

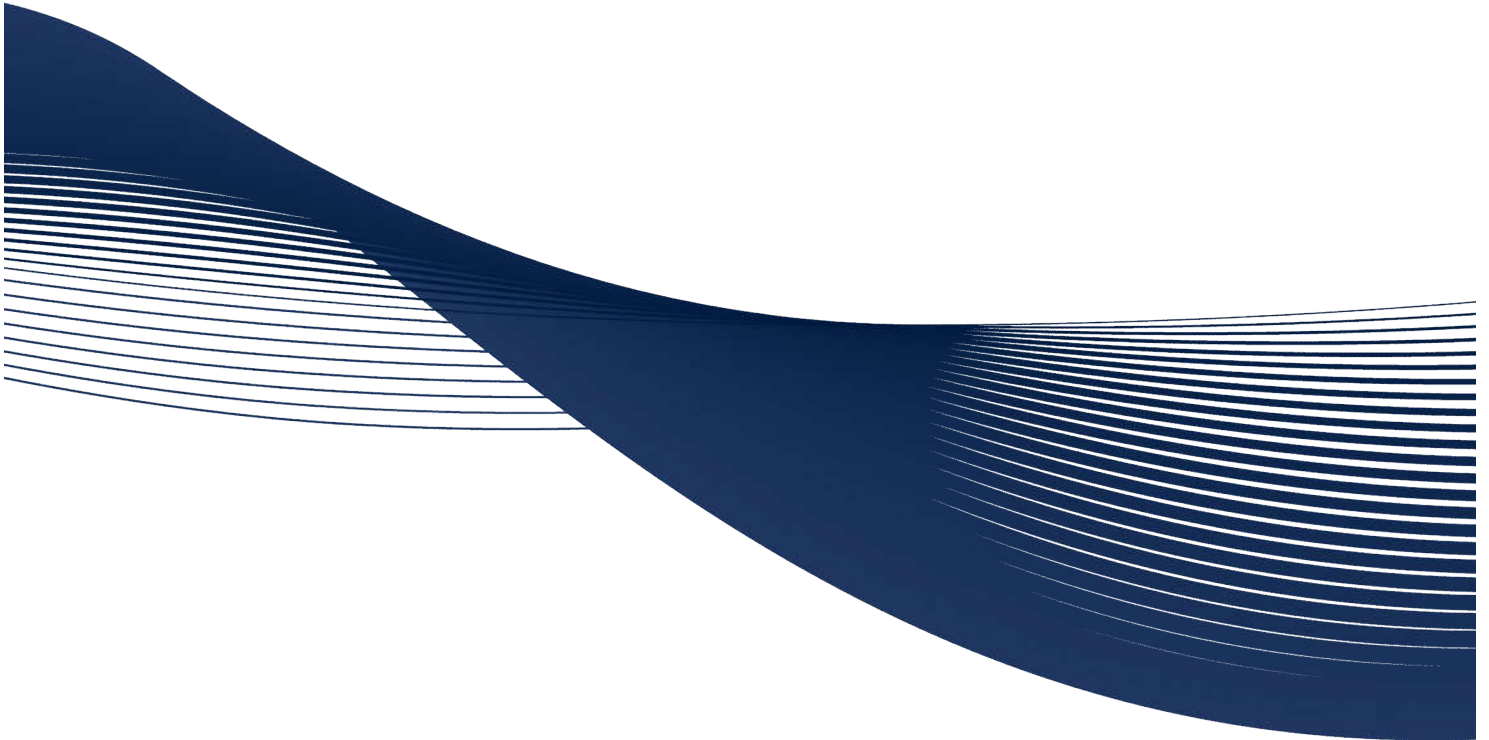
CITY PARK (DIXIE) HOMES INC.

TRAFFIC IMPACT AND PARKING STUDY

2103-2119 Primate Road, 1351 & 1357 Wealthy Place,
2116 & 2112 Dixie Road

City of Mississauga

Project No.: 2017-0294



FEBRUARY 2018

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February 2, 2018
Reference No. 2017-0294

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Dear Mr. Zeppa:

**Re: Traffic Impact and Parking Study
2103-2119 Primate Road, 1351 & 1357 Wealthy Place, 2116 & 2112 Dixie Road,
City of Mississauga**

Cole Engineering Group Ltd. ("COLE") was retained by City Park (Dixie) Homes Inc. (the "Owner") to undertake a Traffic Impact and Parking Study in support of Zoning By-law Amendment and Plan of Subdivision applications for a proposed residential development, located on the northwest quadrant of Dixie Road and North Service Road / Sherway Drive, in the City of Mississauga (the "City"), within the Region of Peel (the "Region").

This Traffic Impact and Parking Study detail the existing and future traffic conditions and the anticipated impact on the surrounding road network as a result of the proposed development. The study has concluded that the proposed development will have minimal impact to the operation of study area intersections throughout the study horizon periods, and no mitigation measures will be required as a result of the traffic generated from the site. There is also adequate maneuvering space provided for garbage and fire trucks to access / egress the site.

Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

COLE ENGINEERING GROUP LTD.



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1 Introduction

Cole Engineering Group Ltd. (“COLE”) was retained by City Park (Dixie) Homes Inc. (the “Owner”) to undertake a Traffic Impact and Parking Study in support of Zoning By-law Amendments and Plan of Subdivision applications for a proposed residential development, located on the northwest quadrant of Dixie Road and North Service Road / Sherway Drive, in the City of Mississauga (the “City”), within the Region of Peel (“Peel”). The site location is shown in **Figure 1-1**.

This study includes the following activities:

- Focus on the intersections of:
 - Dixie Road and Primate Road (Unsignalized); and,
 - Dixie Road and Sherway Drive / North Service Road (Signalized).
- Assess the existing operations of the above-noted study area intersections during the weekday AM and PM peak hours;
- Assess the future background traffic operations for a five (5)-years (2022) horizon period incorporating traffic growth;
- Estimate site traffic based on information published in the *Trip Generation Manual, 9th Edition*, by the Institute of Transportation Engineers (ITE);
- Assess the future total traffic operations (including the anticipated site traffic) at the key study area intersections and accesses for the analysis period;
- Recommend improvements, if applicable, should capacity constraints be observed in the existing and future horizons;
- Review the functionality of the internal vehicular circulation to facilitate fire route / emergency services, as well as garbage collection activities related to the proposed development; and,
- Undertake a review of the proposed parking supply and loading requirements with respect to the City By-law.

1.1 Study Approach

The study’s methodology and analysis reflect the *City of Mississauga Traffic Impact Study Guidelines and Regional Guidelines for Using Synchro Version 7.73 Rev 8*.

Weekday morning and afternoon peak period traffic volume counts were undertaken by Accu-Traffic Inc. on September 6, 2017, at the intersection of Dixie Road / Sherway Drive, and Dixie Road / Primate Road.

Future background traffic volumes for the 2022 horizon year, excluding the additional traffic volumes generated by the proposed development, consist of the following component: traffic growth from outside the study area in the vicinity of the subject development.

Site traffic was derived using information contained in the *Trip Generation, 9th Edition*, published by the Institute of Transportation Engineers (ITE), and distributed based on the existing traffic pattern and 2011 TTS data.

Future total traffic conditions were determined by the summation of the estimated traffic volumes generated by the site and the background traffic volumes for the 2022 full build-out horizon.

1.1.1 Assessment of Unsignalized Intersection Operations

The unsignalized intersection operational analysis in this report was also conducted using *Synchro 9.0* software, which employs the Highway Capacity Manual (HCM 2000) methodology. All parameters for the unsignalized intersection analysis were based on the Synchro default values. Synchro results for the unsignalized intersections are provided in HCM format.

The intersection operations are reported in two (2) ways:

- The volume to capacity (v/c) ratio which is represented numerically for signalized and unsignalized intersections; and,
- The level of service (LOS) which is indicated by a letter and is based on the average control delay per vehicle.

1.1.2 Assessment of Signalized Intersection Operations

Traffic operations conditions at signalized and unsignalized intersections were analyzed using *Synchro Version 9.0*, which incorporates the methodology outlined in the *Highway Capacity Manual* (HCM 2000). Analysis parameters and assumptions have been adopted in accordance with the Region's Synchro guidelines (*Regional Guidelines for Using Synchro- Version 7.73 Rev 8 dated December 2010*). This includes the following assumptions:

- Peak hour factors of 1.00 for all movements on all approaches;
- Ideal saturation flow rate based on Synchro default value of 1,900 vphpl for all movements;
- Heavy vehicle percentage based on the existing traffic volume;
- Existing signal timing and phasing provided by the City; and,
- 3.7m lane width for all through lanes and 3.5m for auxiliary turn lanes on all approaches.

2 Proposed Development

The subject lands are occupied by single dwelling units which will be demolished. The proposed site is to consist of approximately 26 dwelling units of which 18 will be common element condominium detached dwellings and eight (8) will be detached dwellings with frontage on Primate Road. The Site Plan shows a total of 97 parking spaces including 63 parking spaces for common elements townhouses (56 for residents and seven (7) visitor parking spaces), and 32 parking spaces (32 for residents) for the freehold single units the proposed Site Plan is provided in **Figure 2-1**. Access to the common element condominium detached dwellings will be from a common element condominium road extending from the existing Wealthy Place cul-de-sac.

3 Existing Traffic Conditions

3.1 Existing Road Network

The existing road network, lane configuration and traffic control for the study intersections are shown in **Figure 3-1**. The details are described as follows:

- **Primate Road** is a residential two (2) lane undivided roadway with an unposted speed limit of 50km/h. Development along the roadway consists of only residential units with no sidewalks along either side within the study area.
- **Dixie Road** also known as Peel Regional Road 4 (and also, as of 2016, Veterans Memorial Roadway) has a posted speed limit of 50km/h. There are sidewalks available on either side of Dixie Road. Development along the roadway consists of only residential units.
- **Wealthy Place** is a residential two (2) lane undivided roadway with an unposted speed limit of 50km/h. Development along the roadway consists of only residential units with no sidewalks along either side within the study area.

3.2 Existing Transit Routes

Transit services are provided by Durham Region Transit (DRT) and Go Transit. Bus services that operate within the vicinity of the site are described below:

- **MiWay Route 4** travels mostly in the east-west direction with headways of approximately 25 minutes during peak periods. This route can connect the residents to Sherway Gardens to the east and Westdale mall to the west.
- **MiWay Route 5** travels mostly in the north-south direction with headways of approximately 25 minutes during peak periods. This route can connect the residents to Long Branch GO Station to the South and to it travels north up to Cardiff Boulevard.

Existing transit routes are provided in **Appendix A-1**.

3.3 Existing Traffic Counts

The existing traffic volumes, based on recent traffic movement counts obtained at the study area intersections are illustrated in **Figure 3-2** for the weekday AM and PM peak hours.

Traffic surveys were conducted by Accu-Traffic Inc. over a four (4)-hour period, which included the morning peak period (7:00 AM to 9:00 AM) and the evening peak period (4:00 PM to 6:00 PM).

The survey locations are summarized in **Table 3.1** and the survey data (Turning Movement Counts) is attached in **Appendix A-2**.

Table 3.1 Intersection Turning Movement Count Details

Intersection	Count Date	Count Hours	Peak Hours
Dixie Road and Sherway Drive	Wednesday, September 6, 2017	7:00 AM to 9:00 AM 4:00 PM to 6:00 PM	7:45 AM to 8:45 AM 4:00 PM to 5:00 PM
Dixie Road and Primate Road	Wednesday, September 6, 2017	7:00 AM to 9:00 AM 4:00 PM to 6:00 PM	7:45 AM to 8:45 AM 4:15 PM to 5:15 PM

3.4 Existing Traffic Analysis

The existing traffic volumes for the weekday AM and PM peak hours are illustrated in **Figure 3-2**. These peak hour volumes were analyzed using the *Synchro 9.0* software which employs the 2000 Highway Capacity Methodology for the intersection analysis. The results of the existing intersection operations are summarized in **Table 3.2** below with level of service (LOS) and the volume to capacity (v/c) ratios for overall and individual movements. As per the City's Traffic Impact Study Guidelines, v/c ratios for overall signalized intersection operations, through movements, or shared through / turning movements greater than 0.85, and v/c ratios for exclusive movements greater than 0.90 have been shown in bold. The intersection capacity analysis reports under the existing conditions are presented in **Appendix B**.

Table 3.2 Existing (2017) Weekday AM and PM Peak Hour Traffic Analysis

Intersection	Key Movement	LOS (v/c)	
		AM Peak	PM Peak
Dixie Road and Primate Road	EB Left + Through	E (0.21)	E (0.26)
	NB left	B (0.01)	B (0.00)
	NB Through	A (0.30)	A (0.21)
	SB Through + Right	A (0.50)	A (0.61)
North Service Road / Dixie Road and Dixie Road South / Sherway Drive	Overall	F (1.33)	E (1.00)
	EB Left	F (0.89)	F (0.92)
	EB Through	F (0.91)	F (0.92)
	EB Right	D (0.05)	E (0.18)
	WB Left + Through	F (3.65)	F (1.27)
	WB Right	E (0.15)	E (0.03)
	NB Left	C (0.39)	B (0.51)
	NB Through + Right	D (0.33)	C (0.21)
	SB Left	D (0.43)	C (0.14)
	SB Through	D (0.13)	C (0.15)
	SB Right	E (0.93)	F (1.10)

Based on the analysis conducted for the existing (2017) traffic conditions in the AM and PM peak hours, the following movements operate with high LOS.

North Service Road / Dixie Road and Dixie Road South / Sherway Drive:

- The Eastbound left movement along with the through movements operate with a level of service 'F' during the PM peak period. The movements also operate close to capacity (0.92) in the PM peak period;
- Westbound shared left and through movement operate over capacity with the level of service 'F' during both peak periods. The volume to capacity ratio during the morning peak period is 3.65 and 1.27 during the evening peak period; and,
- The Southbound right movement operates close to capacity with a v/c ratio of 0.93 in the AM peak period and level of service of 'E'. It operates over capacity with a v/c ratio of 1.10 in the PM peak period and a level of service of 'F'.

It is important to note that the intersection of North Service Road/Dixie Road & Dixie Road South / Sherway Drive is scheduled for re-alignment as described in the *Transportation Environmental Study Report-Queen Elizabeth Way (QEW) - from Evans Avenue to Cawthra Road* prepared by the MMM Group in January 2016. Details of the re-alignment are described in **Section 4.1**

4 Future Background Traffic

It is expected that the construction of the subject development will be fully completed by 2022 and therefore, for the purpose of this assessment a horizon year of 2022 was selected to represent full build-out of the subject site.

The future background traffic volumes consist of the following components:

- Background traffic growth from outside the study area; and,
- Traffic generated from other proposed developments in the vicinity of the study area.

Based on the available Average Annual Daily Traffic (AADT) volumes along Dixie Road (600m north of South Service Road) from 1996-2013, a 4% (northbound) and -1 % (southbound) growth rate per annum year along Dixie Road was identified. To be more conservative, a 2% per annum growth rate (compounded) was being applied to the through movements along Dixie Road.

There is one (1) active background development immediately south of the proposed site located at 1503-1565 Edencrest Drive. The site is proposed to have 13 detached condominium dwellings on a common element road. A Traffic Impact Study was conducted for this development by the UEM Consulting. A summary of UEM's calculated site generated trips can be seen in **Appendix C**.

4.1 Future Planned Roadway Improvements

The road improvements outlined in the *Transportation Environmental Study Report-Queen Elizabeth Way (QEW) - from Evans Avenue to Cawthra Road* prepared by MMM Group in 2016 states that the existing Dixie Road interchange is to be realigned and replaced with a Parclo (Partial Cloverleaf) A2 configuration north of the QEW and a Parclo A4 configuration south of the QEW. To accommodate the change of interchange the following geometric changes are proposed for Dixie Road:

"The existing Dixie Road alignment will be shifted to the east of the existing Dixie Road Bridge in order to maintain traffic flow on the existing Dixie Road during construction and to minimize the property impacts. The proposed Dixie Road alignment will match with existing roadway approximately 215m north of Sherway Drive north of the QEW and approximately 50m south of Londonderry Boulevard south of the QEW."

With the changes to Dixie Road, North Service Road is proposed to be reconfigured and realigned. The Environmental Study states that “East of Dixie Road, the North Service Road will no longer exist and will be replaced with a new QEW westbound off-ramp that connects to Dixie Road. The access to the existing North Service Road from Brentano Boulevard will be closed. Access to the North Service Road east of Dixie Road will be via the local roads to Sherway Drive.”

The future lane configurations are shown in **Figure 4-1**. The existing traffic was also re-assigned to the future roadways in order to analyze the future scenarios. The re-assigned existing volumes are shown in **Figure 4-2**.

4.2 Future (2022) Background Traffic Analysis

The future (2022) background traffic volumes were analyzed using the *Synchro 9.0* software which employs the 2000 Highway Capacity Methodology for the intersection analysis. The results are summarized in **Table 4.1**. As per the City’s Traffic Impact Study Guidelines, v/c ratios for overall signalized intersection operations, through movements, or shared through / turning movements greater than 0.85, and v/c ratios for exclusive movements greater than 0.90 have been shown in bold. The future (2022) background traffic volumes are illustrated in **Figure 4-3**. Detailed calculations are provided in **Appendix D**.

It should be noted that the future background traffic assessment completed based on the new road alignment described in **Section 4.1**.

Table 4.1 Future (2022) Background Weekday AM and PM Peak Hour Traffic Analysis

Intersection	Key Movement	LOS (v/c)	
		AM Peak	PM Peak
Dixie Road and Primate Road	EB Left + Through	E (0.26)	E (0.09)
	NB left	B (0.01)	B (0.00)
	NB Through	A (0.33)	A (0.24)
	SB Through + Right	A (0.56)	A (0.67)
Dixie Road and Dixie Road South / Sherway Drive (with the new road improvements)	Overall	B (0.63)	A (0.65)
	WB Left	B (0.31)	C (0.20)
	WB Right	B (0.47)	B (0.03)
	NB Through + Right	A (0.55)	A (0.38)
	SB Left	B (0.50)	A (0.16)
	SB Through	B (0.69)	A (0.73)

Based on the analysis conducted for the future (2022) background traffic conditions in the AM and PM peak hours, all intersection movements are performing the good level of service and v/c ratios.

5 Future Total Traffic

5.1 Site Generated Traffic

Trip generation was undertaken using information contained in the *Trip Generation Manual, 9th Edition* published by the Institute of Transportation Engineers (ITE). Vehicle trips during the weekday AM and PM peak hours for the *Residential Condominium / Townhouse* (ITE land use code 230) for the proposed residential land uses were used.

Using the information contained in the 2011 Transportation Tomorrow Survey (TTS) for zones of households 3654 (Subject Zone), 3649, 3653, and 297 the modes of transportation within the study area are provided in **Table 5.1**. A trip reduction of 10% was used to account for public transit use and travel demand management measures

Table 5.1 Non-Auto Modal Split Calculation

Zones	Auto Driver	Auto Passenger	Taxi Passenger	Transit Excluding GO Rail	GO Rail Only	Go Rail Joint Local Transit	Cycle	Walk	Total
3649	14344	2264	102	835	152	80	60	139	17999
3654	7819	918	28	442	178	0	101	39	9525
297	7060	999	0	1371	165	22	71	0	9688
3653	14222	2350	22	1815	82	138	57	69	18755
Total	43445	6531	152	4463	577	240	289	247	55944
Percent	78%	12%	0%	8%	1%	0%	1%	0%	100%
Non-Auto Reduction									10%

The trip rate used to calculate the gross trips is calculated using the average rate in the Trip Generation Manual since the average rate produced a greater number of trips than the regression equation. The summary of the trip generation is shown in **Table 5.2** below.

Table 5.2 Site Trip Generation

	Land Use Code	Units	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Residential Condominium / Townhouse								
Trip Rate (per unit)	230	26	0.62			0.54		
Directional Distribution			17%	83%	100%	67%	33%	100%
Gross Trips			3	15	18	13	7	20
Non-Auto (10%)			0	2	2	2	1	3
New Trips			3	13	16	9	5	14
Total Gross Trips			3	15	18	13	7	20
Total New Trips			3	13	16	9	5	14

The proposed development is expected to generate 16 two (2) way new trips (three (3) trips in / 13 trips out) during the weekday AM peak hour and 14 two (2) way new trips (nine (9) trips in / five (5) trips out) during the PM peak hour.

5.2 Site Trip Distribution

The trip distribution was based on existing turning movements in the vicinity of the site along with the 2011 TTS data analysis and presented in **Table 5.3**. **Figure 5-1** illustrate the resulting site trip assignments.

Table 5.3 Site Trip Distribution

Direction (from / to)		Trip Distribution
North	Via Dixie Road	32%
South	Via Dixie Road	25%
West	Via North Service Road	43%
East	Via Sherway Drive	0%

5.3 Future Total Traffic Volumes

The future total traffic consists of future background traffic plus site-related traffic. The future total traffic volumes in the weekday AM and PM peak hours for the horizon year 2022 are illustrated in **Figure 5-2**.

5.4 Future (2022) Total Traffic Analysis

Intersection capacity analysis under the future (2022) total traffic conditions was completed using *Synchro 9* software which employs the 2000 Highway Capacity Methodology for the intersection analysis. The traffic analysis results for future (2022) total traffic are summarized in **Table 5.4** below. As per the City's Traffic Impact Study Guidelines, v/c ratios for overall signalized intersection operations, through movements, or shared through / turning movements greater than 0.85, and v/c ratios for exclusive movements greater than 0.90 have been shown in bold. The intersection capacity analysis under the future (2022) total traffic conditions are presented in **Appendix E**.

Table 5.4 Future (2022) Total Weekday AM and PM Peak Hour Traffic Analysis

Intersection	Key Movement	LOS (v/c)	
		AM Peak	PM Peak
Dixie Road and Primate Road	EB Left + Through	F (0.36)	E (0.15)
	NB left	B (0.02)	B (0.02)
	NB Through	A (0.33)	A (0.24)
	SB Through + Right	A (0.56)	A (0.67)
Dixie Road and Dixie Road South / Sherway Drive (with the new road improvements)	Overall	B (0.63)	A (0.60)
	WB Left	B (0.31)	C (0.20)
	WB Right	B (0.47)	B (0.03)
	NB Through + Right	A (0.55)	A (0.38)
	SB Left	B (0.50)	A (0.16)
	SB Through	B (0.69)	A (0.73)

Based on the analysis conducted for the future (2022) total traffic conditions in the AM and PM peak hours, all intersections are performing at a good level of service and v/c ratios.

No road network improvements are recommended or required in these conditions in the vicinity of the subject site other than that recommended the road improvements outlined in the *Transportation Environmental Study Report-Queen Elizabeth Way (QEW) - from Evans Avenue to Cawthra Road* prepared by MMM Group in 2016.

6 Site Circulation

Based on Client discussion with MTO, given that the section of Dixie Road in the vicinity of the site falls within the MTO Controlled Access Highway (CAH) area, a site access is not permitted within the vicinity. As such, site access is provided through Wealthy Place.

Vehicle access routes for garbage trucks and fire trucks were assessed using *AutoTURN 10.0* analysis depicting the swept path of vehicles in relation to the proposed driveway system utilizing the Transportation Association of Canada's (TAC) design vehicles.

To ensure heavy vehicles maneuver throughout the subject site, a typical 12.80m fire truck and 12.00 garbage truck were used. **Figure 6-1** and **Figure 6-2** show the assessment for the fire truck and garbage truck respectively. As illustrated in the figures, adequate space is available for the trucks to circulate in the site / access / egress to / from the proposed site.

7 Parking Assessments

The site statistics provided by Flanagan Beresford and Patteson Architects dated November 3, 2017, for the proposed development, shows 97 parking spaces including 63 parking spaces for the common element townhouses (56 for residents and seven (7) visitor parking spaces), and 34 parking spaces for the freehold single units.

7.1 Zoning By-law Parking Requirements

To determine the adequacy of the proposed parking supply to service the proposed hotel development, the existing in force City Zoning By-law No. 0225-2007 Part 3 was reviewed and examined.

Based on the parking ratios noted above, parking for this site is required as noted in **Table 7.1** below.

Table 7.1 City of Mississauga Zoning By-Law 0225-2007 Parking Requirement

Land Use	Units	Parking Rate	Required Parking Space	Proposed Parking Space	Difference
Detached dwellings	8	2 spaces / unit	16	97	40
Common Element detached dwellings (Condominium detached dwellings)	18	2 spaces / unit plus 0.25 visitor spaces / unit	41		

Based on the current City Zoning By-law, the proposed development is required to provide 16 parking spaces for detached dwellings and 41 parking spaces for Condominium common element condominium detached dwellings. The Site Plan illustrates 97 parking spaces, which technically satisfies the City's parking requirement.

8 Transportation Demand Management Plan

Transportation Demand Management (TDM) refers to a variety of strategies to reduce congestion, minimize the number of single-occupant vehicles, encourage non-auto modes of travel, and reduce vehicle dependency to create a sustainable transportation system. In short, TDM works to change how, when, where, and why people travel.

The TDM measures have been prepared to address the following required transportation demand management objectives:

- Provision of facilities / operations to minimize single occupant vehicle (SOV) access to the study area and encourage the use of alternate transportation modes, particularly transit; and,
- Identify the operational and financial roles and responsibilities of the landowner including program development, implementation and ongoing management and operations of the travel demand management plan / program.

TDM education and promotion related strategies support mobility by making the public aware of the options available and actively encourages the use of alternative transportation. These marketing initiatives may take the form of general marketing to targeted outreach. TDM marketing and promotion approaches include:

- Area marketing campaigns – Promoting transit services, carpooling or other TDM;
- Education Programs – Campaigns to inform the public about the specifics of services; and,
- Employer-Based Outreach – Partnerships with employers to support TDM.

8.1 TDM Programs

8.1.1 Area Marketing Campaigns

Area marketing campaigns are premised on the objective of behavioral change. The methods of persuasion include conveying messages of:

- Personal benefit;
- Social benefit, and,
- Adhering to the “social norm”.

It is recognized that individuals are more likely to change their current behavior or continue that behavior if it is the social norm amongst their peers.

One of the first area marketing TDM campaigns within the GTA was established by Metropolitan Toronto in 1994. The Diamond Lane Campaign was implemented in co-ordination with the expansion of the High Occupancy Lane network. The campaign included billboard, transit vehicle, radio, and newspaper ads. Transportation Management Association (TMA)’s can help facilitate TDM directives by developing promotional materials, advocate for funding, conduct transportation fairs, and many other things.

8.1.2 Education Programs and Information Services

The effectiveness of transportation systems to provide mobility to the public is only as good as the awareness of the public to the services provided. Education programs and information services (such as call-lines and internet-based route planners) can supplement marketing campaigns, increasing the commuter's understanding of their mobility options.

Miway provides <http://www.mississauga.ca/portal/miway> a map based navigator. Progressive trip planners including web-based trip data can add to the commuter's understanding of travel options by providing real-time information.

A Denver, Colorado TMA (Transportation Solutions) managed a program designed to improve ridership. Before-and-after surveys were to gauge the impact of the efforts. The results clearly demonstrated the direct impact of the project on improved perceptions of bus transportation in the area. The results showed an increase in awareness:

- 17% increase in those who "know which bus routes to take to work/school"; and,
- 19% increase in those who feel they have "the information I need to ride the bus".

8.1.3 Walking / Cycling

The City has a long-standing commitment to an off-road trail system, having built over 250km of pathways and trails in parks and greenspaces across the City. Pathways in the neighborhood parks provide cycling and walking friendly connections to schools, community centers, and libraries. In addition, cycling safety programs were offered such as CAN-BIKE courses and community safety workshops. The Road Safety Handbook was published and includes a chapter on cycling safety.

As identified in the Regions of Peel's Active Transportation Plan Implementation Strategy 2014 Program Update, Hanlan Feedermain Water Project and the City of Mississauga to improve walking and cycling facilities along Dixie Road, as a component of the Preferred Plan, MTO will be accommodating the Peel Region's request to extend their multi-use trail along Dixie Road from south of Kendall Road southerly through the study limits to the newly relocate Dixie Outlet Mall south entrance. As a result, a sidewalk on the east side and multi-use pedestrian / cyclist trail on the west side.

Based on the COLE's previously submitted TIS reports, a parking rate of 0.08 bicycle parking space per unit was used for short-term bicycle parking and a rate of 0.7 parking space per unit was used for long-term parking space. The long-term bicycle parking for common-element is been assumed to be covered with the provided garages. For short-term bicycle parking, two (2) parking spots are required. It is recommended that one (1) on-site bike rack, which can park two (2) bicycles, be provided for the detached dwellings and common element condominium detached dwellings.

8.1.4 Carpooling

The Smart Commute program has been established in the form of 10 transportation management associations (TMAs) across the GTHA. The Smart Commute TMAs are supported by Metrolinx to coordinate and implement TDM initiatives.

Smart Commute – the City is a TMA committed to reducing traffic congestion, improving air quality and advocating for sustainable transportation within the study area. Since inception in 2001, Smart Commute has collectively reduced approximately 1.2 million single-occupant vehicles (SOV) trips, which avoided more than 61 million vehicle kilometers traveled (VKT) and prevented the emission of over 14,000 tonnes of greenhouse gases (GHG) and 88 tonnes of smog-causing air pollutants. Smart Commute works to:

- Implement employee trip reduction programs at local workplaces;
- Decrease traffic congestion, and improve air quality and health by reducing vehicle emissions;
- Improve employee productivity and morale, and reduce employee turnover;
- Advocate for improved transit service, and increased local transportation infrastructure;
- Bus-only and cycling lanes, and a wider network of subway and light rapid transit;
- Promote the benefits of transit-supportive development and smart-growth strategies;
- Encourage legislative flexibility in support of high-value, cost-effective transportation strategies such as vanpools, telework, transit subsidies and shuttle services; and,
- Increase opportunities for TMA collaboration with business and government.

Smart Commute offers one-on-one support for staff to use sustainable modes of transportation and provides promotions and incentives on an on-going basis. A web-based car matching tool is provided to allow carpoolers to easily identify ride matching options among a large membership base and form carpooling arrangements.

9 Conclusions

The findings and conclusions of our analysis are represented as follows:

- The study area intersections are operating over capacity in the existing traffic conditions during both the AM and PM peak hours;
- With the new Dixie Road alignment, during both the AM and PM peak hours in the future background traffic conditions for the horizon year 2022, all the key intersections are expected to function below-capacity and with acceptable level of service;
- The proposed development is expected to generate 16 two (2) way new trips (three (3) trips in / 13 trips out) during the weekday AM peak hour and 14 two (2) way new trips (nine (9) trips in / five (5) trips out) during the PM peak hour;

- The proposed development is expected to have a negligible impact on the surrounding road network as future total traffic is expected to operate in a similar fashion to the future background scenario (below-capacity and with acceptable level of service) in 2022 horizon years;
- The proposed development is required to provide 16 parking spaces for detached dwellings and 41 parking spaces for Condominium common element condominium detached dwellings. The Site Plan illustrates 97 parking spaces, which technically satisfies the City's parking requirement;
- Based on the *AutoTurn* assessment, adequate space is available for fire trucks and garbage trucks to access / egress from / to the proposed site; and,
- For short-term bicycle parking, two (2) parking spots are required. It is recommended that one (1) on-site bike rack, which can park two (2) bicycles be provided.

Based on the traffic analysis presented in this report, it is concluded that the existing road network has sufficient capacity to accommodate both the roadway growth and new traffic generated from the proposed development throughout the study horizon periods and no additional measures are required.

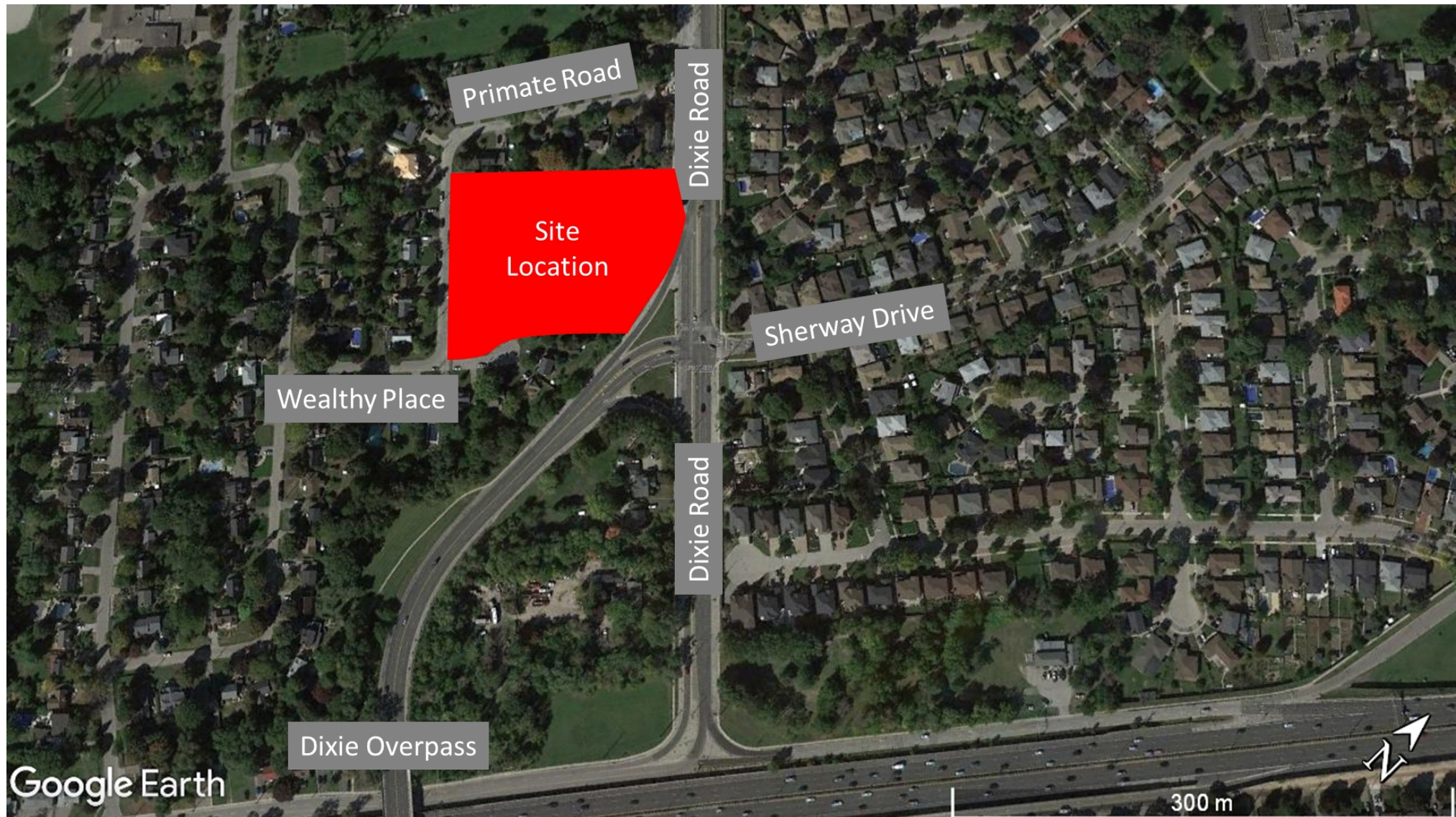
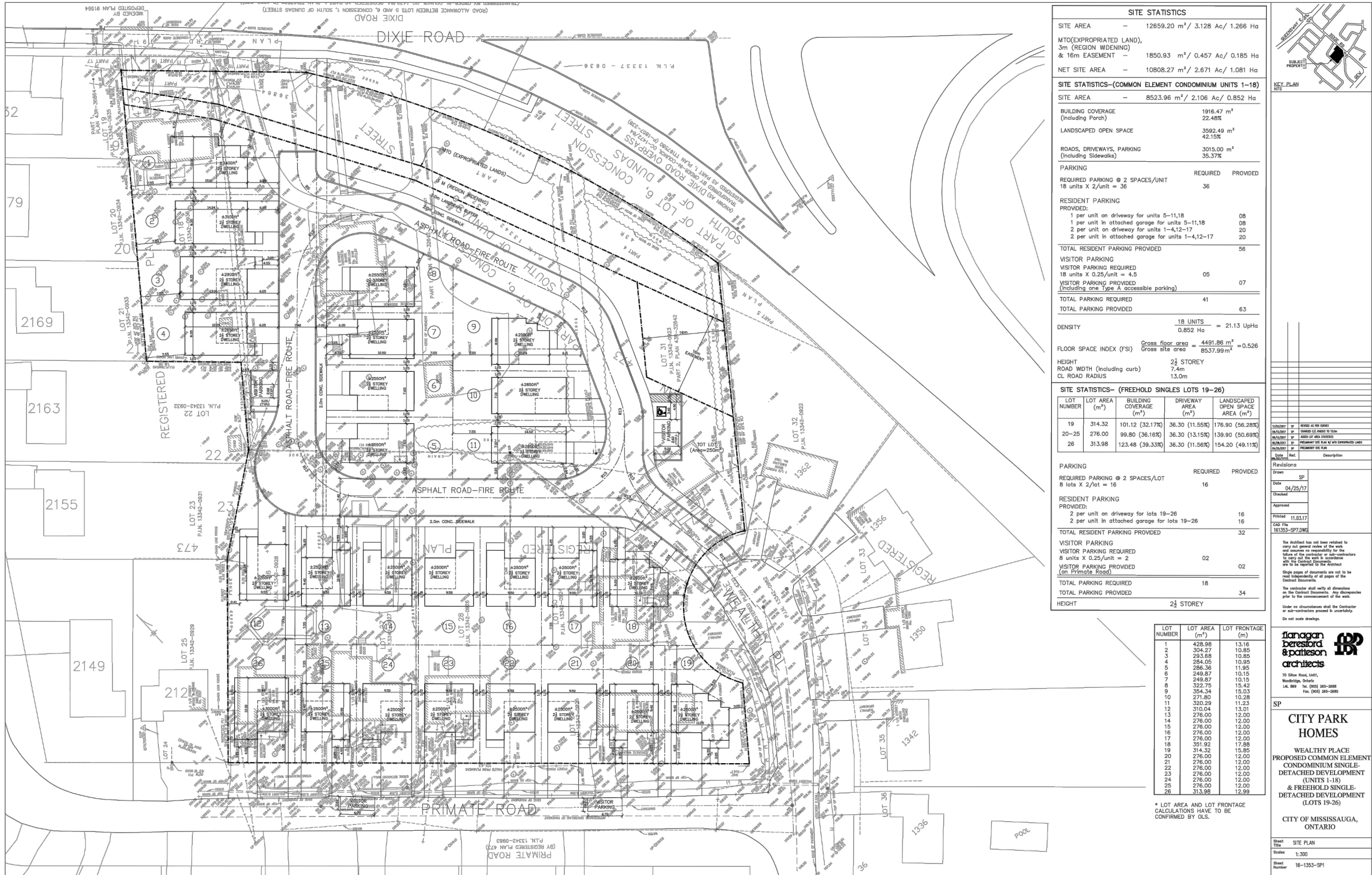


Figure 1-1
Site Location



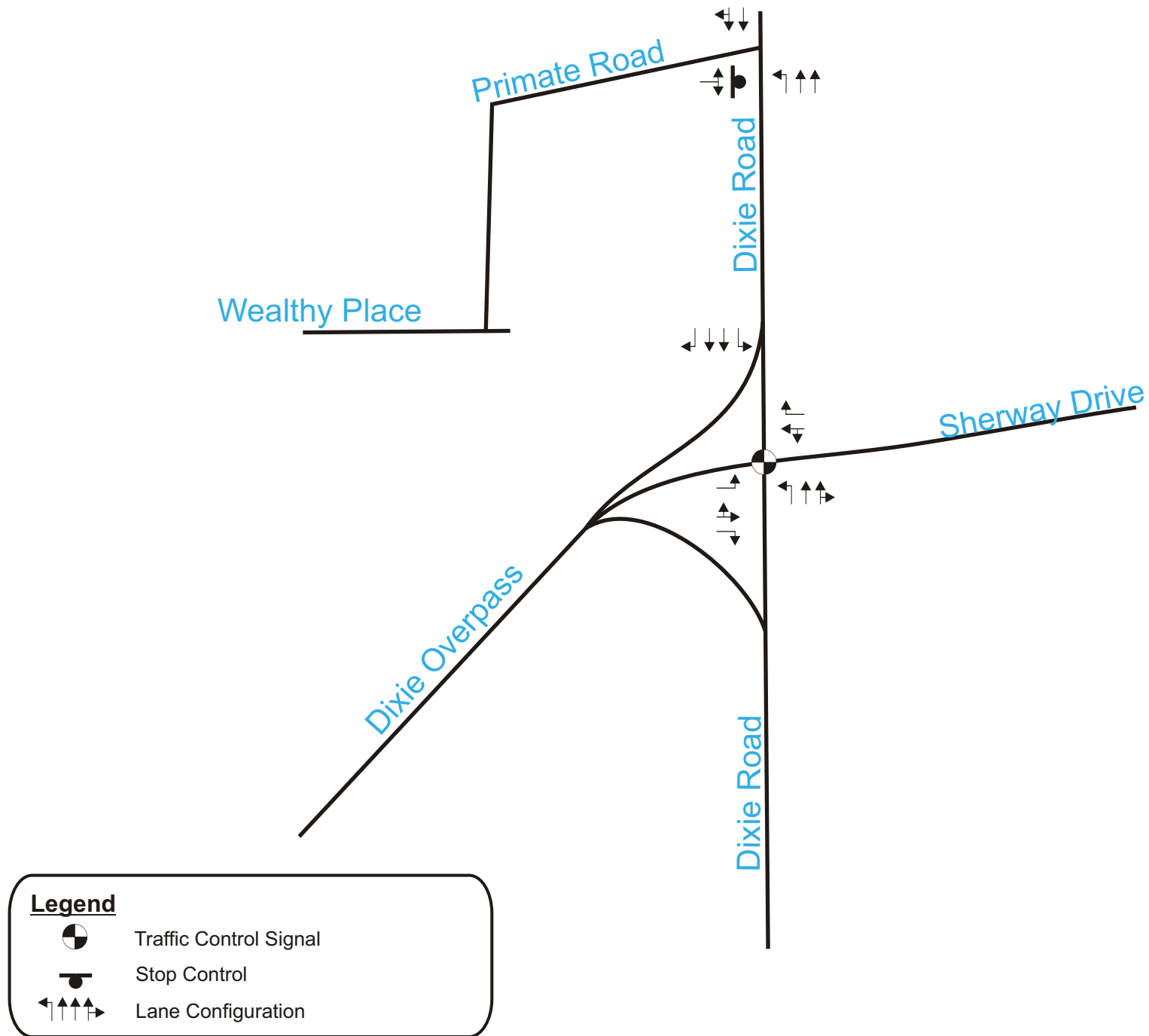
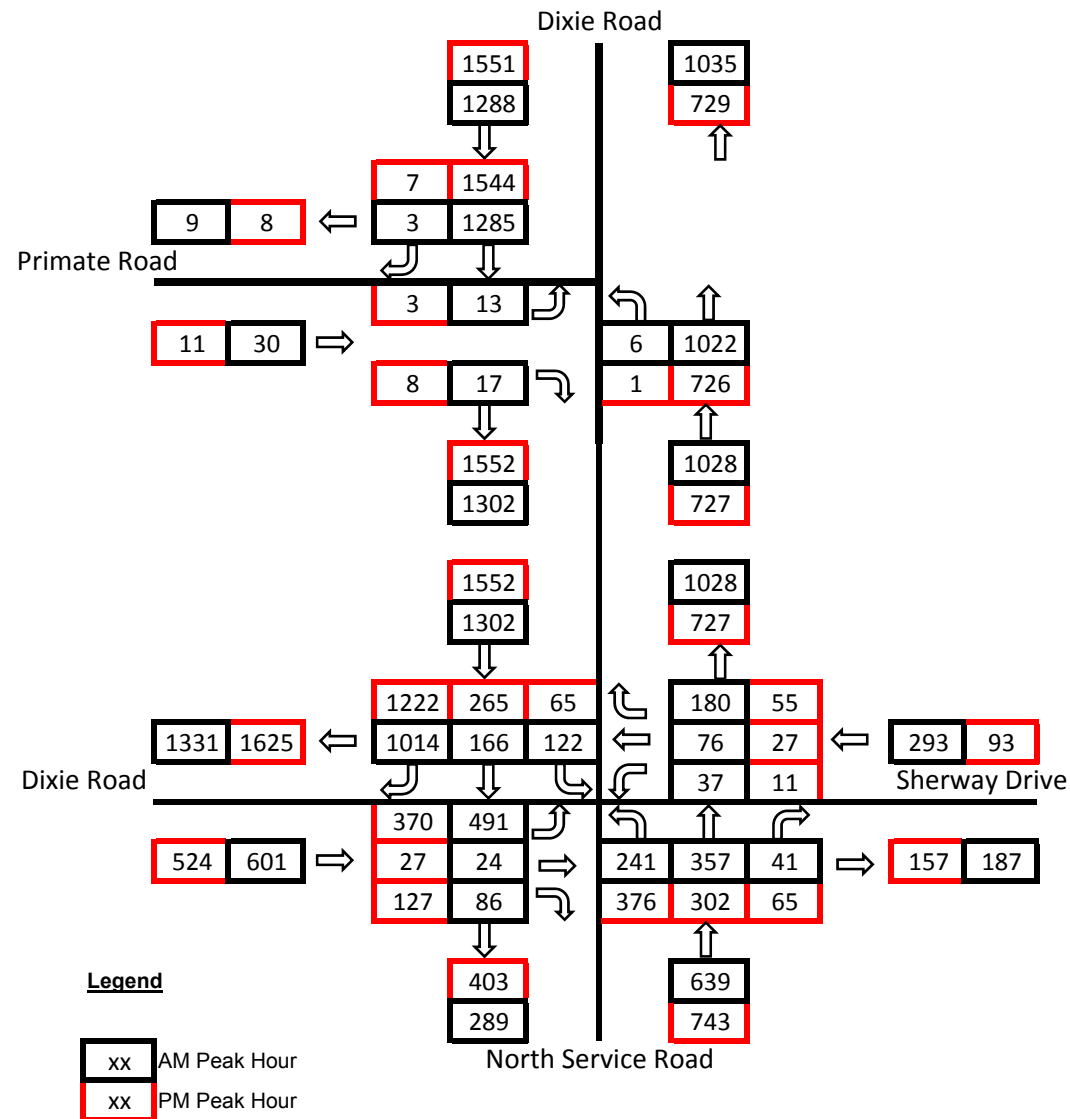
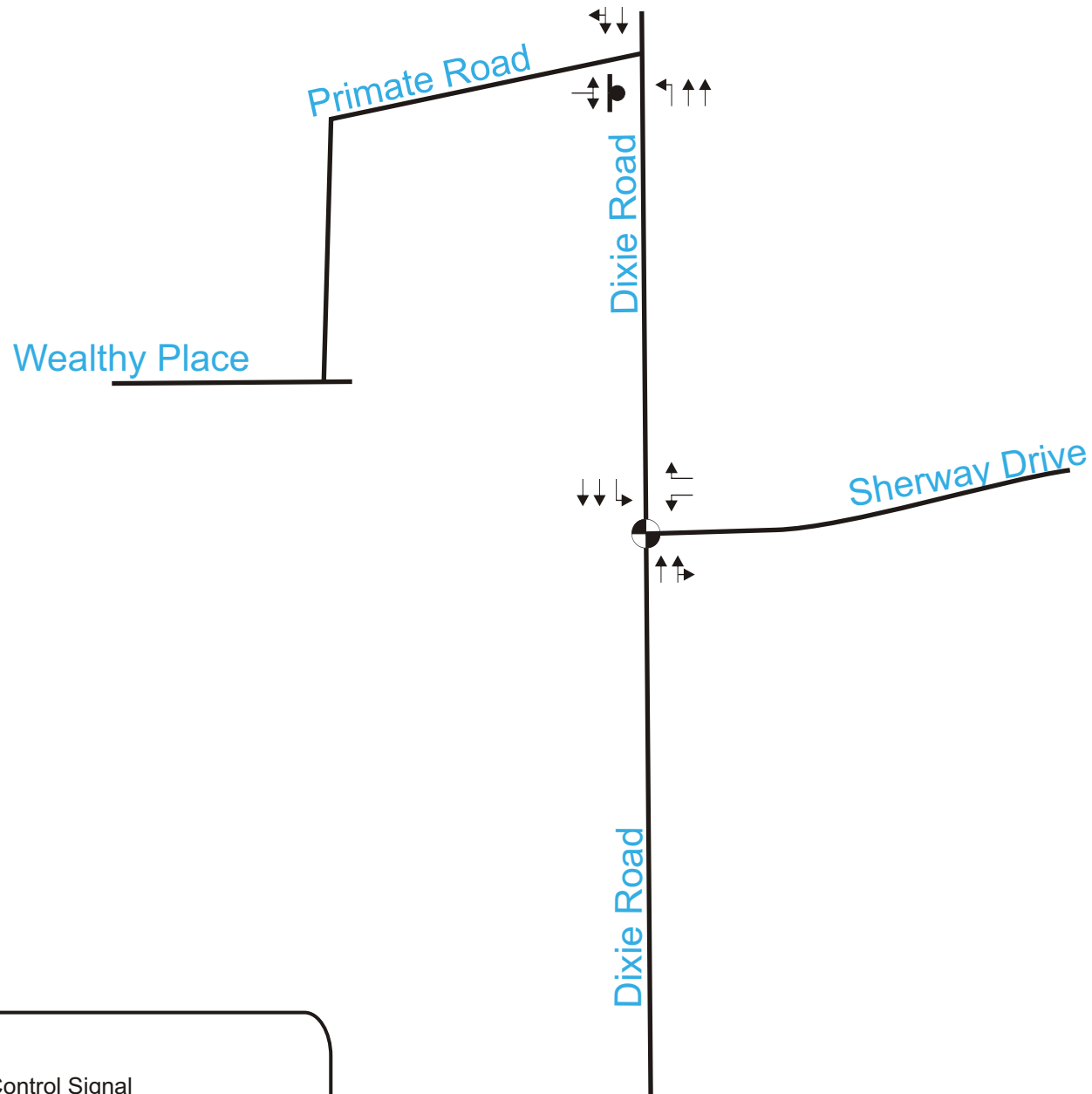


Figure 3-1
Existing Road Network





Legend



Traffic Control Signal

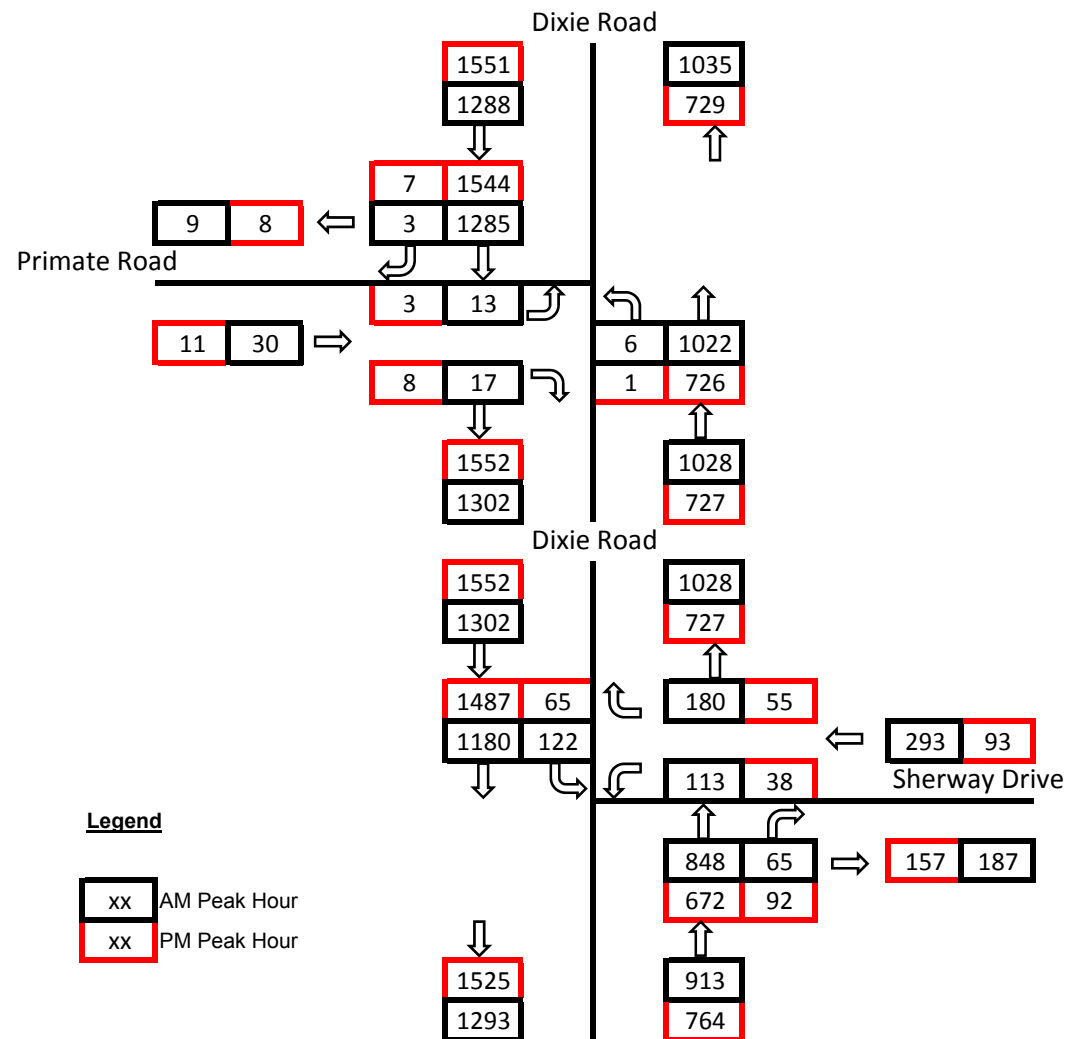


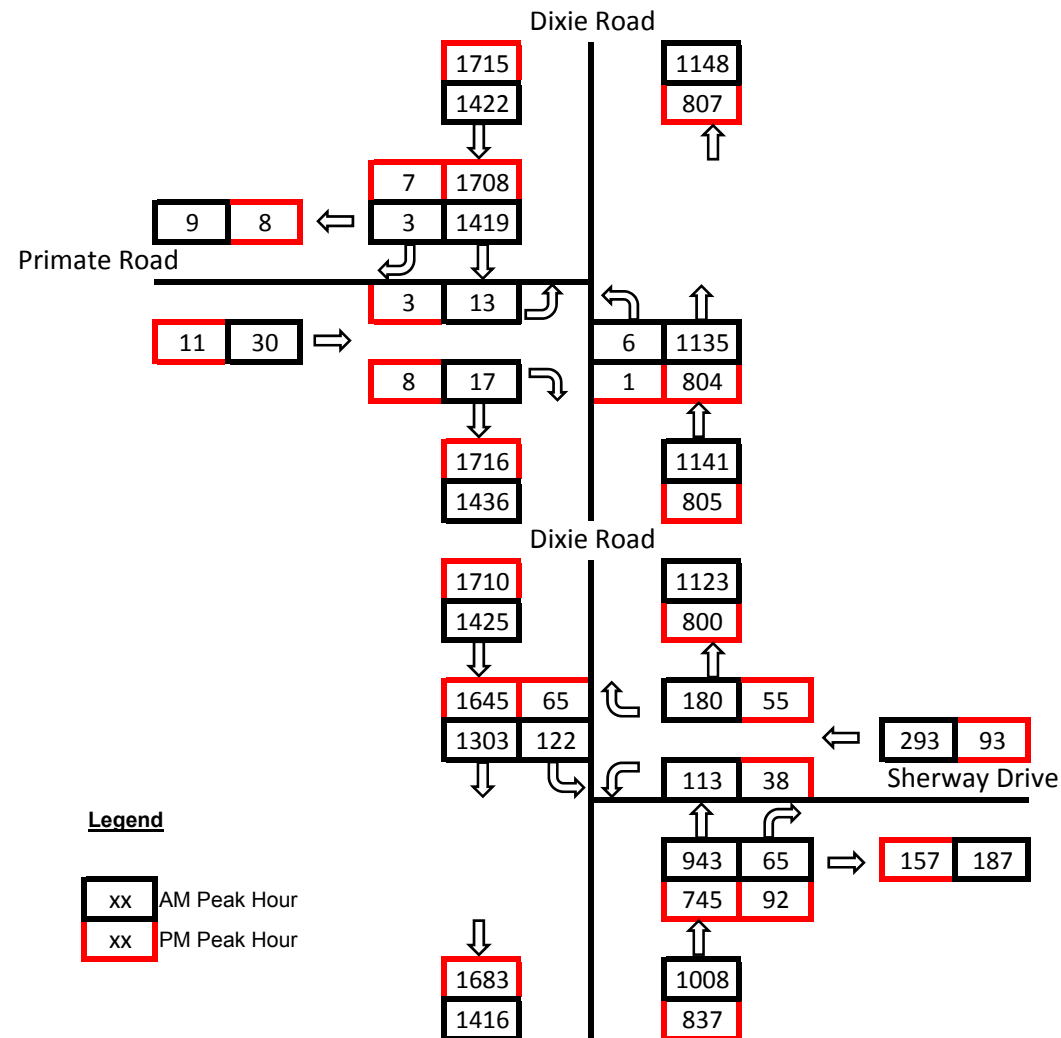
Stop Control

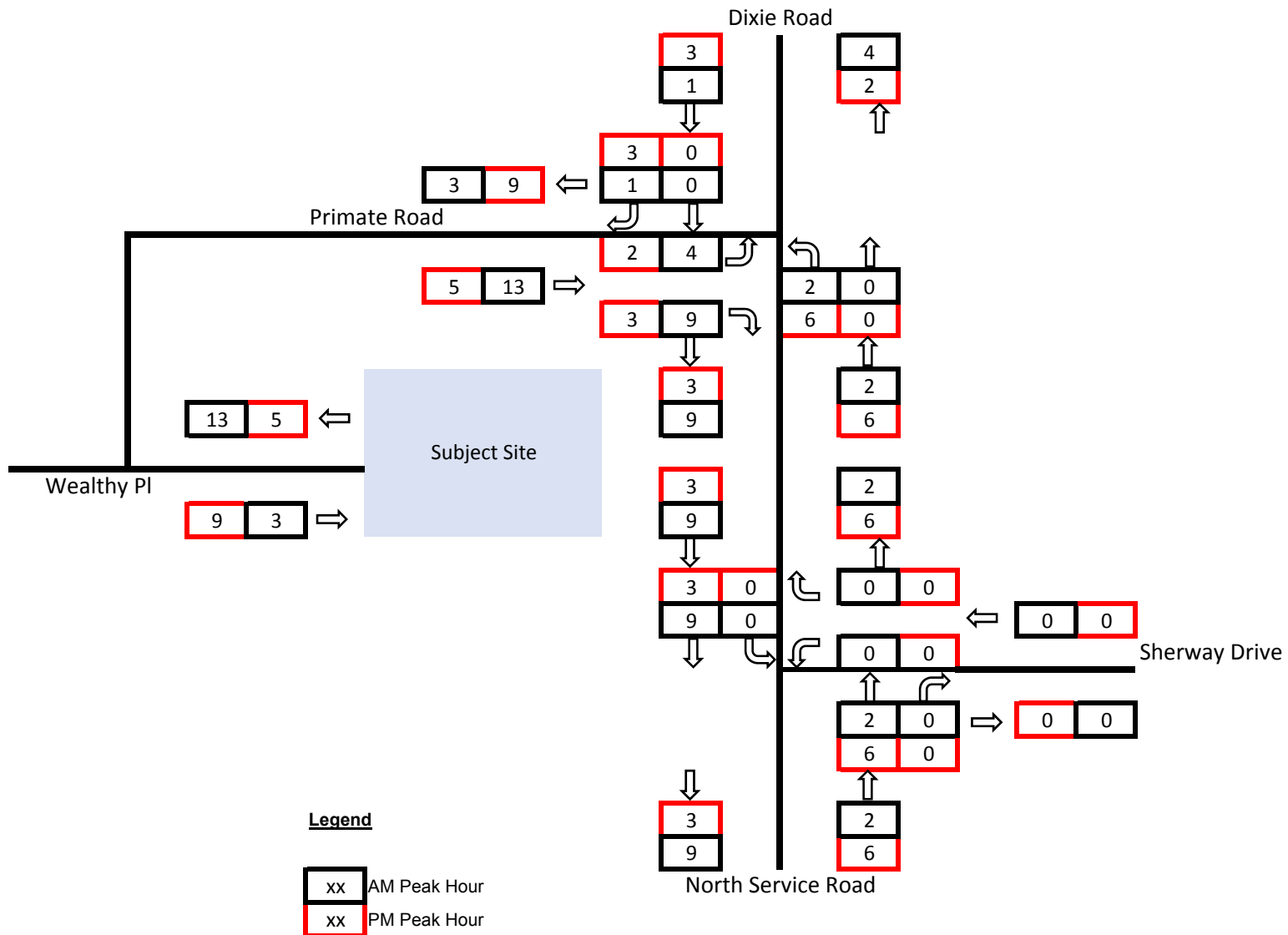


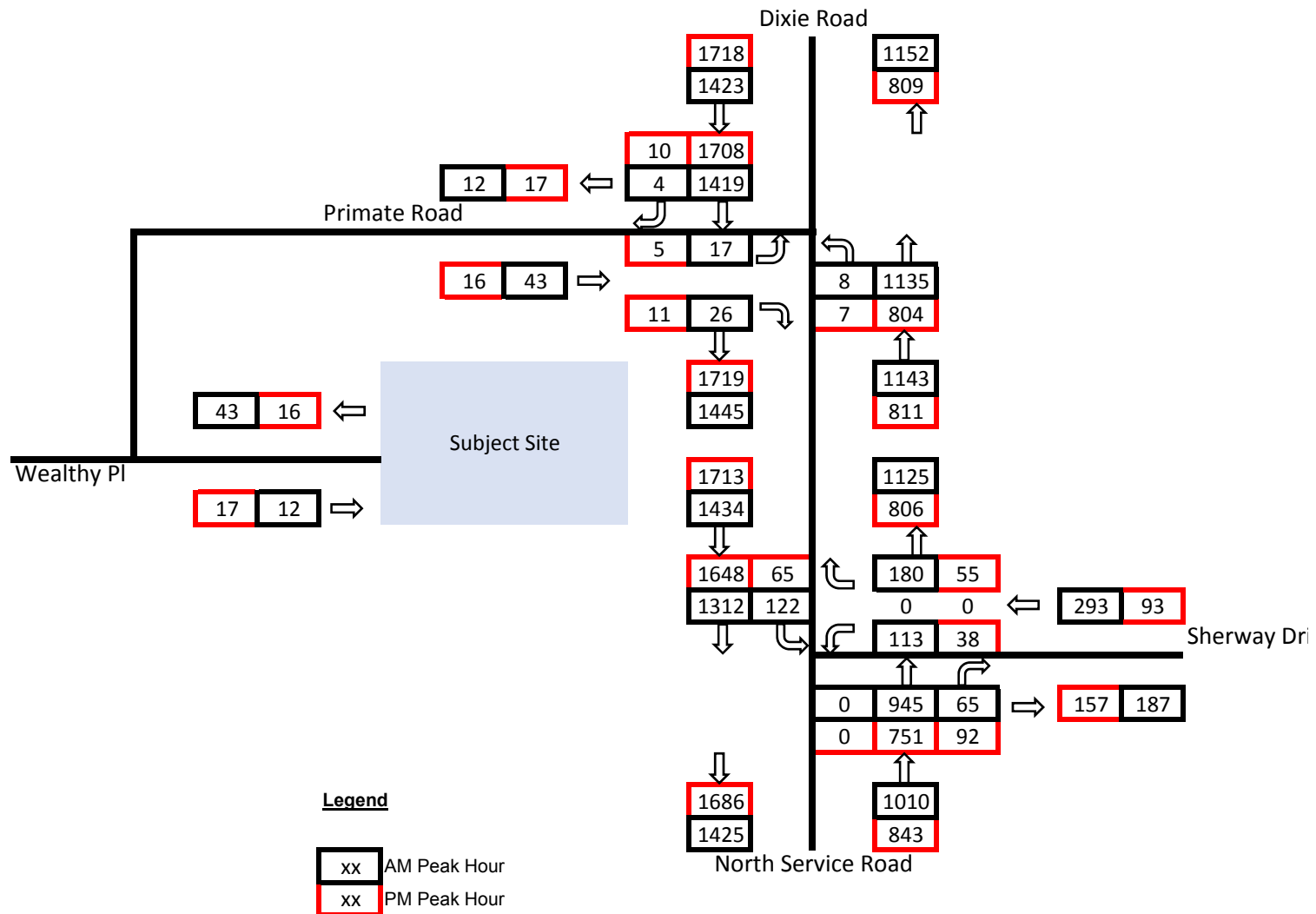
Lane Configuration

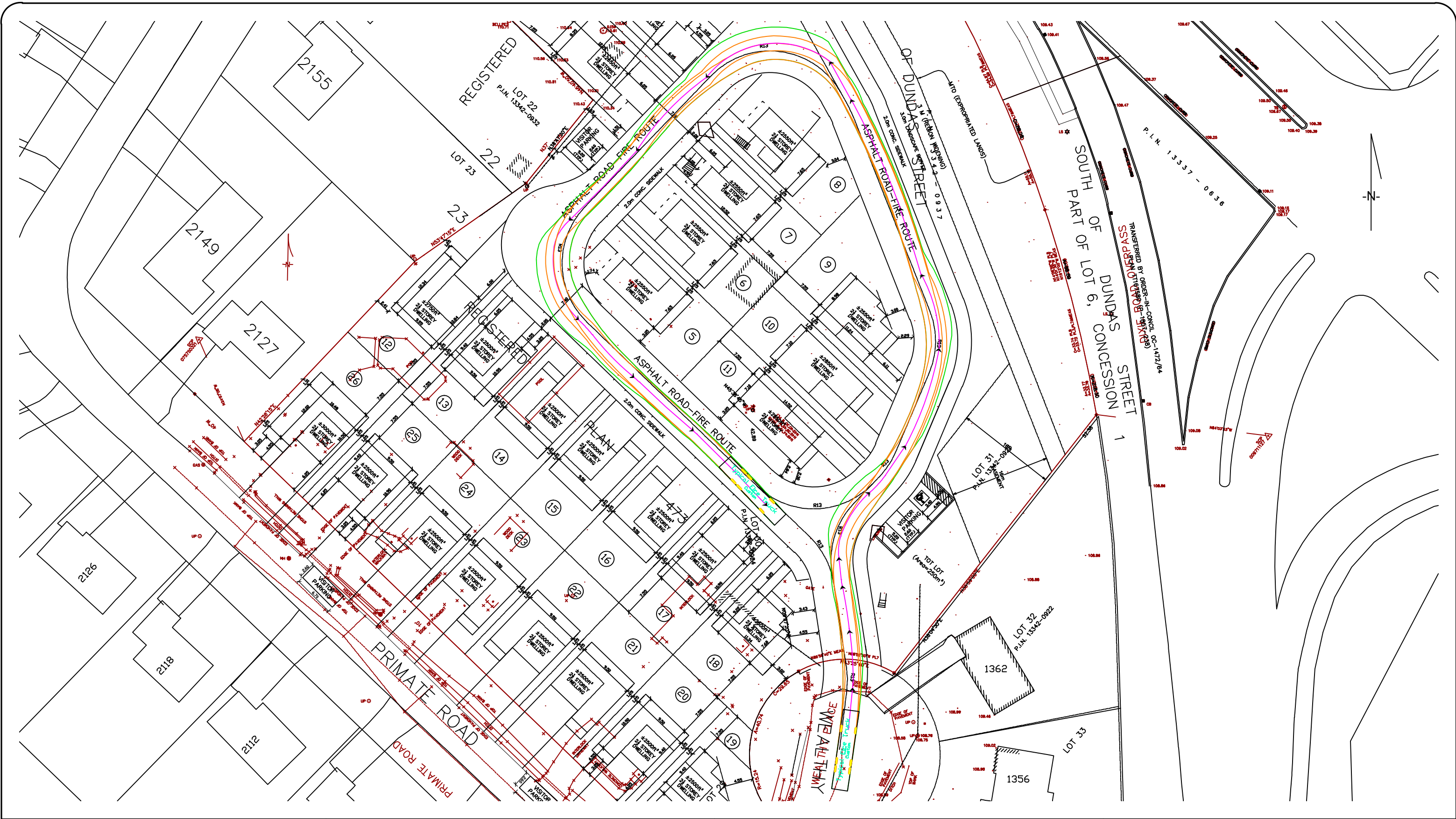
Figure 4-1
Future Road Network

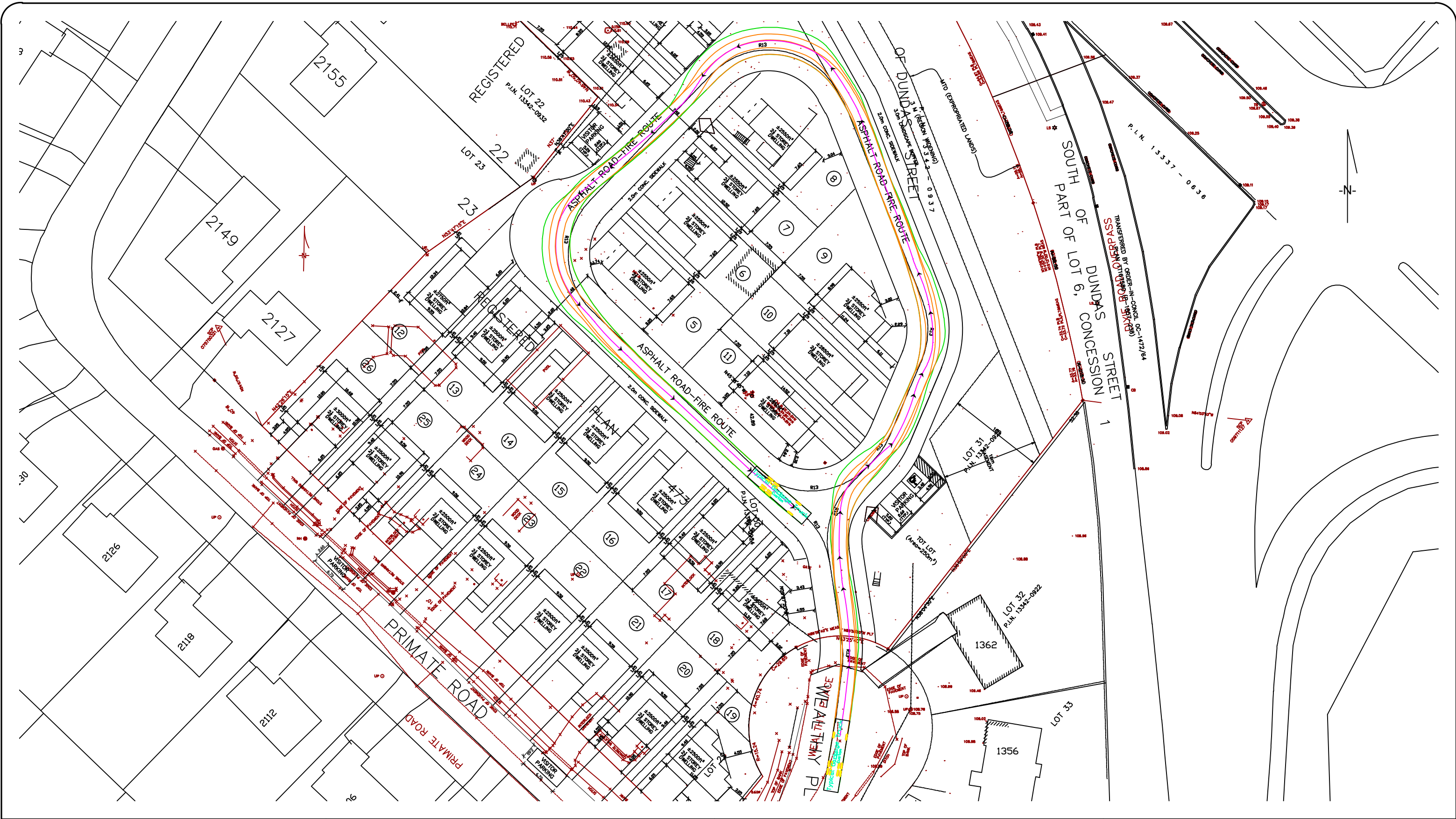






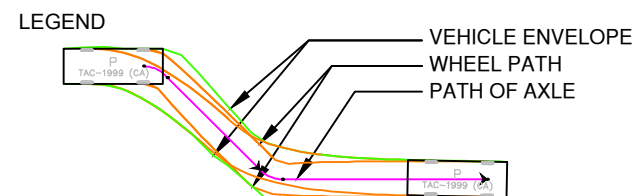







**COLE
ENGINEERING**

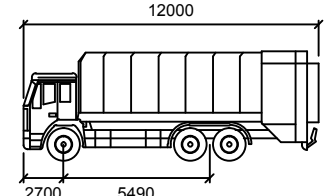
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T:416.987.6161 / 905.940.6161 F:905.940.2064



DESIGN VEHICLE

Typical Garbage Truck

Width	: 2400
Track	: 2400
Lock to Lock Time	: 6.0
Steering Angle	: 28.3



GARBAGE TRUCK SITE CIRCULATION
PROPOSED RESIDENTIAL DEVELOPMENT
2116 DIXIE ROAD AND 1357 WEALTHY PLACE
CITY OF MISSISSAUGA

DATE:	FEBRUARY 2018	PROJECT No.:	2017-0294
SCALE:	N.T.S.	FIGURE No.:	6-2

APPENDIX A-1

Existing Transit Routes

4 Sherway Gardens

Monday-Sunday Service

Effective: January 2, 2017



Legend

- | | | | |
|--------------------|------------------------|------------------------------------|--------------------------|
| TTC Subway Station | Major Transit Terminal | Shopping Centre | Public Library |
| GO Train Station | Hospital | High School, University or College | Living Arts Centre |
| Transitway Station | Ice Rink | Recreation or Community Centre | Civic Centre (City Hall) |

MiWay Customer Service

- | | |
|--|--|
| @MiWayHelps | TTY: 905-615-3886 |
| miway.ca/feedback | miway.info@mississauga.ca |
| 905-615-INFO (4636) | Customer Service Ambassadors
In person at various locations |

Trip Plans & Schedules

- | | | |
|---|---|---------------------------------------|
| m.miway.ca
Mobile Site | miway.ca/planatrip
Online Trip Planner | citylink
905-615-4BUS(4287) |
| Call and enter a four-digit bus stop number. | | |

5 Dixie

Monday-Sunday Service

Effective: January 4, 2016



Legend

- | | | | |
|--|-------------------------------|---|---------------------------------|
| Islington
TTC Subway Station | Major Transit Terminal | Shopping Centre | Public Library |
| Clarkson
GO Train Station | Hospital | High School, University or College | Living Arts Centre |
| Transitway Station | Ice Rink | Recreation or Community Centre | Civic Centre (City Hall) |



Customer Service - We're here to help

@MiWayHelps
 miway.ca/feedback
 905-615-INFO (4636)
miway.info@mississauga.ca
 TTY: 905-615-3886



Find a schedule or trip plan











m.miway.ca
 miway.ca/planatrip
 citylink
 905-615-4BUS(4287)
 Call and enter a four-digit bus stop number.

HCM Unsignalized Intersection Capacity Analysis

1: Dixie Road & Primate Road

Future 2022 Total AM Peak Hour

11/17/2017











						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	26	8	1135	1419	4
Future Volume (Veh/h)	17	26	8	1135	1419	4
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	17	26	8	1135	1419	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				164		
pX, platoon unblocked	0.83					
vC, conflicting volume	2004	712	1423			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1801	712	1423			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	71	93	98			
cM capacity (veh/h)	59	380	484			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	43	8	568	568	946	477
Volume Left	17	8	0	0	0	0
Volume Right	26	0	0	0	0	4
cSH	121	484	1700	1700	1700	1700
Volume to Capacity	0.36	0.02	0.33	0.33	0.56	0.28
Queue Length 95th (m)	10.1	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	50.3	12.6	0.0	0.0	0.0	0.0
Lane LOS	F	B				
Approach Delay (s)	50.3	0.1			0.0	
Approach LOS	F					
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			49.4%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

Future 2022 Total AM Peak Hour

11/17/2017

2: Dixie Road & Sherway Drive

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	113	180	945	122	1312
Future Volume (vph)	113	180	945	122	1312
Lane Group Flow (vph)	113	180	1010	122	1312
Turn Type	Prot	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		6	
Detector Phase	8	8	2	6	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	31.6	31.6	26.0	26.0	26.0
Total Split (s)	31.6	31.6	28.4	28.4	28.4
Total Split (%)	52.7%	52.7%	47.3%	47.3%	47.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.26	0.43	0.51	0.46	0.64
Control Delay	15.3	15.1	9.9	19.9	12.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	15.1	9.9	19.9	12.5
Queue Length 50th (m)	6.8	8.9	25.7	5.8	38.2
Queue Length 95th (m)	15.1	20.3	49.3	#27.2	#83.8
Internal Link Dist (m)	101.9		50.0		140.1
Turn Bay Length (m)		35.0		30.0	
Base Capacity (vph)	956	864	1980	266	2045
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.12	0.21	0.51	0.46	0.64

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 46.8




Natural Cycle: 65

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Dixie Road & Sherway Drive












	Ø2			
28.4 s				
	Ø6			
28.4 s				
			Ø8	
		31.6 s		

HCM Signalized Intersection Capacity Analysis

2: Dixie Road & Sherway Drive

Future 2022 Total AM Peak Hour

11/17/2017

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	113	180	945	65	122	1312
Future Volume (vph)	113	180	945	65	122	1312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.7	3.7	3.5	3.7
Total Lost time (s)	6.6	6.6	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1785	1581	3423		1785	3544
Flt Permitted	0.95	1.00	1.00		0.25	1.00
Satd. Flow (perm)	1785	1581	3423		462	3544
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	113	180	945	65	122	1312
RTOR Reduction (vph)	0	29	6	0	0	0
Lane Group Flow (vph)	113	151	1004	0	122	1312
Heavy Vehicles (%)	0%	1%	6%	0%	0%	3%
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	9.9	9.9	25.7		25.7	25.7
Effective Green, g (s)	9.9	9.9	25.7		25.7	25.7
Actuated g/C Ratio	0.21	0.21	0.53		0.53	0.53
Clearance Time (s)	6.6	6.6	6.0		6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	366	324	1825		246	1889
v/s Ratio Prot	0.06		0.29			c0.37
v/s Ratio Perm		c0.10			0.26	
v/c Ratio	0.31	0.47	0.55		0.50	0.69
Uniform Delay, d1	16.2	16.8	7.4		7.1	8.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	2.2	1.2		7.0	2.1
Delay (s)	17.3	19.1	8.6		14.1	10.5
Level of Service	B	B	A		B	B
Approach Delay (s)	18.4		8.6			10.8
Approach LOS	B		A			B
Intersection Summary						
HCM 2000 Control Delay			10.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			48.2		Sum of lost time (s)	12.6
Intersection Capacity Utilization			57.1%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group

APPENDIX A-2
Existing Traffic Movement Counts

Accu-Traffic Inc.

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 7:45:00

To: 8:45:00

Municipality: Mississauga

Site #: 1716900001

Intersection: Dixie Rd & Sherway Dr

TFR File #: 1

Count date: 6-Sep-17

Weather conditions:

Person counted:

Person prepared:

Person checked:

** Signalized Intersection **

Major Road: Dixie Rd runs N/S

North Leg Total: 2316

North Entering: 1302

North Peds: 0

Peds Cross: 

	Heavys	Trucks	Cars	Totals
North	33	4	7	44
East	17	3	0	20
South	964	159	115	1238
West	1014	166	122	



Heavys 32

Trucks 8

Cars 974

Totals 1014

East Leg Total: 480

East Entering: 293

East Peds: 0

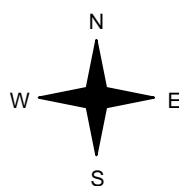
Peds Cross: 

Heavys	Trucks	Cars	Totals
40	19	1272	1331



Dixie Rd

Heavys	Trucks	Cars	Totals
20	2	469	491
1	0	23	24
4	0	82	86
25	2	574	




Cars	Trucks	Heavys	Totals
176	0	4	180
74	0	2	76
33	0	4	37
283	0	10	

Sherway Dr



Cars	Trucks	Heavys	Totals
177	0	10	187

Peds Cross: 

West Peds: 0

West Entering: 601

West Leg Total: 1932

Cars 274

Trucks 3

Heavys 12

Totals 289



Cars 234 329 39 602

Trucks 2 6 0 8

Heavys 5 8 2 15

Totals 241 343 41

Peds Cross: 

South Peds: 0

South Entering: 625

South Leg Total: 914

Comments

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 16:45:00

To: 17:45:00

Municipality: Mississauga

Site #: 1716900001

Intersection: Dixie Rd & Sherway Dr

TFR File #: 1

Count date: 6-Sep-17

Weather conditions:

Person counted:

Person prepared:

Person checked:

** Signalized Intersection **

Major Road: Dixie Rd runs N/S

North Leg Total: 2265

North Entering: 1552

North Peds: 2

Peds Cross: 

Heavys	10	1	0	11
Trucks	7	0	0	7
Cars	1205	264	65	1534
Totals	1222	265	65	



Heavys 14

Trucks 10

Cars 689

Totals 713

East Leg Total: 250

East Entering: 93

East Peds: 1

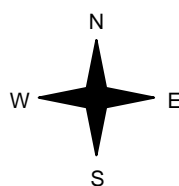
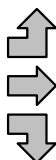
Peds Cross: 

Heavys	Trucks	Cars	Totals
14	8	1603	1625



Dixie Rd

Heavys	Trucks	Cars	Totals
6	3	361	370
0	0	27	27
4	3	120	127
10	6	508	



Cars	Trucks	Heavys	Totals
55	0	0	55
27	0	0	27
11	0	0	11
93	0	0	

Sherway Dr



Cars	Trucks	Heavys	Totals
157	0	0	157

Peds Cross: 

West Peds: 0

West Entering: 524

West Leg Total: 2149

Cars 395

Trucks 3

Heavys 5

Totals 403



Cars 371 273 65 709

Trucks 1 7 0 8

Heavys 4 8 0 12

Totals 376 288 65

Peds Cross: 

South Peds: 3

South Entering: 729

South Leg Total: 1132

Comments

Accu-Traffic Inc.

Total Count Diagram

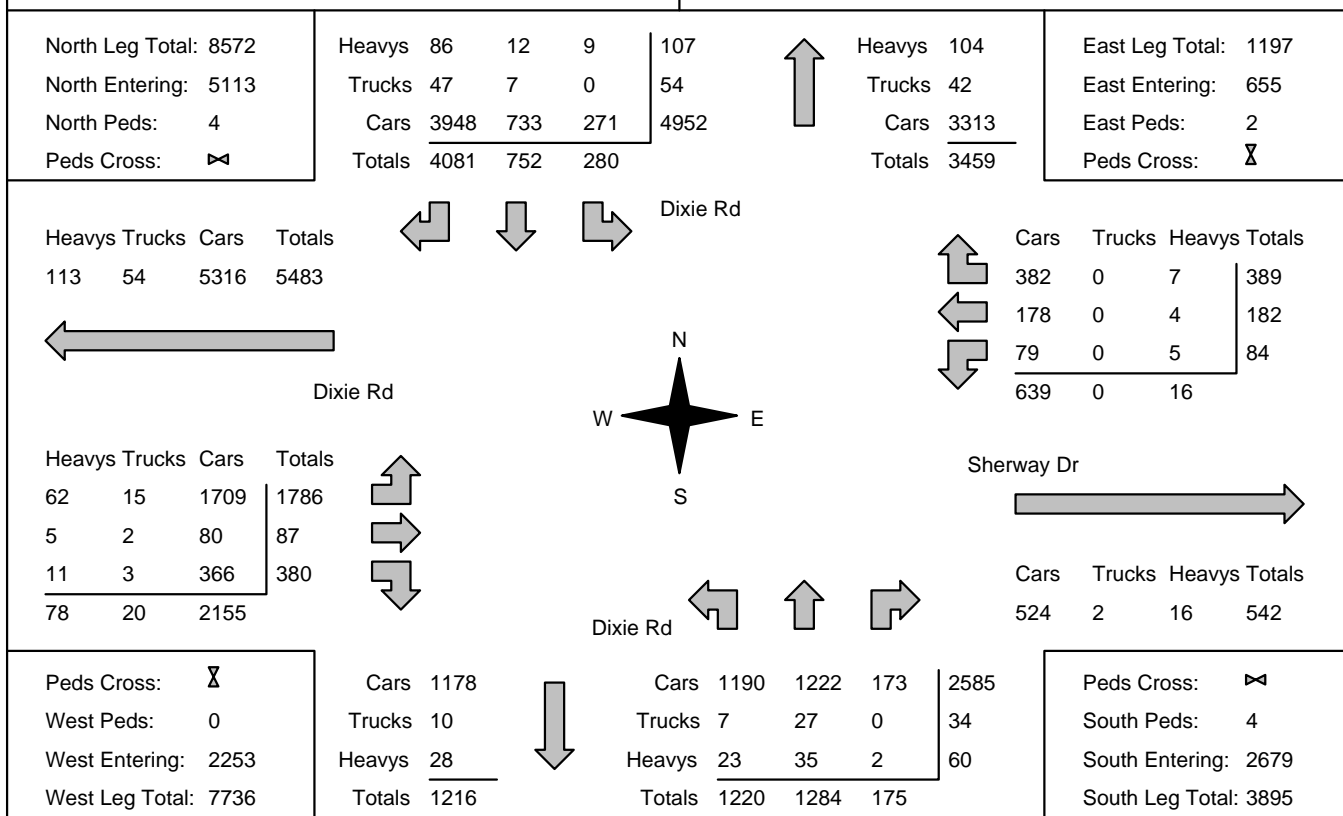
Municipality: Mississauga
Site #: 1716900001
Intersection: Dixie Rd & Sherway Dr
TFR File #: 1
Count date: 6-Sep-17

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Dixie Rd runs N/S



Accu-Traffic Inc.

Traffic Count Summary

Intersection: Dixie Rd & Sherway Dr					Count Date: 6-Sep-17		Municipality: Mississauga					
North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	61	125	954	1140	0	1728	8:00:00	258	308	22	588	0
9:00:00	90	159	840	1089	0	1737	9:00:00	224	389	35	648	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	62	220	1048	1330	0	2038	17:00:00	358	294	56	708	0
18:00:00	67	248	1239	1554	4	2289	18:00:00	380	293	62	735	4

[illegible]

[illegible]

[illegible]

[illegible]

Accu-Traffic Inc.

<h3>Morning Peak Diagram</h3>	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 7:45:00 To: 8:45:00
Municipality: Mississauga Site #: 1716900002 Intersection: Dixie Rd & Primate Rd TFR File #: 1 Count date: 6-Sep-17	Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **		Major Road: Dixie Rd runs N/S

North Leg Total: 2316 North Entering: 1281 North Peds: 0 Peds Cross:	<table style="width: 100%;"> <tr> <td>Heavys</td><td>0</td><td>43</td><td>43</td></tr> <tr> <td>Trucks</td><td>0</td><td>21</td><td>21</td></tr> <tr> <td>Cars</td><td>3</td><td>1214</td><td>1217</td></tr> <tr> <td>Totals</td><td>3</td><td>1278</td><td></td></tr> </table>	Heavys	0	43	43	Trucks	0	21	21	Cars	3	1214	1217	Totals	3	1278		<table style="width: 100%;"> <tr> <td>Heavys</td><td>31</td></tr> <tr> <td>Trucks</td><td>9</td></tr> <tr> <td>Cars</td><td>995</td></tr> <tr> <td>Totals</td><td>1035</td></tr> </table>	Heavys	31	Trucks	9	Cars	995	Totals	1035	
Heavys	0	43	43																								
Trucks	0	21	21																								
Cars	3	1214	1217																								
Totals	3	1278																									
Heavys	31																										
Trucks	9																										
Cars	995																										
Totals	1035																										

Heavys	Trucks	Cars	Totals
0	0	9	9

Dixie Rd

N
W E
S

Heavys	Trucks	Cars	Totals
0	0	13	13

Primate Rd

0	0	17	17
0	0	30	

Dixie Rd

Peds Cross: West Peds: 0 West Entering: 30 West Leg Total: 39	<table style="width: 100%;"> <tr> <td>Cars</td><td>1231</td></tr> <tr> <td>Trucks</td><td>21</td></tr> <tr> <td>Heavys</td><td>43</td></tr> <tr> <td>Totals</td><td>1295</td></tr> </table>	Cars	1231	Trucks	21	Heavys	43	Totals	1295	<table style="width: 100%;"> <tr> <td>Cars</td><td>6</td><td>982</td><td>988</td></tr> <tr> <td>Trucks</td><td>0</td><td>9</td><td>9</td></tr> <tr> <td>Heavys</td><td>0</td><td>31</td><td>31</td></tr> <tr> <td>Totals</td><td>6</td><td>1022</td><td></td></tr> </table>	Cars	6	982	988	Trucks	0	9	9	Heavys	0	31	31	Totals	6	1022		Peds Cross: South Peds: 0 South Entering: 1028 South Leg Total: 2323
Cars	1231																										
Trucks	21																										
Heavys	43																										
Totals	1295																										
Cars	6	982	988																								
Trucks	0	9	9																								
Heavys	0	31	31																								
Totals	6	1022																									

Comments

Accu-Traffic Inc.

Afternoon Peak Diagram

Specified Period

From: 16:00:00

To: 18:00:00

One Hour Peak

From: 17:00:00

To: 18:00:00

Municipality: Mississauga

Site #: 1716900002

Intersection: Dixie Rd & Primate Rd

TFR File #: 1

Count date: 6-Sep-17

Weather conditions:

Person counted:

Person prepared:

Person checked:


** Non-Signalized Intersection **

Major Road: Dixie Rd runs N/S

North Leg Total: 2275

North Entering: 1546

North Peds: 0

Peds Cross: 

Heavys 0 12

Trucks 0 9

Cars 7 1518

Totals 7 1539

12

9

1525

Heavys 13

Trucks 10

Cars 706

Totals 729

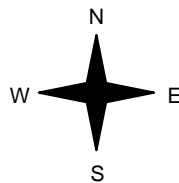
Heavys Trucks Cars Totals
0 0 8 8



Primate Rd

Heavys Trucks Cars Totals
0 0 3 3

0 0 8 8
0 0 11



Dixie Rd

Peds Cross: 

West Peds: 2

West Entering: 11

West Leg Total: 19

Cars 1526

Trucks 9

Heavys 12

Totals 1547

Cars 1 703

Trucks 0 10

Heavys 0 13

Totals 1 726

704

10

13

Peds Cross: 

South Peds: 0

South Entering: 727

South Leg Total: 2274

Comments

Accu-Traffic Inc.

Total Count Diagram

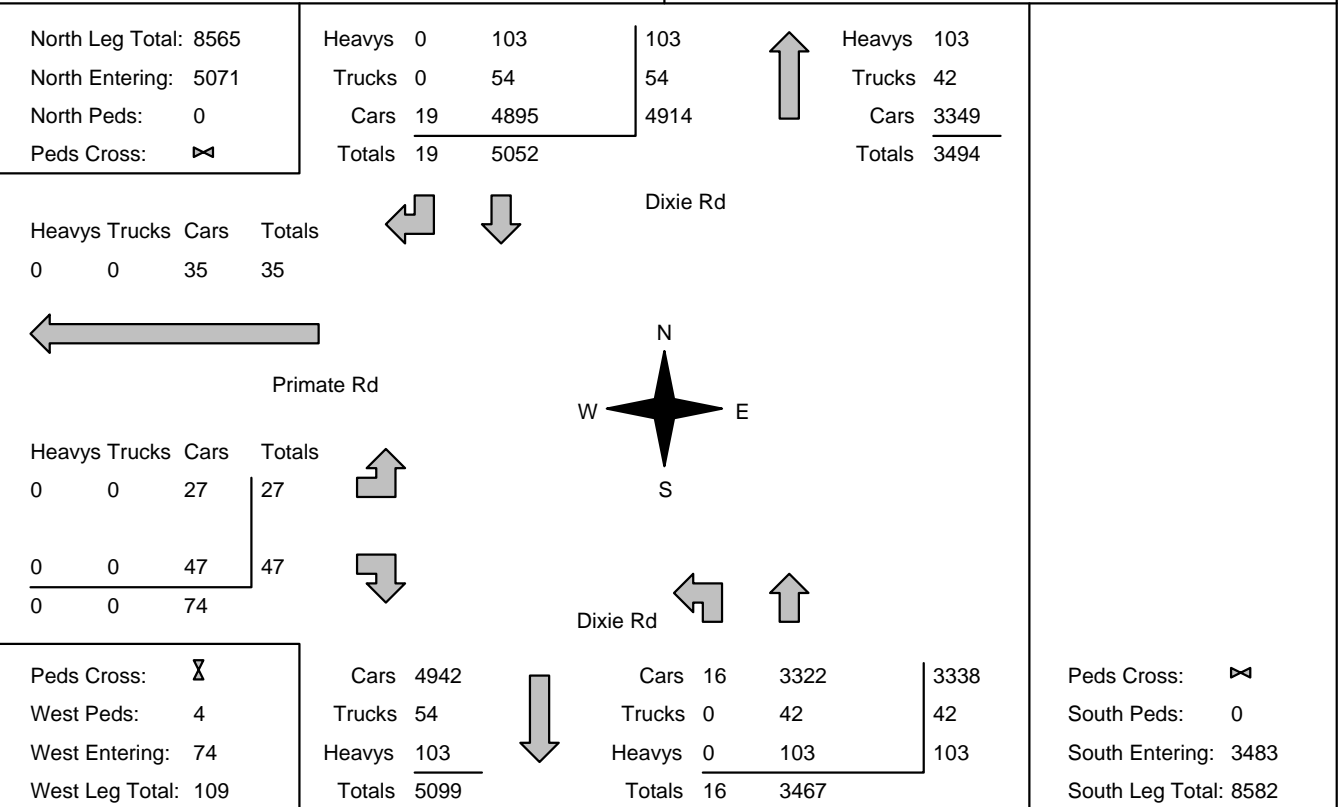
Municipality: Mississauga
Site #: 1716900002
Intersection: Dixie Rd & Primate Rd
TFR File #: 1
Count date: 6-Sep-17

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Non-Signalized Intersection ****

Major Road: Dixie Rd runs N/S



Comments

Accu-Traffic Inc.

Traffic Count Summary

Intersection: Dixie Rd & Primate Rd					Count Date: 6-Sep-17		Municipality: Mississauga					
North Approach Totals						North/South Total Approaches	South Approach Totals					
Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds		Hour Ending	Includes Cars, Trucks, & Heavys				Total Peds
	Left	Thru	Right	Grand Total				Left	Thru	Right	Grand Total	
7:00:00	0	0	0	0	0	0	7:00:00	0	0	0	0	0
8:00:00	0	1119	0	1119	0	1867	8:00:00	2	746	0	748	0
9:00:00	0	1073	4	1077	0	2310	9:00:00	8	1225	0	1233	0
16:00:00	0	0	0	0	0	0	16:00:00	0	0	0	0	0
17:00:00	0	1321	8	1329	0	2104	17:00:00	5	770	0	775	0
18:00:00	0	1539	7	1546	0	2273	18:00:00	1	726	0	727	0

[illegible]

[illegible]











[illegible]

[illegible]

APPENDIX B
Intersection Capacity Analysis Reports
Existing (2017) Traffic Conditions

HCM Unsignalized Intersection Capacity Analysis
1: Dixie Road & Primate Road

Existing 2017 PM Peak Hour-Baseline Scenario
11/17/2017
























						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	17	1	726	1544	7
Future Volume (Veh/h)	13	17	1	726	1544	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	17	1	726	1544	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				176		
pX, platoon unblocked	0.96					
vC, conflicting volume	1912	776	1551			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1868	776	1551			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	79	95	100			
cM capacity (veh/h)	63	345	433			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	30	1	363	363	1029	522
Volume Left	13	1	0	0	0	0
Volume Right	17	0	0	0	0	7
cSH	117	433	1700	1700	1700	1700
Volume to Capacity	0.26	0.00	0.21	0.21	0.61	0.31
Queue Length 95th (m)	6.7	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	46.1	13.3	0.0	0.0	0.0	0.0
Lane LOS	E	B				
Approach Delay (s)	46.1	0.0			0.0	
Approach LOS	E					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			52.9%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

Existing 2017 PM Peak Hour-Baseline Scenario

2: North Service Road/Dixie Road & Dixie Road South/Sherway Drive

11/17/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	
Lane Configurations												
Traffic Volume (vph)	370	27	127	11	27	55	376	302	65	265	1222	
Future Volume (vph)	370	27	127	11	27	55	376	302	65	265	1222	
Lane Group Flow (vph)	196	201	127	0	38	55	376	367	65	265	1222	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	
Protected Phases		4			3		1	2		2		
Permitted Phases	4		4	3		3	2		2		2	
Detector Phase	4	4	4	3	3	3	1	2	2	2	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	31.6	31.6	31.6	31.6	31.6	31.6	8.0	26.0	26.0	26.0	26.0	
Total Split (s)	40.0	40.0	40.0	27.2	27.2	27.2	32.0	60.8	60.8	60.8	60.8	
Total Split (%)	25.0%	25.0%	25.0%	17.0%	17.0%	17.0%	20.0%	38.0%	38.0%	38.0%	38.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.6	2.6	2.6	2.6	2.6	2.6	0.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6		6.6	6.6	3.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	
v/c Ratio	0.92	0.92	0.36		1.12	0.24	0.49	0.21	0.14	0.15	1.06	
Control Delay	107.7	107.5	19.6		250.9	5.6	17.4	26.5	30.9	27.1	60.4	
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	107.7	107.5	19.6		250.9	5.6	17.4	26.5	30.9	27.1	60.4	
Queue Length 50th (m)	59.6	61.2	8.0		~12.1	0.0	50.6	31.6	10.8	23.2	~273.9	
Queue Length 95th (m)	#91.8	#93.8	25.2		#32.5	4.2	80.9	52.2	25.2	39.6	#351.4	
Internal Link Dist (m)		116.7			162.1			255.0		151.9		
Turn Bay Length (m)			30.0			21.0	171.0		56.0		30.0	
Base Capacity (vph)	262	268	408		46	278	825	1741	472	1810	1151	
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio	0.75	0.75	0.31		0.83	0.20	0.46	0.21	0.14	0.15	1.06	

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 67.2 (42%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 140

Control Type: Actuated-Coordinated





~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.











Queue shown is maximum after two cycles.

Splits and Phases: 2: North Service Road/Dixie Road & Dixie Road South/Sherway Drive

 Ø1	 Ø2 (R)	 Ø3	 Ø4
32 s	60.8 s	27.2 s	40 s

HCM Unsignalized Intersection Capacity Analysis
1: Dixie Road & Primate Road

Existing 2017 AM Peak Hour-Baseline Scenario
11/17/2017























						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	17	6	1022	1285	3
Future Volume (Veh/h)	13	17	6	1022	1285	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	17	6	1022	1285	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				176		
pX, platoon unblocked	0.93					
vC, conflicting volume	1810	644	1288			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1717	644	1288			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	83	96	99			
cM capacity (veh/h)	76	420	545			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	30	6	511	511	857	431
Volume Left	13	6	0	0	0	0
Volume Right	17	0	0	0	0	3
cSH	141	545	1700	1700	1700	1700
Volume to Capacity	0.21	0.01	0.30	0.30	0.50	0.25
Queue Length 95th (m)	5.4	0.2	0.0	0.0	0.0	0.0
Control Delay (s)	37.2	11.7	0.0	0.0	0.0	0.0
Lane LOS	E	B				
Approach Delay (s)	37.2	0.1			0.0	
Approach LOS	E					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			45.6%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

Existing 2017 AM Peak Hour-Baseline Scenario

2: North Service Road/Dixie Road & Dixie Road South/Sherway Drive

11/17/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR	
Lane Configurations												
Traffic Volume (vph)	491	24	86	37	76	180	241	357	122	166	1014	
Future Volume (vph)	491	24	86	37	76	180	241	357	122	166	1014	
Lane Group Flow (vph)	255	260	86	0	113	180	241	398	122	166	1014	
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	
Protected Phases		4			3		1	2		2		
Permitted Phases	4		4	3		3	2		2		2	
Detector Phase	4	4	4	3	3	3	1	2	2	2	2	
Switch Phase												
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	5.0	8.0	8.0	8.0	8.0	
Minimum Split (s)	31.6	31.6	31.6	31.6	31.6	31.6	8.0	26.0	26.0	26.0	26.0	
Total Split (s)	48.0	48.0	48.0	32.0	32.0	32.0	24.0	56.0	56.0	56.0	56.0	
Total Split (%)	30.0%	30.0%	30.0%	20.0%	20.0%	20.0%	15.0%	35.0%	35.0%	35.0%	35.0%	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.6	2.6	2.6	2.6	2.6	2.6	0.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.6	6.6	6.6		6.6	6.6	3.0	6.0	6.0	6.0	6.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max	
v/c Ratio	0.89	0.91	0.19		3.53	0.46	0.38	0.33	0.43	0.13	0.96	
Control Delay	89.4	92.0	9.3		1230.3	13.4	26.2	40.4	48.7	38.3	32.1	
Queue Delay	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	89.4	92.0	9.3		1230.3	13.4	26.2	40.4	48.7	38.3	32.1	
Queue Length 50th (m)	75.0	76.9	0.0		~58.9	2.5	41.8	46.5	28.8	18.4	101.6	
Queue Length 95th (m)	#121.4	#124.5	12.7		#97.1	23.6	59.9	60.8	48.8	27.3	#207.7	
Internal Link Dist (m)		116.7			162.1			255.0		151.9		
Turn Bay Length (m)			30.0			21.0	171.0		56.0		30.0	
Base Capacity (vph)	303	304	476		32	393	657	1206	282	1241	1051	
Starvation Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio	0.84	0.86	0.18		3.53	0.46	0.37	0.33	0.43	0.13	0.96	

Intersection Summary

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 68.8 (43%), Referenced to phase 2:NBSB and 6:, Start of Green

Natural Cycle: 110

Control Type: Actuated-Coordinated

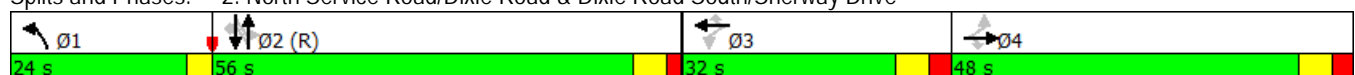
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: North Service Road/Dixie Road & Dixie Road South/Sherway Drive

























HCM Signalized Intersection Capacity Analysis

Existing 2017 AM Peak Hour-Baseline Scenario

2: North Service Road/Dixie Road & Dixie Road South/Sherway Drive

11/17/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	491	24	86	37	76	180	241	357	41	122	166	1014
Future Volume (vph)	491	24	86	37	76	180	241	357	41	122	166	1014
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6	6.6		6.6	6.6	3.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1630	1685	1597		1890	1581	1767	3530		1785	3650	1551
Flt Permitted	0.68	0.67	1.00		0.10	1.00	0.65	1.00		0.44	1.00	1.00
Satd. Flow (perm)	1174	1174	1597		201	1581	1203	3530		831	3650	1551
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	491	24	86	37	76	180	241	357	41	122	166	1014
RTOR Reduction (vph)	0	0	65	0	0	143	0	5	0	0	0	524
Lane Group Flow (vph)	255	260	21	0	113	37	241	393	0	122	166	490
Heavy Vehicles (%)	4%	0%	0%	0%	0%	1%	1%	2%	0%	0%	0%	3%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases		4			3		1	2			2	
Permitted Phases	4		4	3		3	2			2		2
Actuated Green, G (s)	39.1	39.1	39.1		25.4	25.4	73.3	54.4		54.4	54.4	54.4
Effective Green, g (s)	39.1	39.1	39.1		25.4	25.4	73.3	54.4		54.4	54.4	54.4
Actuated g/C Ratio	0.24	0.24	0.24		0.16	0.16	0.46	0.34		0.34	0.34	0.34
Clearance Time (s)	6.6	6.6	6.6		6.6	6.6	3.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	286	286	390		31	250	617	1200		282	1241	527
v/s Ratio Prot							c0.05	0.11			0.05	
v/s Ratio Perm	0.22	c0.22	0.01		c0.56	0.02	0.13			0.15		c0.32
v/c Ratio	0.89	0.91	0.05		3.65	0.15	0.39	0.33		0.43	0.13	0.93
Uniform Delay, d1	58.4	58.7	46.3		67.3	58.0	27.2	39.2		40.9	36.5	51.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	28.9	31.8	0.1		1265.6	0.6	0.9	0.7		4.8	0.2	25.2
Delay (s)	87.3	90.6	46.4		1332.9	58.6	28.1	39.9		45.6	36.7	76.1
Level of Service	F	F	D		F	E	C	D		D	D	E
Approach Delay (s)		82.9			550.0			35.5			68.2	
Approach LOS		F			F			D			E	
Intersection Summary												
HCM 2000 Control Delay			113.7				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			1.33									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			22.2		
Intersection Capacity Utilization			96.6%				ICU Level of Service			F		
Analysis Period (min)			15									























c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

Existing 2017 PM Peak Hour-Baseline Scenario

2: North Service Road/Dixie Road & Dixie Road South/Sherway Drive

11/17/2017

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	370	27	127	11	27	55	376	302	65	65	265	1222
Future Volume (vph)	370	27	127	11	27	55	376	302	65	65	265	1222
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.7	3.5	3.5	3.7	3.5	3.5	3.7	3.7	3.5	3.7	3.5
Total Lost time (s)	6.6	6.6	6.6		6.6	6.6	3.0	6.0		6.0	6.0	6.0
Lane Util. Factor	0.95	0.95	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	0.96	1.00		0.99	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1630	1691	1597		1894	1581	1767	3496		1785	3650	1551
Flt Permitted	0.73	0.73	1.00		0.19	1.00	0.58	1.00		0.51	1.00	1.00
Satd. Flow (perm)	1257	1284	1597		364	1581	1082	3496		952	3650	1551
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	370	27	127	11	27	55	376	302	65	65	265	1222
RTOR Reduction (vph)	0	0	79	0	0	50	0	9	0	0	0	389
Lane Group Flow (vph)	196	201	48	0	38	5	376	358	0	65	265	833
Heavy Vehicles (%)	4%	0%	0%	0%	0%	1%	1%	2%	0%	0%	0%	3%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases		4			3		1	2			2	
Permitted Phases	4		4	3		3	2			2		2
Actuated Green, G (s)	27.3	27.3	27.3		13.6	13.6	96.9	78.0		78.0	78.0	78.0
Effective Green, g (s)	27.3	27.3	27.3		13.6	13.6	96.9	78.0		78.0	78.0	78.0
Actuated g/C Ratio	0.17	0.17	0.17		0.08	0.08	0.61	0.49		0.49	0.49	0.49
Clearance Time (s)	6.6	6.6	6.6		6.6	6.6	3.0	6.0		6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2		0.2	0.2	0.2	0.2		0.2	0.2	0.2
Lane Grp Cap (vph)	214	219	272		30	134	736	1704		464	1779	756
v/s Ratio Prot							c0.06	0.10			0.07	
v/s Ratio Perm	0.16	c0.16	0.03		c0.10	0.00	0.25			0.07		c0.54
v/c Ratio	0.92	0.92	0.18		1.27	0.03	0.51	0.21		0.14	0.15	1.10
Uniform Delay, d1	65.2	65.2	56.7		73.2	67.2	15.8	23.4		22.6	22.7	41.0
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.2	38.0	0.1		254.4	0.0	0.3	0.3		0.6	0.2	64.2
Delay (s)	103.4	103.2	56.9		327.6	67.2	16.1	23.7		23.2	22.8	105.2
Level of Service	F	F	E		F	E	B	C		C	C	F
Approach Delay (s)		92.1			173.6			19.8			87.7	
Approach LOS		F			F			B			F	
Intersection Summary												
HCM 2000 Control Delay			73.9				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			160.0				Sum of lost time (s)			22.2		
Intersection Capacity Utilization			117.0%				ICU Level of Service			H		
Analysis Period (min)			15									

c Critical Lane Group

APPENDIX C

Background Site Generated Trips

5.0 SITE TRAFFIC ANALYSIS

5.1 Trip Generation

Trip generation is the process that estimates the volume of vehicular traffic that can reasonably be expected to enter and leave a specific development. The generation analysis estimates vehicle trips for periods when traffic on the road network and/or when generation for the specific land use are at their highest daily levels. During other time periods, the estimated site traffic and/or the volume of traffic on the area roads are lower. This approach to the evaluation of development proposals allows for the traffic analysis to consider operations for more severe conditions than may be expected at other times. The process of estimating site traffic generally relies on the use of published information such as the trip generation material published by the Institute of Transportation Engineers (ITE)⁷. While the development is for condominium residential units, trip generation information for the Land Use Code 210 – Single Family Detached Housing was used since the development proposal is for detached units.

The Site Plan (reproduced herein as **Figure 2-1**) contemplates thirteen (13) units but since the existing residence at 1556 Marionville Drive will be demolished, the net effect of the proposed development is a total of 12 new residential dwelling units this residential neighbourhood. The trip generation for the proposed development is presented in **Table 5-1** and **Table 5-2**. Using the ITE trip rates, the proposed development is expected to generate an additional 21 two-way vehicle trips, or less, during the three design hours.

Table 5-1 Trip Generation – Weekday Peak Hours

		Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
ITE Based Trip Generation							
LUC 210	Vehicles	5	14	19	10	6	16
Unit Trip Rates	Vehicles/unit	0.42	1.17	1.59	0.83	0.50	1.32
Unit Trip Rates derived from Locally gathered Traffic Data							
Unit Trip Rates	Vehicles/unit	0.50	1.00	1.50	0.50	0.33	0.83

⁷ Institute of Transportation Engineers. *Trip Generation – An Informational Report*, 8th Edition, December 2008.

Table 5-2 Trip Generation – Saturday Midday Peak Hour

		Weekday AM Peak Hour		
		In	Out	Total
ITE Based Trip Generation				
LUC 210	Vehicles	11	10	21
Unit Trip Rates	Vehicles/unit	0.92	0.83	1.75

Local trip rates were derived from the weekday traffic count collected at the intersection of Primate Road and Wealthy Place. As shown in **Table 5-1**, a comparison of the ITE unit trip rates and local trip rates reveals ITE trip rates are 13%-60% higher than the locally derived trip rates. Accordingly, the estimates of site traffic for the proposed development are considered very conservative and may overstate the traffic generating characteristics of the proposed development.

5.2 Trip Distribution and Assignment

The distribution is the process that is used to estimate where traffic enters and/or leaves the more detailed study area. Basic distribution data for the analysis was obtained from the 2006 Transportation Tomorrow Survey (2006 TTS), a comprehensive travel survey of households in the Greater Toronto Area and Hamilton Area, and from existing travel patterns at the study intersections. The assignment lays out the vehicle pathways for traffic travelling through the study area and in particular to and from the proposed development. The allocation of traffic to pathways is essentially dependent on the convenience and perceived safety offered by each pathway.

The general direction of approach for the traffic generated by the proposed development is presented in **Table 5-3**.

Table 5-3 Direction of Approach

Route	Weekday Design Hours		Saturday Design Hour	
	In	Out	In	Out
Park Royale Boulevard to access QEW EB	0%	20%	0%	20%
Dixie Road North for travel to North, West and East	90%	70%	60%	50%
Dixie Road South	10%	10%	30%	10%
Rometown Drive to access Dixie Outlet Mall	0%	0%	10%	20%
Total	100%	100%	100%	100%

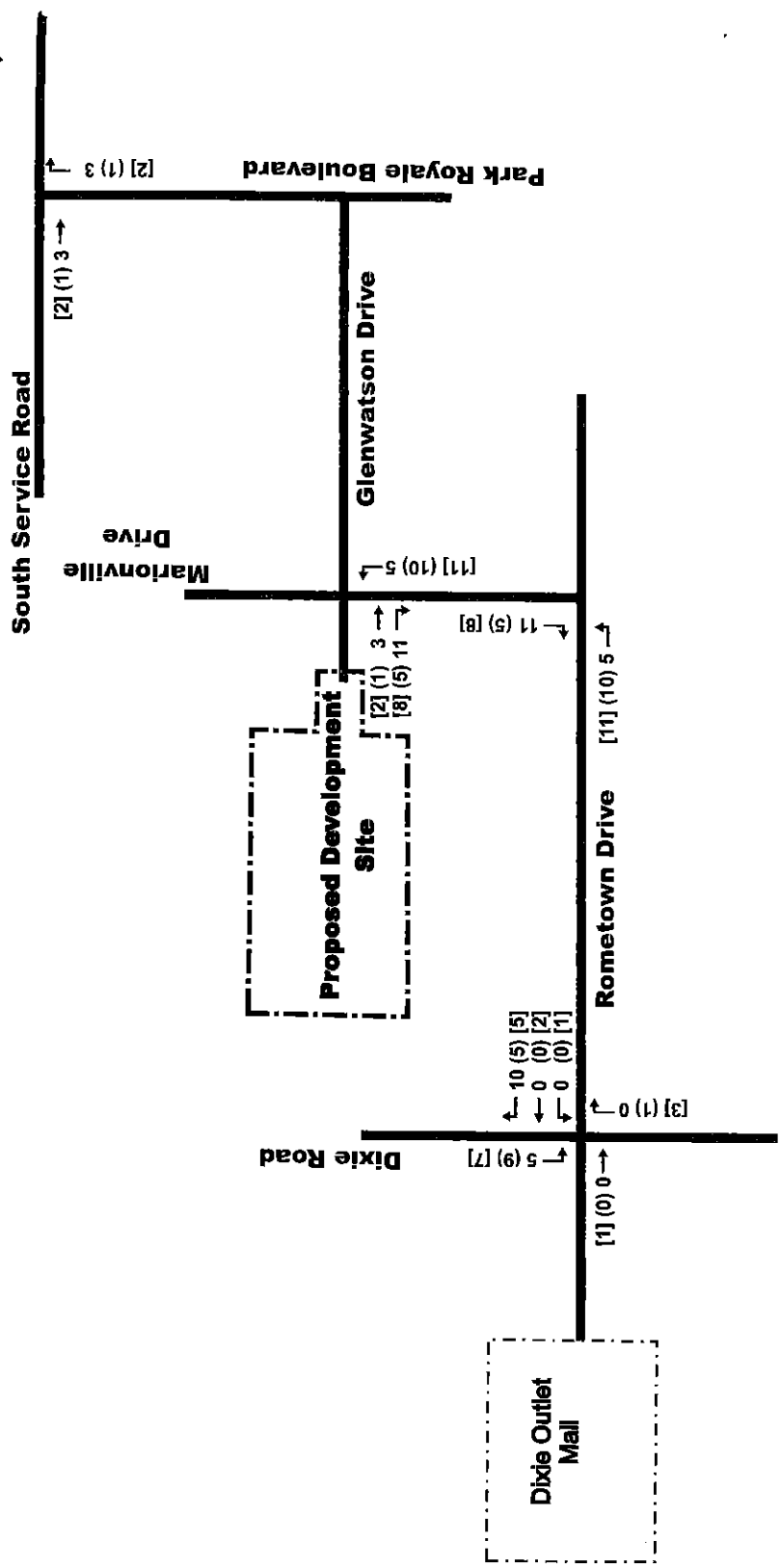
The site traffic assignment for the three design hours is illustrated in **Figure 5-1**.

5.3 Total Traffic Volumes

Estimated total traffic is that traffic expected to use the area road network at the end of the planning horizon. The estimate is created by adding together the estimates of the future background traffic and the traffic generated by the proposed development. The information is presented in the form of turning movements at the key intersection. More detailed information on the traffic forecasting is provided in **Appendix E**.

The future (2016) total traffic volumes during the three design hours are illustrated in **Figure 5-2**.

The additional site traffic entering the intersection of Dixie Road and Rometown Drive is less than 1.3% of the total traffic expected to enter the intersection by 2016. Similarly, the additional site traffic entering the intersection of South Service Road and Park Royale Boulevard is less than 0.6% of the total traffic expected to enter the intersection by 2016. The addition of site traffic to the area road network is not considered significant.



Legend

20 (40) [10]: AM (PM) [SAT] Peak Hour Traffic
(in vehicles per hour)

Not to Scale

Figure 5-1 Site Generated Traffic Volumes
Sedona Lifestyles (Rometown) Inc. Proposed Condominium Development
City of Mississauga, Ontario













APPENDIX D

Intersection Capacity Analysis Reports

Future (2022) Background Traffic Conditions











HCM Unsignalized Intersection Capacity Analysis
1: Dixie Road & Primate Road

Future 2022 Background PM Peak Hour
11/17/2017

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	3	8	1	804	1708	7
Future Volume (Veh/h)	3	8	1	804	1708	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	3	8	1	804	1708	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				164		
pX, platoon unblocked	0.94					
vC, conflicting volume	2116	858	1715			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2057	858	1715			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	97	100			
cM capacity (veh/h)	46	304	375			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	11	1	402	402	1139	576
Volume Left	3	1	0	0	0	0
Volume Right	8	0	0	0	0	7
cSH	120	375	1700	1700	1700	1700
Volume to Capacity	0.09	0.00	0.24	0.24	0.67	0.34
Queue Length 95th (m)	2.1	0.1	0.0	0.0	0.0	0.0
Control Delay (s)	38.1	14.6	0.0	0.0	0.0	0.0
Lane LOS	E	B				
Approach Delay (s)	38.1	0.0			0.0	
Approach LOS	E					
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			57.4%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
1: Dixie Road & Primate Road

Future 2022 Background AM Peak Hour
11/17/2017











						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	17	6	1135	1419	3
Future Volume (Veh/h)	13	17	6	1135	1419	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	13	17	6	1135	1419	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)				164		
pX, platoon unblocked	0.83					
vC, conflicting volume	2000	711	1422			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1796	711	1422			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	78	96	99			
cM capacity (veh/h)	60	380	485			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	30	6	568	568	946	476
Volume Left	13	6	0	0	0	0
Volume Right	17	0	0	0	0	3
cSH	115	485	1700	1700	1700	1700
Volume to Capacity	0.26	0.01	0.33	0.33	0.56	0.28
Queue Length 95th (m)	6.8	0.3	0.0	0.0	0.0	0.0
Control Delay (s)	47.1	12.5	0.0	0.0	0.0	0.0
Lane LOS	E	B				
Approach Delay (s)	47.1	0.1			0.0	
Approach LOS	E					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			49.3%		ICU Level of Service	A
Analysis Period (min)			15			

Queues

2: Dixie Road & Sherway Drive

Future 2022 Background AM Peak Hour

11/17/2017

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	113	180	943	122	1303
Future Volume (vph)	113	180	943	122	1303
Lane Group Flow (vph)	113	180	1008	122	1303
Turn Type	Prot	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		6	
Detector Phase	8	8	2	6	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	31.6	31.6	26.0	26.0	26.0
Total Split (s)	31.6	31.6	28.4	28.4	28.4
Total Split (%)	52.7%	52.7%	47.3%	47.3%	47.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.26	0.43	0.51	0.46	0.64
Control Delay	15.3	15.1	9.9	19.8	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.3	15.1	9.9	19.8	12.4
Queue Length 50th (m)	6.8	8.9	25.7	5.8	37.7
Queue Length 95th (m)	15.1	20.3	49.3	#27.1	#82.8
Internal Link Dist (m)	101.9		50.0		140.1
Turn Bay Length (m)		35.0		30.0	
Base Capacity (vph)	956	864	1980	267	2045
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.12	0.21	0.51	0.46	0.64

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 46.8




Natural Cycle: 65

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.












Queue shown is maximum after two cycles.

Splits and Phases: 2: Dixie Road & Sherway Drive

	Ø2			
28.4 s				
	Ø6			
28.4 s				
			Ø8	
		31.6 s		

HCM Signalized Intersection Capacity Analysis
2: Dixie Road & Sherway Drive

Future 2022 Background AM Peak Hour
11/17/2017

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	113	180	943	65	122	1303
Future Volume (vph)	113	180	943	65	122	1303
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.7	3.7	3.5	3.7
Total Lost time (s)	6.6	6.6	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1785	1581	3423		1785	3544
Flt Permitted	0.95	1.00	1.00		0.25	1.00
Satd. Flow (perm)	1785	1581	3423		463	3544
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	113	180	943	65	122	1303
RTOR Reduction (vph)	0	29	6	0	0	0
Lane Group Flow (vph)	113	151	1002	0	122	1303
Heavy Vehicles (%)	0%	1%	6%	0%	0%	3%
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	9.9	9.9	25.7		25.7	25.7
Effective Green, g (s)	9.9	9.9	25.7		25.7	25.7
Actuated g/C Ratio	0.21	0.21	0.53		0.53	0.53
Clearance Time (s)	6.6	6.6	6.0		6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	366	324	1825		246	1889
v/s Ratio Prot	0.06		0.29			c0.37
v/s Ratio Perm		c0.10			0.26	
v/c Ratio	0.31	0.47	0.55		0.50	0.69
Uniform Delay, d1	16.2	16.8	7.4		7.1	8.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	2.2	1.2		7.0	2.1
Delay (s)	17.3	19.1	8.6		14.1	10.4
Level of Service	B	B	A		B	B
Approach Delay (s)	18.4		8.6			10.7
Approach LOS	B		A			B
Intersection Summary						
HCM 2000 Control Delay			10.8		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.63			
Actuated Cycle Length (s)			48.2		Sum of lost time (s)	12.6
Intersection Capacity Utilization			57.1%		ICU Level of Service	B
Analysis Period (min)			15			











c Critical Lane Group

Queues

2: Dixie Road & Sherway Drive

Future 2022 Background PM Peak Hour

11/17/2017

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	38	55	745	65	1645
Future Volume (vph)	38	55	745	65	1645
Lane Group Flow (vph)	38	55	837	65	1645
Turn Type	Prot	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		6	
Detector Phase	8	8	2	6	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	31.6	31.6	26.0	26.0	26.0
Total Split (s)	31.6	31.6	28.4	28.4	28.4
Total Split (%)	52.7%	52.7%	47.3%	47.3%	47.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.11	0.16	0.34	0.14	0.64
Control Delay	16.5	6.8	5.3	6.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	6.8	5.3	6.5	9.9
Queue Length 50th (m)	3.1	0.0	16.5	2.1	47.5
Queue Length 95th (m)	7.0	5.6	27.6	7.2	#94.4
Internal Link Dist (m)	101.9		50.0		140.1
Turn Bay Length (m)		35.0		30.0	
Base Capacity (vph)	966	881	2498	462	2588
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.06	0.34	0.14	0.64

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 46.6




Natural Cycle: 75

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.












Queue shown is maximum after two cycles.

Splits and Phases: 2: Dixie Road & Sherway Drive

	Ø2				
28.4 s					
	Ø6				
28.4 s					
				Ø8	
			31.6 s		

HCM Signalized Intersection Capacity Analysis
2: Dixie Road & Sherway Drive

Future 2022 Background PM Peak Hour
11/17/2017

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	38	55	745	92	65	1645
Future Volume (vph)	38	55	745	92	65	1645
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.7	3.7	3.5	3.7
Total Lost time (s)	6.6	6.6	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1785	1581	3408		1785	3544
Flt Permitted	0.95	1.00	1.00		0.34	1.00
Satd. Flow (perm)	1785	1581	3408		633	3544
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	55	745	92	65	1645
RTOR Reduction (vph)	0	49	9	0	0	0
Lane Group Flow (vph)	38	6	828	0	65	1645
Heavy Vehicles (%)	0%	1%	6%	0%	0%	3%
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	5.3	5.3	31.5		31.5	31.5
Effective Green, g (s)	5.3	5.3	31.5		31.5	31.5
Actuated g/C Ratio	0.11	0.11	0.64		0.64	0.64
Clearance Time (s)	6.6	6.6	6.0		6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	191	169	2173		403	2259
v/s Ratio Prot	c0.02		0.24			c0.46
v/s Ratio Perm		0.00			0.10	
v/c Ratio	0.20	0.03	0.38		0.16	0.73
Uniform Delay, d1	20.1	19.8	4.3		3.6	6.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.1	0.2	0.5		0.9	2.1
Delay (s)	21.2	19.9	4.8		4.5	8.2
Level of Service	C	B	A		A	A
Approach Delay (s)	20.4		4.8			8.0
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			7.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			49.4		Sum of lost time (s)	12.6
Intersection Capacity Utilization			62.6%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group











APPENDIX E
Intersection Capacity Analysis Reports
Future (2022) Total Traffic Conditions

HCM Unsignalized Intersection Capacity Analysis

1: Dixie Road & Primate Road

Future 2022 Total PM Peak Hour

11/17/2017











						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	11	7	804	1708	10
Future Volume (Veh/h)	5	11	7	804	1708	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	5	11	7	804	1708	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)				164		
pX, platoon unblocked	0.94					
vC, conflicting volume	2129	859	1718			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2071	859	1718			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	96	98			
cM capacity (veh/h)	44	304	374			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	16	7	402	402	1139	579
Volume Left	5	7	0	0	0	0
Volume Right	11	0	0	0	0	10
cSH	107	374	1700	1700	1700	1700
Volume to Capacity	0.15	0.02	0.24	0.24	0.67	0.34
Queue Length 95th (m)	3.5	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	44.6	14.8	0.0	0.0	0.0	0.0
Lane LOS	E	B				
Approach Delay (s)	44.6	0.1			0.0	
Approach LOS	E					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			57.5%		ICU Level of Service	B
Analysis Period (min)			15			

Queues

Future 2022 Total PM Peak Hour

11/17/2017

2: Dixie Road & Sherway Drive

					
Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	38	55	751	65	1648
Future Volume (vph)	38	55	751	65	1648
Lane Group Flow (vph)	38	55	843	65	1648
Turn Type	Prot	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		6	
Detector Phase	8	8	2	6	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	31.6	31.6	26.0	26.0	26.0
Total Split (s)	31.6	31.6	28.4	28.4	28.4
Total Split (%)	52.7%	52.7%	47.3%	47.3%	47.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.6	2.6	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.6	6.6	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.11	0.16	0.34	0.14	0.64
Control Delay	16.5	6.8	5.3	6.6	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	16.5	6.8	5.3	6.6	9.9
Queue Length 50th (m)	3.1	0.0	16.6	2.1	47.7
Queue Length 95th (m)	7.0	5.6	27.9	7.2	#94.5
Internal Link Dist (m)	101.9		50.0		140.1
Turn Bay Length (m)		35.0		30.0	
Base Capacity (vph)	966	881	2497	459	2588
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.04	0.06	0.34	0.14	0.64

Intersection Summary

Cycle Length: 60

Actuated Cycle Length: 46.6




Natural Cycle: 75

Control Type: Actuated-Uncoordinated

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 2: Dixie Road & Sherway Drive












	Ø2			
28.4 s				
	Ø6			
28.4 s				
			Ø8	
		31.6 s		

HCM Signalized Intersection Capacity Analysis

2: Dixie Road & Sherway Drive

Future 2022 Total PM Peak Hour

11/17/2017

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	38	55	751	92	65	1648
Future Volume (vph)	38	55	751	92	65	1648
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.7	3.7	3.5	3.7
Total Lost time (s)	6.6	6.6	6.0		6.0	6.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1785	1581	3408		1785	3544
Flt Permitted	0.95	1.00	1.00		0.33	1.00
Satd. Flow (perm)	1785	1581	3408		629	3544
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	38	55	751	92	65	1648
RTOR Reduction (vph)	0	49	9	0	0	0
Lane Group Flow (vph)	38	6	834	0	65	1648
Heavy Vehicles (%)	0%	1%	6%	0%	0%	3%
Turn Type	Prot	Perm	NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	5.3	5.3	31.5		31.5	31.5
Effective Green, g (s)	5.3	5.3	31.5		31.5	31.5
Actuated g/C Ratio	0.11	0.11	0.64		0.64	0.64
Clearance Time (s)	6.6	6.6	6.0		6.0	6.0
Vehicle Extension (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	191	169	2173		401	2259
v/s Ratio Prot	c0.02		0.24			c0.47
v/s Ratio Perm		0.00			0.10	
v/c Ratio	0.20	0.03	0.38		0.16	0.73
Uniform Delay, d1	20.1	19.8	4.3		3.6	6.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.1	0.2	0.5		0.9	2.1
Delay (s)	21.2	19.9	4.8		4.5	8.2
Level of Service	C	B	A		A	A
Approach Delay (s)	20.4		4.8			8.0
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			7.4		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			49.4		Sum of lost time (s)	12.6
Intersection Capacity Utilization			62.7%		ICU Level of Service	B
Analysis Period (min)			15			

c Critical Lane Group