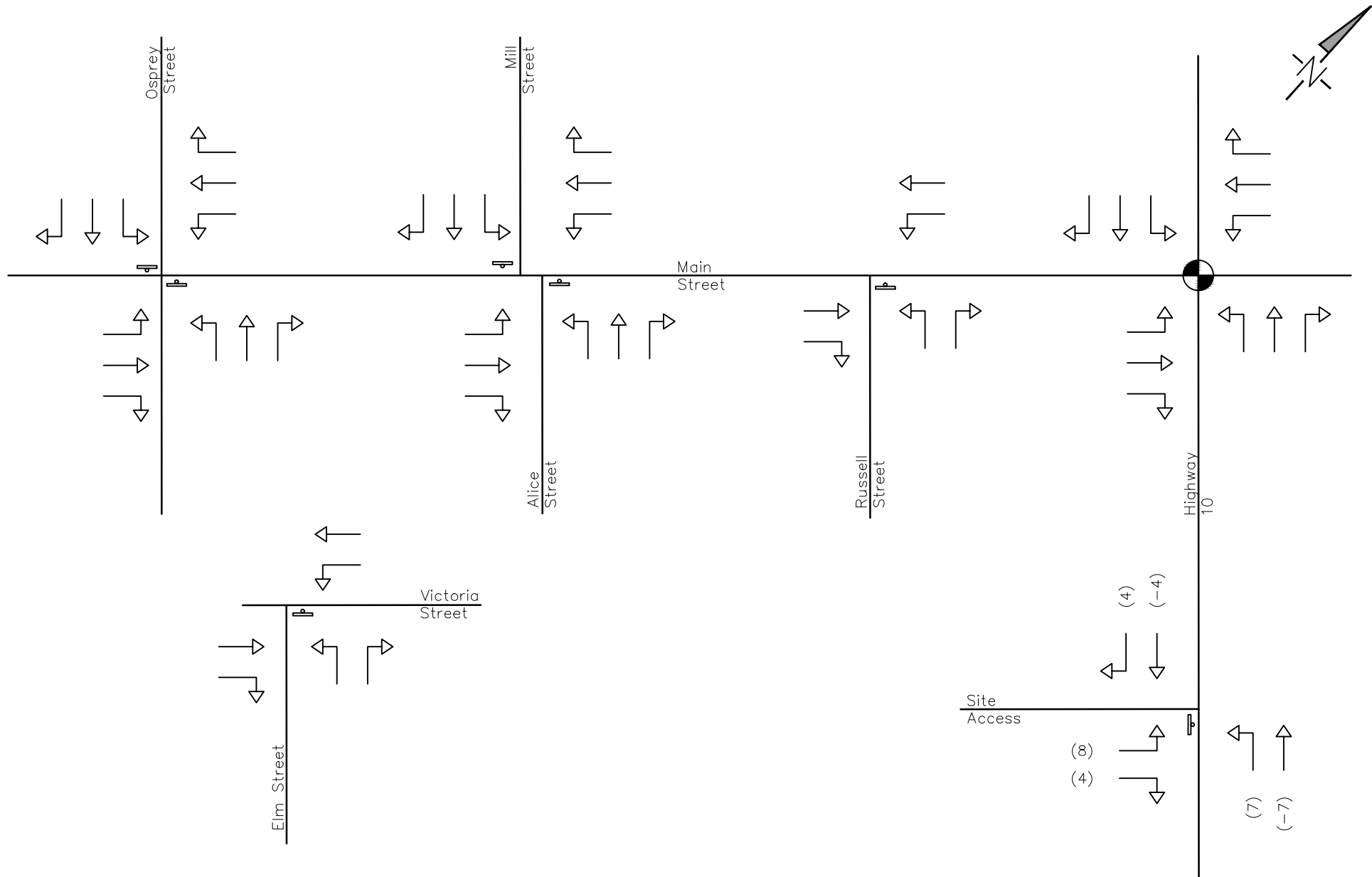
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Scale	N.T.S.	Date	JAN. 20, 2020	Check By	M.F.
					Drawing FIG. 13






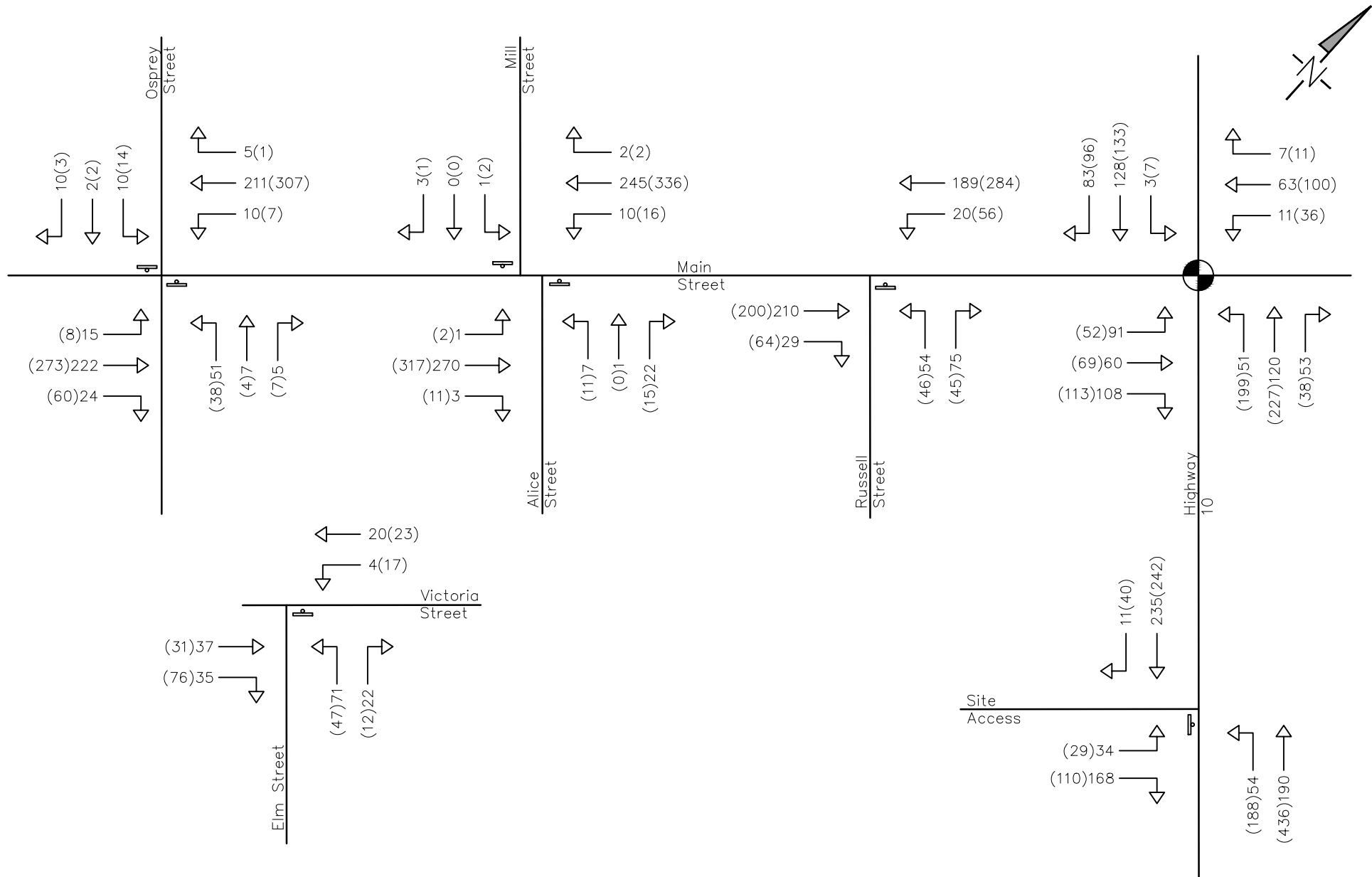
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<div>Legend</div> <div><div></div><div>SIGNAL CONTROL</div></div> <div><div></div><div>STOP CONTROL</div></div> <div><div><div>xx(yy)</div><div>A.M. (P.M.)</div><div>PEAK HOUR TRAFFIC VOLUMES</div></div></div>	<div>Project</div> <div>Edgewood Greens Dundalk, Township of Southgate</div>	<div><div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div><div><div>THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA</div></div></div>
	<div>Drawing</div> <div>Commercial Primary Trip Assignment</div>	
	<div><div>Drawn By</div><div>S.K.</div><div>Design By</div><div>S.K.</div><div>Project</div><div>1060-5384</div></div> <div><div>Scale</div><div>N.T.S.</div><div>Date</div><div>JAN. 20, 2020</div><div>Check By</div><div>M.F.</div><div>Drawing</div><div>FIG. 14</div></div>	



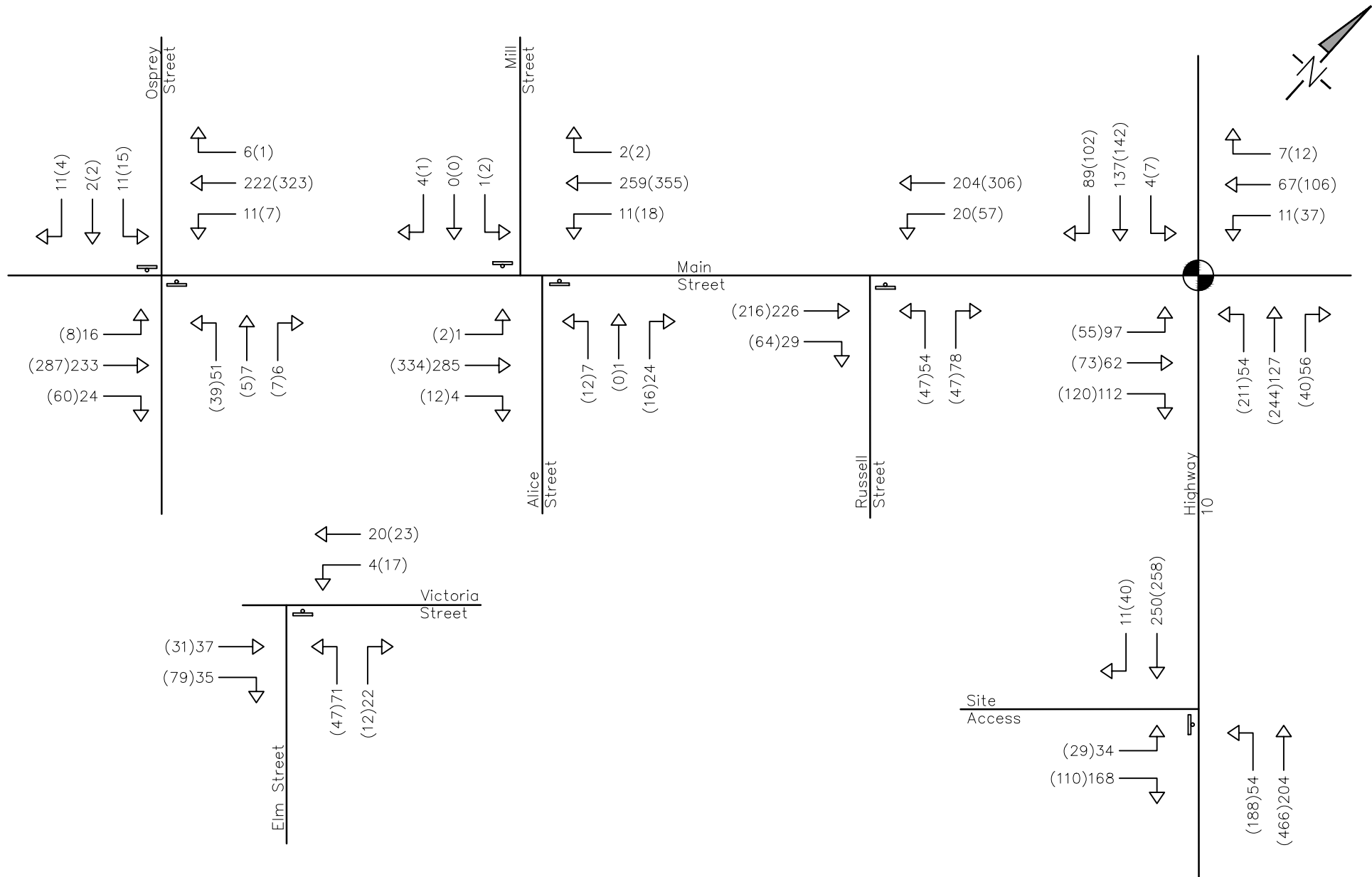
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<div>Legend</div> <div><div></div><div>SIGNAL CONTROL</div></div> <div><div></div><div>STOP CONTROL</div></div> <div><div><div>xx(yy)</div><div>A.M. (P.M.)</div><div>PEAK HOUR TRAFFIC VOLUMES</div></div></div>	<div>Project</div> <div>Edgewood Greens Dundalk, Township of Southgate</div>	<div><div></div><div><div>CROZIER</div><div>CONSULTING ENGINEERS</div></div><div><div>THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA</div></div></div>																		
	<div>Drawing</div> <div>Commercial Pass-by Trip Assignment</div>		<table><tr><td>Drawn By</td><td>S.K.</td><td>Design By</td><td>S.K.</td><td>Project</td><td>1060-5384</td></tr><tr><td>Scale</td><td>N.T.S.</td><td>Date</td><td>JAN. 20, 2020</td><td>Check By</td><td>M.F.</td></tr><tr><td colspan="5"></td><td>Drawing</td><td>FIG. 15</td></tr></table>	Drawn By	S.K.	Design By	S.K.	Project	1060-5384	Scale	N.T.S.	Date	JAN. 20, 2020	Check By	M.F.					
Drawn By	S.K.	Design By	S.K.	Project	1060-5384															
Scale	N.T.S.	Date	JAN. 20, 2020	Check By	M.F.															
					Drawing	FIG. 15														



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Legend SIGNAL CONTROL STOP CONTROL xx(yy) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES	Project Edgewood Greens Dundalk, Township of Southgate			CROZIER CONSULTING ENGINEERS THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705 446-3510 T 705 446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA	
	Drawing 2025 Future Total Traffic Volumes			Drawn By S.K. Design By S.K. Project 1060-5384	Scale N.T.S. Date JAN. 20, 2020 Check By M.F. Drawing FIG. 16



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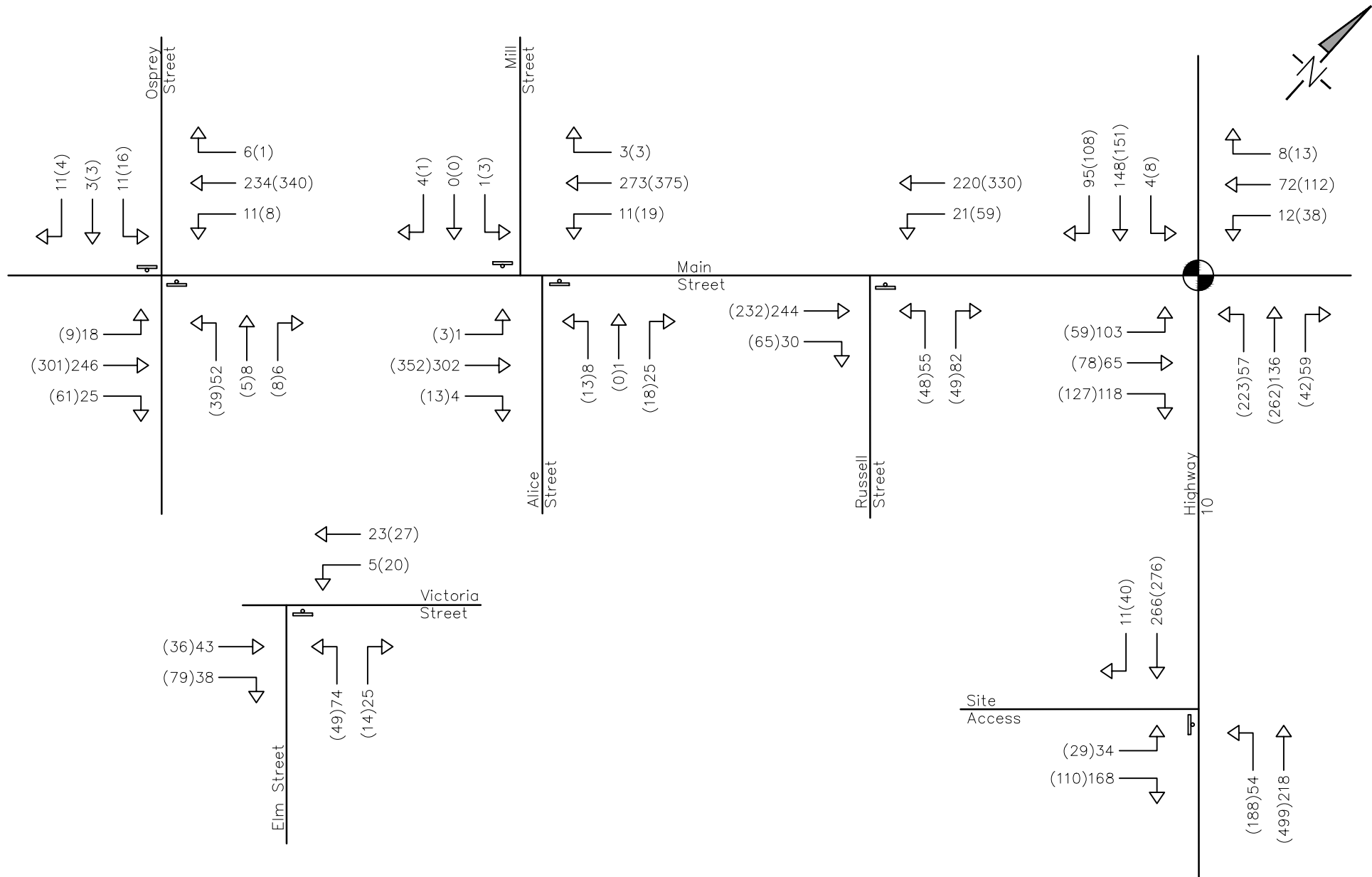
Legend SIGNAL CONTROL STOP CONTROL xx(yy) A.M. (P.M.) PEAK HOUR TRAFFIC VOLUMES	Project Edgewood Greens Dundalk, Township of Southgate	
	Drawing 2030 Future Total Traffic Volumes	



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Scale	N.T.S.	Date	JAN. 20, 2020	Check By	M.F.
					Drawing FIG. 17



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Scale	N.T.S.	Date	JAN. 20, 2020	Check By	M.F.
				Drawing	FIG. 18