TRANSPORTATION IMPACT STUDY

115 WATSON PARKWAY NORTH

CITY OF GUELPH

PREPARED FOR:

GUELPH WATSON HOLDINGS INC.

PREPARED BY:

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NOVEMBER 2023

CFCA FILE NO. 2358-6526

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	October 2023	Issued for review
Rev.1	November 2023	Issued for 1st Submission

Executive Summary

C.F. Crozier & Associates Inc. (Crozier) has been retained by Guelph Watson Holdings Inc. (the Applicant) to prepare a Transportation Impact Study (TIS) in support of the proposed mixed-use development for the site located at 115 Watson Parkway North in the City of Guelph.

Under the 2023 Existing conditions all study intersections are expected to continue performing optimally with a Level of Service "C" or better during the a.m. and p.m. peak hours, except Watson Parkway North at Starwood Drive operating at LOS "E" during the p.m. peak hour.

This study considered three horizon periods the expected buildout year of 2025, 2030 for five years after build-out, and 2035 for 10-years after buildout. These years were used to assess the impact of the trips generated by the development on surrounding intersections, per correspondence with the City of Guelph.

Under the 2035 Future Background conditions, most of the study intersections operate with a LOS of "C" or better during the a.m. and p.m. peak period. Watson Parkway North at Starwood and Watson Parkway North at York Road are expected to operate at LOS "F".

The proposed development is expected to generate 471 and 623 new two-way trips during the weekday a.m. and p.m. peak periods, respectively.

There is minimal change in the LOS values between the Future Background and Future Total conditions. The intersections are expected to operate at LOS "D" or better during the a.m. and p.m. peak hours. While Watson Parkway North at Starwood and Watson Parkway North at York Road is still anticipated to operate at LOS "F".

A signal warrant was conducted at Watson Parkway North at Starwood Drive. It was warranted for the 2025 Future Total conditions. Therefore, it is recommended that the intersection of Watson Parkway North at Starwood Drive, be converted from stop-controlled to signalized when the conversion from a T-intersection to a four-legged intersection with the site access is completed. The LOS of the intersection is projected to improve from LOS "F" to "D" under the 2035 Future Total conditions after signalization.

A dual left-turn lane on the eastbound approach at the intersection of Watson Parkway North at York Road was tested and it improved the intersection LOS at Watson Parkway North at York Road from "F" to "E" during the p.m. peak hour.

Per the old the *City of Guelph Zoning By-Law (1995) 14864,* the number of required parking spaces is 1435. The development has proposed 1232 spaces and therefore has a deficit of 233 spaces. This deficit can be justified since the old parking By-Law is conservative with the parking rates. According to the new *City of Guelph Zoning By-Law (2023) 20790*, the number of required parking spaces is 1232 while the development has proposed 1232 spaces and therefore meets the minimum requirements while being below the maximum requirements.

The existence of local transit, planned cycling facilities, combined with the provision of pedestrian infrastructure at the Site and the availability of several Transportation Demand Management options for the development are expected to reduce single-occupant vehicle trips on the study roads.

Based on the analysis contained within this report, the proposed mixed-use building development at 115 Watson Parkway North in the City of Guelph can be supported from the transportation operations perspectives.

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Guelph Watson Holdings Inc. to undertake a Transportation Impact Study (TIS), for the proposed mixed-use development located at 115 Watson Parkway North in the City of Guelph. The purpose of this study is to assess the impacts of the proposed development on the boundary road network and to recommend required mitigation measures, if warranted.

The study has been completed in accordance with the agreed upon Terms of Reference (ToR) with the City of Guelph (City) staff. Correspondence from the City is included in **Appendix A**.

2.0 Development Proposal

Based on the concept plan prepared by Turner Fleischer Architects as illustrated in **Figure 1**, we understand the elements envisioned for this development include a total site area of 6.44 ha, three development blocks with a total of 873 apartments units and 197 town house units. Block 1 contains buildings A and B with 10 and 12-storeys of mixed-use residential buildings, respectively and 959.4 m^2 of ground level commercial space. Block 2 contains buildings B and C with 12 and 14-storeys mixed-use residential buildings, respectively and 1858.8 m^2 of ground level commercial space. Block 3 contains 2-storey and 3-storey townhouses. The site will provide 1232 vehicular parking spaces in total for all blocks.

3.0 Existing Conditions

The following section provides a description of the study area from a transportation context, as well as a transportation operations analysis of the study road network.

3.1 Development Lands

The subject lands cover an area of approximately 6.44 ha and currently consists of vacant lands. The subject property (115 Watson Parkway North) is bounded by Watson Parkway North to the north and west, a storm pond to the south, and Watson Road North and an apartment building to the east. The site location and surrounding area are illustrated in **Figure 2.**

- Please provide details of any planned roadway or transit improvements in the surrounding study area within the horizon years, if there are any. See above comments.

Please let us know if there are any questions or concerns.

Kind regards,
Ariel

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#	DATE	DESCRIPTION	BY
1	Date 1	Revision 1	

TERCOT COMMUNITIES

PROJECT
Guelph Watson Holdings Inc.
115 WATSON PARKWAY, GUELPH, ON

DRAWING
SITE PLAN / ROOF PLAN

PROJECT NO.	22.028FS
PROJECT DATE	2023-09-25
DRAWN BY	AAF
CHECKED BY	AYU
SCALE	1 : 500
DRAWING NO.	RZ005
REV.	1

2023-09-25 6:08:01 PM

Legend	115 Watson Parkway North	CROZIER CONSULTING ENGINEERS	Figure 2
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes {xx} Weekend Peak Hour Traffic Volumes	Site Location		Project No. 2358-6526 Date. 2023-09-21 Analyst. S.A

3.2 Study Roadways

Watson Parkway North is a north-south roadway with a two-lane rural cross-section. It is under the jurisdiction of the City of Guelph and is classified as an arterial road under the City of Guelph Street Map, included in **Appendix B**. A 2.0 metre bike lane exists in both directions, however, there is no sidewalk in place. The roadway has a posted speed limit of 50 km/hr.

York Road is an east-west roadway with a two-lane rural cross section. It is under the jurisdiction of the City of Guelph and is classified as an arterial road under the City of Guelph Street Map, included in **Appendix B.** The roadway has a posted speed limit of 60 km/hr.

Starwood Drive is a north-south roadway with a two-lane urban cross section separated by a vegetated median. It is under the jurisdiction of the City of Guelph and is classified as a local road under Section 2 of the City of Guelph Downtown Streetscape Manual, included in **Appendix B**. The roadway has a posted speed limit of 40 km/hr.

Watson Road North is a north-south roadway with a two-lane rural cross-section. It is under the jurisdiction of the City of Guelph and is classified as a local road under Section 2 of the City of Guelph Downtown Streetscape Manual, included in **Appendix B**. The roadway has a posted speed limit of 60 km/hr near the proposed Site location.

3.3 Study Intersections

The following intersections were reviewed as part of the study area (per confirmation with the City).

Watson Parkway North and Starwood Drive is a three-legged stop-controlled on the minor road intersection. The eastbound and westbound approaches are separated by an island near the intersection. On the northeast corner, there is a shortened sidewalk which connects the Guelph Public Library to the transit station on Watson Parkway, and to the neighbourhood on the east side of Starwood Drive. The eastbound approach on Watson Parkway consists of a single through lane and a single left-turn lane. The westbound approach on Watson Parkway consists of a shared through/right-turn lane. The southbound approach on Starwood Drive consists of a left-turn lane and a right-turn lane.

Watson Parkway and Watson Road is a three-legged stop-controlled on the minor road intersection. There is a sidewalk on either side of Watson Parkway from the residential area to Starwood Drive. The eastbound approach has a shared through/right-turn lane. The westbound approach has a single through lane and an auxiliary left-turn lane. The northbound approach consists of a shared left-turn/ right-turn lane.

Watson Road and York Road is a four-legged signalized intersection. All approaches consist of a shared through/left-turn lane/right-turn lane. There are pedestrian walkways across all approaches, as well as pedestrian signal heads at all intersections. There are no sidewalks or bike lanes in any of the approaches.

Watson Parkway and York Road is a four-legged signalized intersection. The northbound approach consists of a shared through/right-turn lane and an auxiliary left-turn lane. The southbound approach consists of a through lane, auxiliary left-turn, and right-turn lanes. There is a bicycle lane in between the through lane and right-turn lane. The westbound approach consists of a through lane, an auxiliary left-turn lane, and an auxiliary right-turn lane. The eastbound approach consists of a through lane and an auxiliary left-turn lane. There are pedestrian signal heads and crosswalks across all approaches.

3.4 Traffic Data

Turning movement counts at the study intersections were conducted by Spectrum on Tuesday, November 8, 2022, between 6:00 a.m. – 9:45 a.m., and 3:00 p.m. – 6:45 p.m. Based on the results of these counts, the peak hours at the study intersection occurred between the hours of 7:45 a.m. – 8:45 a.m. and between the hours 4:15 p.m. – 5:15 p.m. during the p.m. peak hours. The traffic data provided in **Appendix C** includes these turning movement counts.

It is noted that the historical data was provided in specific years per the request of the City. The data at Watson Parkway North and Starwood Drive is from 2016, while the data from both Watson Road North and York Road, and Watson Parkway North and York Road is from 2019. Historical data from Watson Parkway North and Watson Road North was not available from the City to compare with the Traffic data provided by Spectrum, therefore is not included in the table below.

Table 1: Comparison Between Historical and 2022 Traffic Volumes

Intersection	A.M. Peak			P.M. Peak		
	Historical City (Grown to 2022)	2022 Spectrum	% Difference	Historical City (Grown to 2022)	2022 Spectrum	% Difference
Watson Parkway North at Starwood Drive (2016)	1056	921	**-15%**	1230	1213	**-1%**
Watson Road North at York Road (2019)	1042	858	**-21%**	751	1024	**+27%**
Watson Parkway North at York Road (2019)	1706	1719	**+1%**	2151	2156	**0%**

Generally, **Table 1** indicates that the traffic counts have decreased for the a.m. peak hour and increased for the p.m. peak hour. The use of historical traffic counts for the a.m. peak hours and Spectrum 2022 counts in the p.m. peak hour yields the most conservative evaluation of the Site. Additionally, considering that data is not available for the Watson Parkway North at Watson Road North intersection, the 2022 Spectrum data is to be used for that intersection.

Given that the historical data sets are from varying years, there are inconsistences in the counts between the intersections. Hence, balancing was performed to meet the higher volume of counts at each junction. To maintain the ratios of each movement, up to a 10% increase was made to each movement, thereby reducing the inconsistencies but not eliminating them.

All traffic data was grown to the existing year of 2023 when used in the analysis.

3.5 Traffic Modelling

The assessment of intersections is based on the method outlined in the "Highway Capacity Manual, 2010" using Synchro 11 modeling software. Intersections are assessed using a LOS metric, with ranges of delay assigned a letter from "A" to "F". For example, if the LOS A means free flow conditions with unimpeded maneuverability, and LOS F means extremely low low-speed vehicle maneuverability, and high delay.

For signalized intersections, a LOS "A" or "B" would typically be measured during off-peak hours when lesser traffic volumes are on the roadways resulting in no or minor delays for vehicles travelling through these intersections. LOS "C" through "F" are often measured in the commuter peak hours when greater vehicle volumes cause longer wait times resulting in longer travel times. The LOS definitions for signalized and stop control intersections is included in **Appendix D**.

3.6 Intersection Operations

The existing conditions analyzed in the year 2023 are illustrated in **Figure 3** below. Levels of Service based on current operations are outlined in **Table 2. Appendix E** contains the detailed capacity analysis.

Table 2: 2023 Existing Conditions

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th Percentile Queue Length [3] OR 95th Percentile Queue > Storage Lane Length
Watson Parkway North at Starwood Drive	Stop Controlled	A.M.	C	20.0 s	0.59 (EBR)	54.5 m (EBR)
		P.M.	**E**	44.0 s	0.18 (EBL)	39.9 m (NBL)
Watson Parkway North at Watson Road North	Stop Controlled	A.M.	B	11.2 s	0.07 (WBL)	10.5 m (SBL)
		P.M.	C	15.4 s	0.33 (WBL)	32.3 m (WBL)
Watson Road North at York Road	Signalized	A.M.	B	13.9 s	0.63 (SBT)	53.2 m (WBT)
		P.M.	B	11.5 s	0.56 (NBT)	67.7 m (EBT)
Watson Parkway North at York Road	Signalized	A.M.	C	23.7 s	0.81 (SBT)	68.9 m (WBT)
		P.M.	C	23.8 s	0.75 (NBT)	183.2 m > 68 m (EBL)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Note 3: 95th percentile queue lengths were derived from SimTraffic reports using 15-minute seeding, 60-minute simulation and an average of five runs.

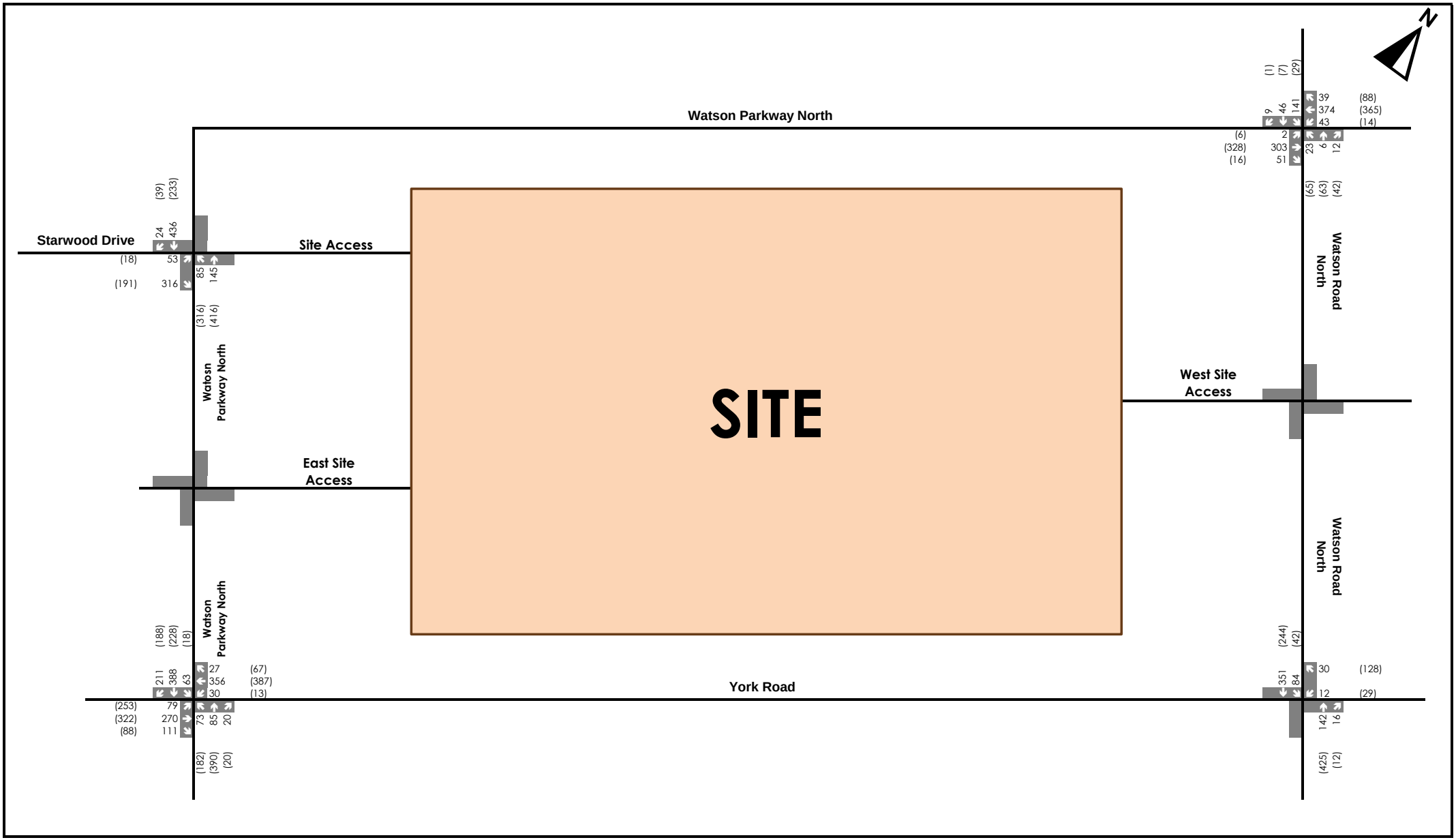
The stop-controlled intersection of Watson Parkway North at Starwood Drive is currently operating with a LOS of "C" during the a.m. peak period and a LOS "E" during the p.m. peak period. The intersection experiences a maximum control delay of 44.0 seconds during the p.m. peak period, and a maximum volume-to-capacity (v/c) ratio of 0.59. The 95th percentile queue is currently expected to be a maximum of 54.5 metres or less for this intersection.

The stop-controlled intersection of Watson Parkway North at Watson Road North is currently operating with a LOS of "B" during the a.m. peak period and LOS C during the p.m. peak period. The intersection experiences a maximum control delay of 15.4 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 0.33. The 95th percentile queue is currently expected to be a maximum of 32.3 metres or less for this intersection.

The signalized intersection of Watson Road North at York Road is currently operating with a LOS of "B" during the a.m. and p.m. peak periods. The intersection experiences a maximum control delay of 13.9 seconds during the a.m. peak period, and a maximum volume-to-capacity ratio of 0.63. The 95th percentile queue is currently expected to be a maximum of 67.7 metres or less for this intersection.

The signalized intersection of Watson Parkway North at York Road is currently operating with a LOS of "C" during the a.m. and p.m. peak periods. The intersection experiences a maximum control delay of 23.8 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 0.81. The 95th percentile queue will be greater than the storage length during the p.m. peak period by 115.2 metres.

These results indicate that majority of the intersections in the study area are currently operating efficiently with minimal delays and with reserve capacity to accommodate future increases in traffic volume.



Legend	115 Watson Parkway North	CROZIER CONSULTING ENGINEERS	Figure 3
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2023 Existing Volumes		Project No. 2358-6526 Date. 2023-09-21 Analyst. S.A

4.0 Future Background Conditions

Future background conditions refer to traffic conditions incorporating expected growth, background developments and improvements within the surrounding intersections occurring within the study horizons, outside of the development proposal.

4.1 Horizon Years

As confirmed with the City of Guelph, the horizon years selected to assess the impacts of the proposed development include:

- Full Build-out: 2025
- Five years from full build-out year: 2030
- Ten years from full build-out year: 2035

Future background traffic volumes for horizon years consist of the following components:

- Background traffic growth from outside the study area.
- Traffic generated within the study area from other proposed developments.

4.2 Traffic Growth Rates

Per discussion with the City of Guelph, a growth rate of 2% was applied to all traffic, as confirmed in the Terms of Reference established with City staff.

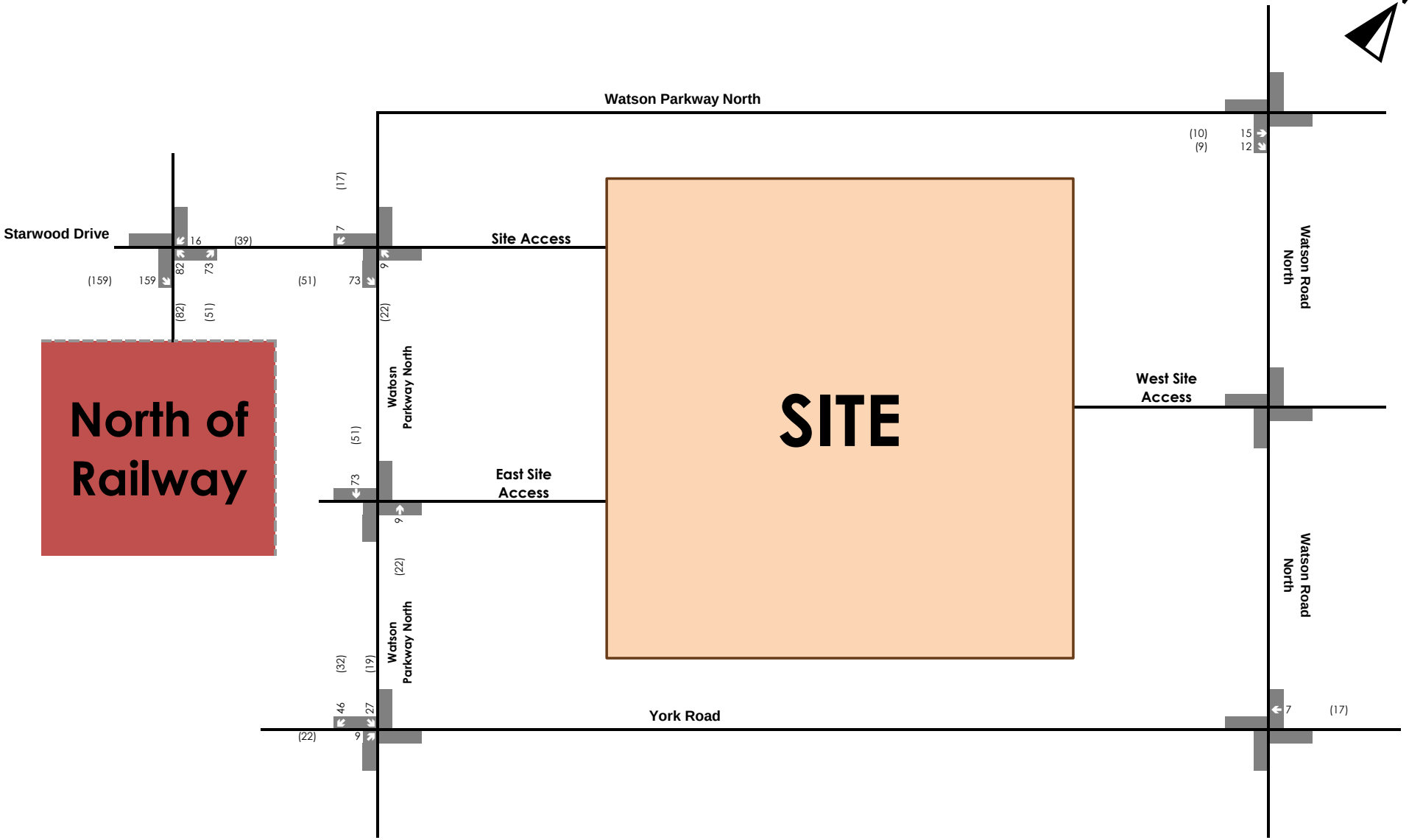
4.3 Background Developments

The following background developments located in the vicinity of the subject Site were identified based on Correspondence with the City. The ITE Trip Generation reports for the a.m. and p.m. peak hours can be found in **Appendix F**.

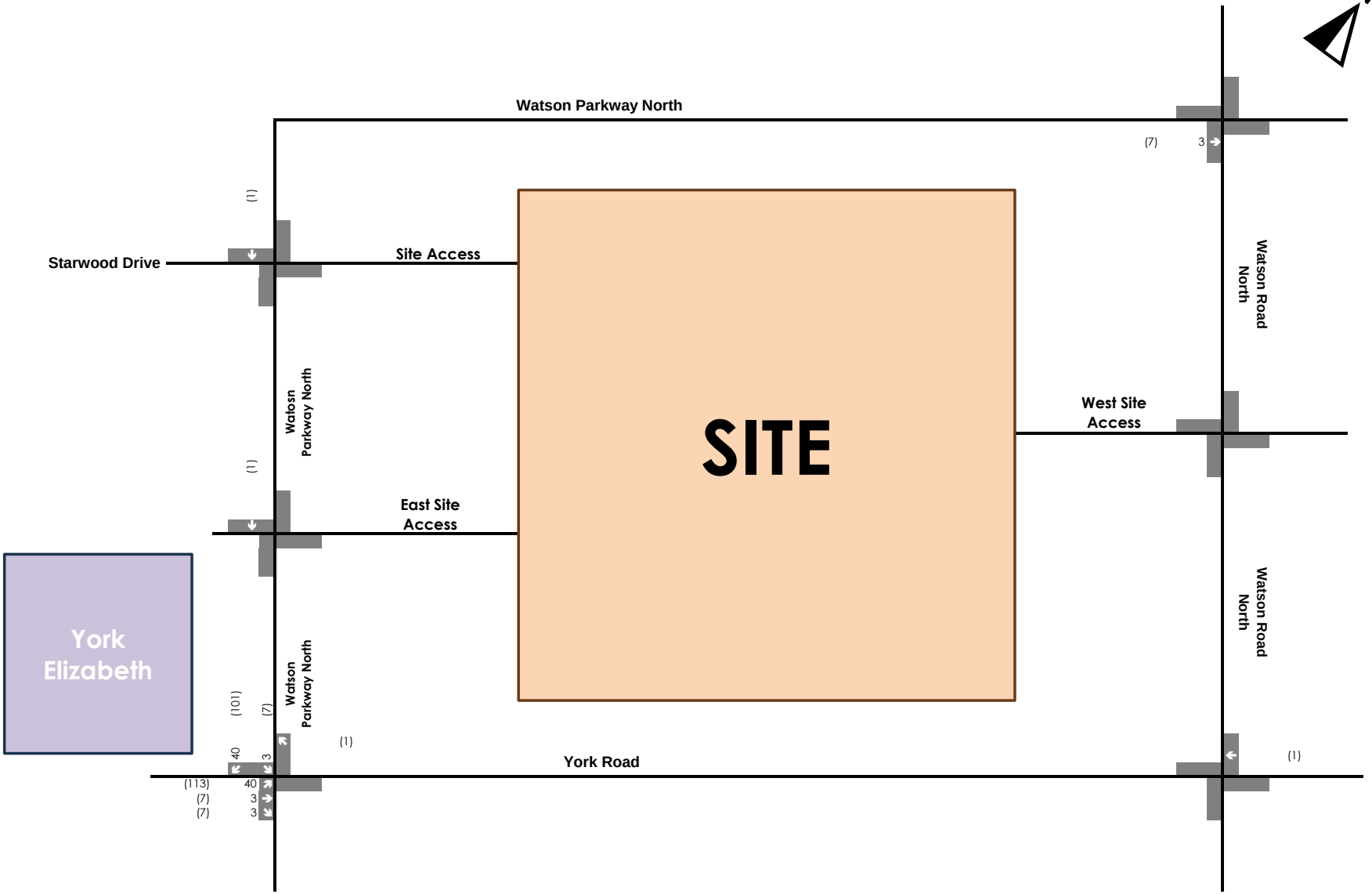
No TIS's were provided for the two developments to be included as part of this study. As such, none of the recommendations made by these reports were implemented in this study. Trips were estimating for the developments through:

- Residential Development North of the Railway Track – This development is proposed to consist of 156 single units, 85 townhouses, and 525 apartment units. No Transportation Impact Study was prepared for the development, hence the ITE Trip Generation Manual was used to predict the number of trips, while the Transportation Tomorrow Survey (TTS) was used to distribute and assign them. LUC "Single-Family Detached Housing (210)", LUC "Single-Family Attached Housing (215)", and LUC "Multifamily Housing (High-Rise) (close to rail) (222) were assumed to be appropriate. The Site is estimated to generate approximately 542 a.m. peak hour trips and 663 p.m. peak hour trips. **Figure 4** displays the trip assignment for the development.

- York Elizabeth Land Use Study Area – This development is proposed to consist of 88 townhouses and 4,878 m^2 of commercial space. No Transportation Impact Study was prepared for the development, hence the ITE Trip Generation Manual was used to predict the number of trips, while the Transportation Tomorrow Survey (TTS) was used to distribute and assign them. LUC "Shopping Centre (>150k) (820) and LUC "Single-Family Attached Housing (215)" were assumed to be appropriate. LUC "Strip Retail Plaza (<40k) (822)" was not used as the number of studies was limited, hence providing a skewed rate. By using LUC 820, a more conservative analysis is provided as the proposed commercial area is not greater than 150,000 ft^2. The Site is estimated to generate approximately 173 a.m. peak hour trips and 457 p.m. peak hour trips. **Figure 5** displays the trip assignment for the development.



Legend	115 Watson Parkway North	CROZIER CONSULTING ENGINEERS	Figure 4
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	North of Railway Background Development		Project No. 2358-6526 Date. 2023-09-21 Analyst. S.A



Legend	115 Watson Parkway North	CROZIER CONSULTING ENGINEERS	Figure 5
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	York Elizabeth Background Development		Project No. 2358-6526 Date. 2023-09-21 Analyst. S.A

4.4 Intersection Operations

Traffic operations at the study intersections were analyzed following addition of volumes from associated growth rates and background developments. **Table 3**, **Table 4**, and **Table 5** summarizes the 2025, 2030, and 2035 Future Background operations, respectively. **Appendix D** contains the Level of Service definitions and **Appendix E** contains the detailed capacity analysis.

Table 3: 2025 Future Background Operations

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th Percentile Queue Length [3] OR 95th Percentile Queue > Storage Lane Length
Watson Parkway North at Starwood Drive	Stop-Controlled	A.M.	D	30.7 s	0.78 (EBR)	18.7 m (NBL)
		P.M.	**F**	57.1 s	0.23 (EBL)	35 m (NBL)
Watson Parkway North at Watson Road North	Stop-Controlled	A.M.	B	12.2 s	0.10 (WBL)	12.5 m (WBL)
		P.M.	C	16.2 s	0.36 (WBL)	25.2 m (WBL)
Watson Road North at York Road	Signalized	A.M.	B	14.6 s	0.65 (SBT)	63.8 m (WBT)
		P.M.	B	12.0 s	0.58 (NBT)	62.5 m (WBT)
Watson Parkway North at York Road	Signalized	A.M.	C	24.5 s	**0.86 (SBT)**	75.8 m (WBT)
		P.M.	D	40.4 s	**1.18 (EBL)**	168.8 m > 68 m (EBL)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Note 3: 95th percentile queue lengths were derived from SimTraffic reports using 15-minute seeding, 60-minute simulation and an average of five runs.

Table 4: 2030 Future Background Conditions

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th Percentile Queue Length [3] OR 95th Percentile Queue > Storage Lane Length
Watson Parkway North at Starwood Drive	Stop-Controlled	A.M.	**E**	25.3 s	0.27 (EBL)	95.1 m (EBR)
		P.M.	**F**	82.1 s	0.34 (EBL)	36.4 m (EBR)
Watson Parkway North at Watson Road North	Stop-Controlled	A.M.	B	12.4 s	0.11 (WBL)	11.7 m (SBL)
		P.M.	C	16.7 s	0.38 (WBL)	24.9 m (WBL)
Watson Road North at York Road	Signalized	A.M.	B	16.6 s	0.67 (SBT)	85.1 m (WBT)
		P.M.	B	13.2 s	0.60 (NBT)	70.6 m (WBT)
Watson Parkway North at York Road	Signalized	A.M.	C	28.1 s	**0.91 (SBT)**	97 m (SBT)
		P.M.	F	56.8 s	**1.39 (EBL)**	168 m > 68 m (EBL) 69.9 m > 68 m (WBR) 127.9 m > 112 m (SBR)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Note 3: 95th percentile queue lengths were derived from SimTraffic reports using 15-minute seeding, 60-minute simulation and an average of five runs.

Table 5: 2035 Future Background Conditions

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th Percentile Queue Length [3] OR 95th Percentile Queue > Storage Lane Length
Watson Parkway North at Starwood Drive	Stop-Controlled	A.M.	**F**	88.4 s	**1.06 (EBR)**	139.6 m > 84 m (EBL)
		P.M.	**F**	135.4 s	0.50 (EBL)	40.8 m (EBR)
Watson Parkway North at Watson Road North	Stop-Controlled	A.M.	B	12.6 s	0.11 (WBL)	13 m (WBL)
		P.M.	C	17.1 s	0.39 (WBL)	24.8 m (WBL)
Watson Road North at York Road	Signalized	A.M.	B	19.6 s	0.76 (WBT)	177 m (WBT)
		P.M.	B	15.1 s	0.69 (WBT)	80.3 m (WBT)
Watson Parkway North at York Road	Signalized	A.M.	C	34.0 s	**0.98 (SBT)**	123.4 m > 112 m (SBR)
		P.M.	**F**	91.7 s	**1.83 (EBL)**	168.1 m > 68 m (EBL) 125.8 m > 68 m (WBR) 223.3 m > 102 m (SBL) 196.9 m > 112 m (SBR)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Note 3: 95th percentile queue lengths were derived from SimTraffic reports using 15-minute seeding, 60-minute simulation and an average of five runs.

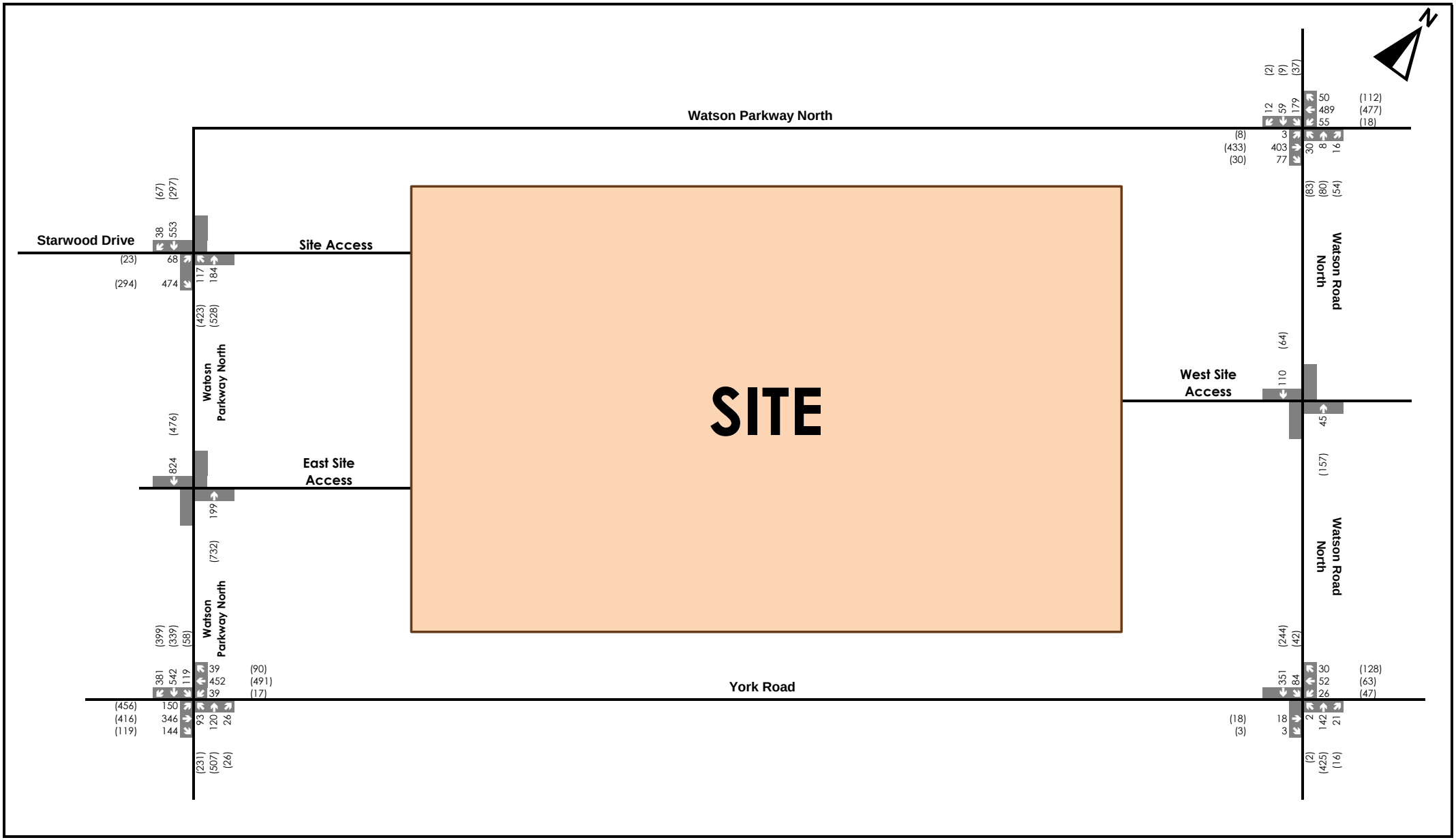
During the year of 2035, the stop-controlled intersection of Watson Parkway North at Starwood Drive is anticipated to operate with a LOS of "F" during the a.m. and p.m. peak period. The intersection may experience a maximum control delay of 135.4 seconds during the p.m. peak period, and maximum volume-to-capacity (v/c) ratio of 1.06. The 95th percentile queue may be greater than the storage length by 55.6 metres during the a.m. peak period.

The stop-controlled intersection of Watson Parkway North at Watson Road North is anticipated to operate with a LOS of "B" during the a.m. peak period and LOS "C" during the p.m. peak period. The intersection may experience a maximum control delay of 17.1 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 0.39. The 95th percentile queue is currently expected to be a maximum of 24.8 metres or less for this intersection.

The signalized intersection of Watson Road North at York Road is expected to operate with a LOS of "B" during the a.m. and p.m. peak periods. The intersection may experience a maximum control delay of 19.6 seconds during the a.m. peak period, and a maximum volume-to-capacity ratio of 0.76. The 95th percentile queue is currently expected to be a maximum of 177 metres or less for this intersection.

The signalized intersection of Watson Parkway North at York Road is anticipated to operate with a LOS of "C" during the a.m. and LOS of "F" during the p.m. peak periods. The intersection experiences a maximum control delay of 91.7 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 1.83. The 95th percentile queue may exceed the storage lane lengths during the a.m. period in the southbound right turn movement. During the p.m. period the 95th percentile queue length will exceed the storage lane length in the eastbound left, westbound right, southbound left, and southbound right turning movements.

These results indicate that majority of the intersections in the study area are currently operating efficiently with minimal delays and with reserve capacity to accommodate future increases in traffic volume. The intersection of Watson Parkway North at Starwood Drive will be signalized in the future which will alleviate congestion in the eastbound movement but should continue to be observed by the City. The figure below shows the 2035 Future Background conditions.



Legend	115 Watson Parkway North	CROZIER CONSULTING ENGINEERS	Figure 6
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2035 Future Background Volumes		Project No. 2358-6526 Date. 2023-09-21 Analyst. S.A

5.0 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 Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition was used to forecast the number of trips generated by the mixed-use development. The trips generated by the townhouses were determined using Land Use Category (LUC) 220 "Multifamily Housing Low-Rise". The trips generated by the apartment buildings A, B, C, and D were determined using Land Use Category 222 "Multifamily Housing High-Rise". While building A is categorized as LUC 221 "Multifamily Housing Mid-Rise" as it is only 10 storeys, the concept plan only mentioned the total unit count on Block A. Block A contains buildings A and B therefore, building A was assumed to have a LUC of 222.

Relevant excerpts from the ITE Trip Generation Manual 11th Edition are included in **Appendix F**.

Table 6 summarizes the number of trips forecasted to be generated by the proposed development. The number of units can be found in the concept plan.

Table 6: ITE Trip Generation

Type	Parameter	A.M. Peak Hour			P.M. Peak Hour		
		In	Out	2-Way	In	Out	2-Way
Multifamily Housing (High-Rise) (LUC 222) 873 Units	Gross Trips	61	174	235	173	106	279
	Equation/Rate	0.27			0.32		
Multifamily Housing (Low-Rise) (LUC 220) 197 Units	Gross Trips	20	64	84	66	39	105
	Equation/Rate	0.40			0.51		
Shopping Centre (>150k) (LUC 820) 30,340 ft²	Gross Trips	94	58	152	115	124	239
	Equation/Rate	0.84			3.40		
Net New Trips		**175**	**296**	**471**	**354**	**269**	**623**

The subject site is expected to generate 471 two-way (175 inbound and 296 outbound) trips during the weekday a.m. peak hour, and 623 two-way (354 inbound and 269 outbound) trips during the weekday p.m. peak hour.

5.2 Trip Distribution and Assignment

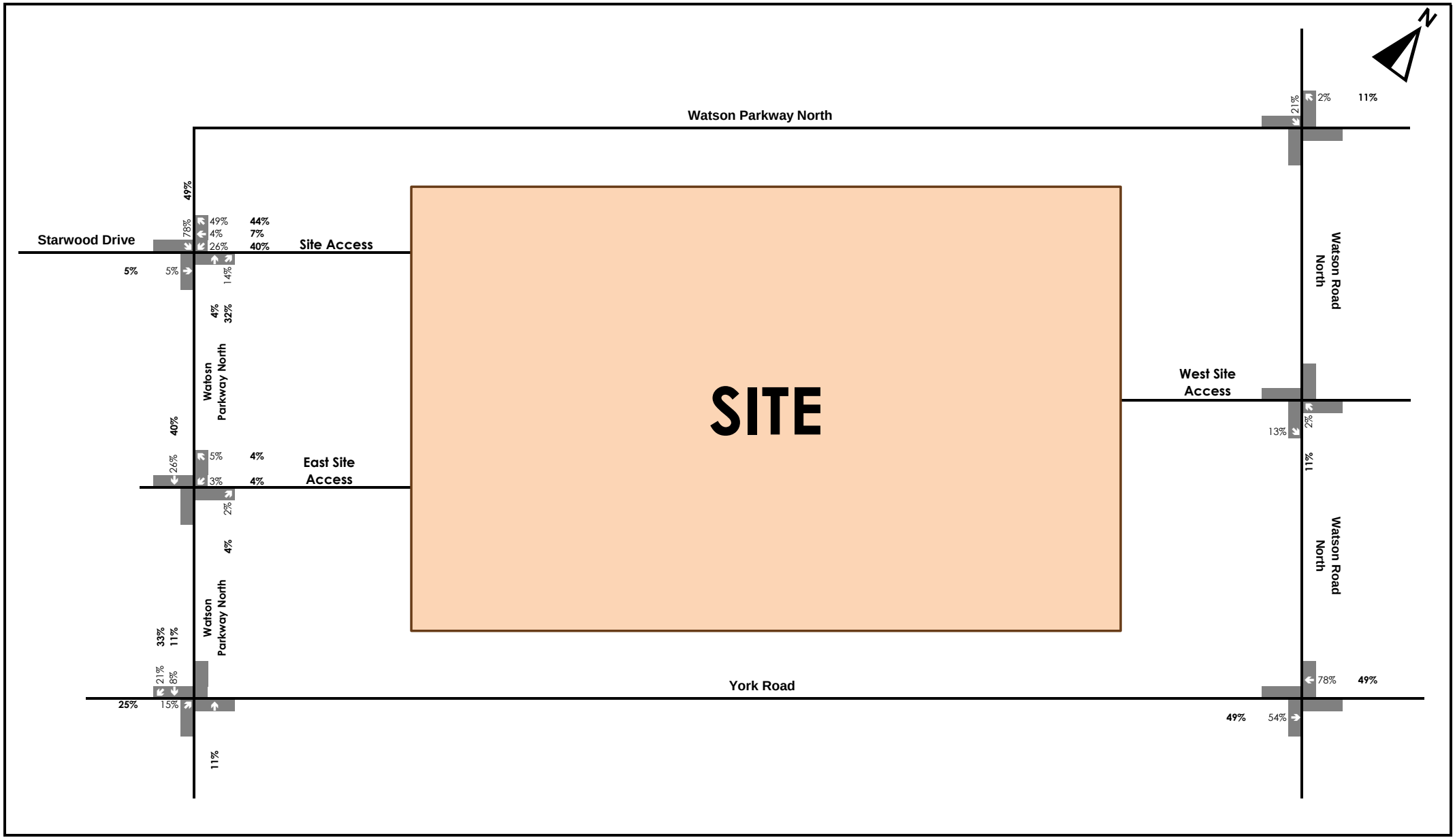
The trips were distributed and assigned based on the Transportation Tomorrow Survey (TTS) and analysis of movements along the roadway. Data from Transportation Tomorrow Surveys (TTS) was used to estimate the peak hour trip distribution at the site, as confirmed with the City of Guelph. **Table 7** outlines the trip distribution for the proposed development divided into time and direction of travel. Data from Transportation Tomorrow Surveys (TTS) was used to distribute the site generated trips to the study road network.

Table 7: Trip Distribution for Passenger Vehicles

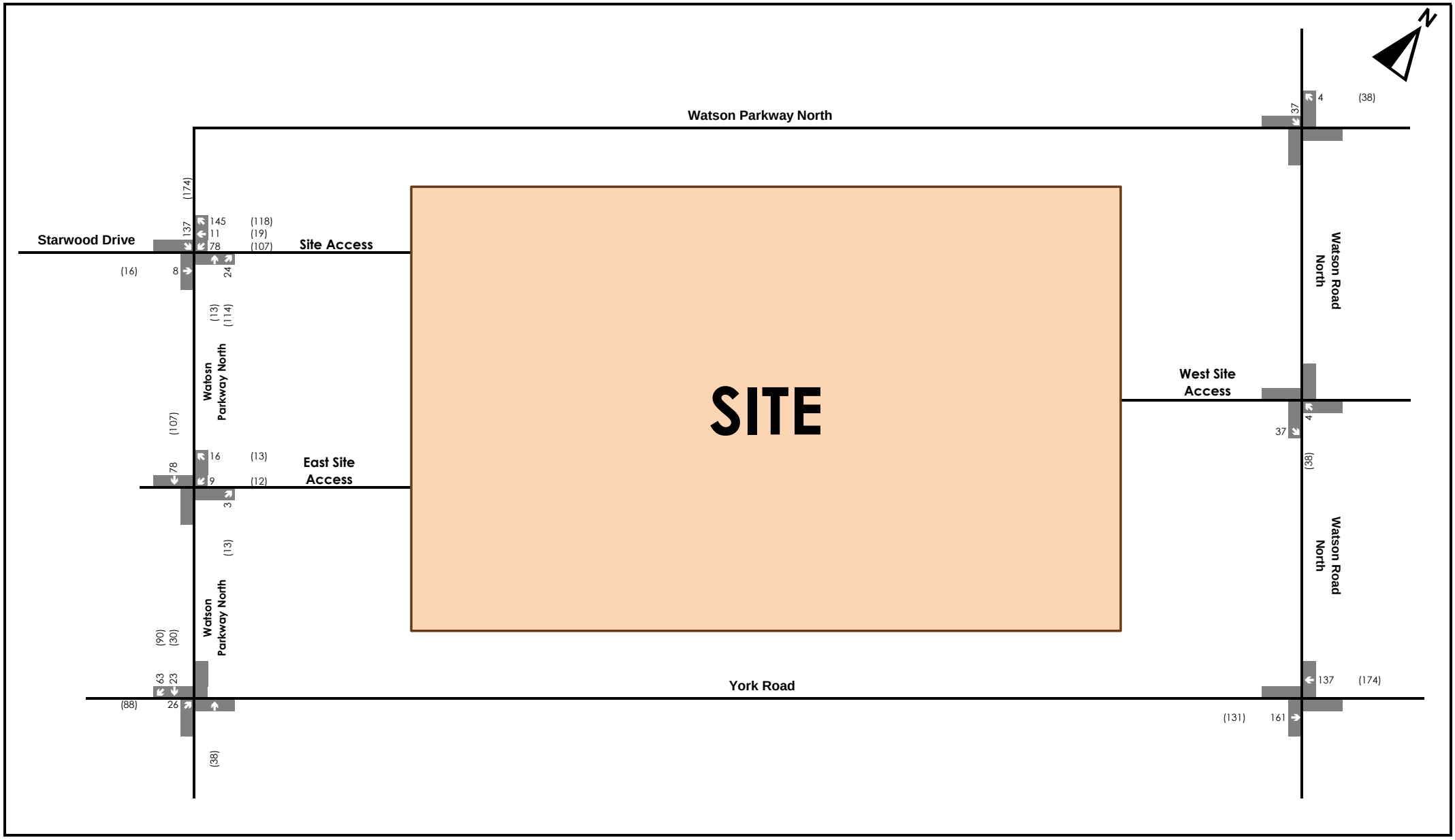
Direction	A.M. Peak Hour		P.M. Peak Hour	
	In	Out	In	Out
Northwest	64%	52%	44%	49%
North	9%	0%	2%	0%
Northeast	4%	0%	0%	0%
East	0%	4%	4%	0%
Southeast	0%	7%	7%	0%
South	0%	4%	3%	0%
Southwest	0%	14%	18%	16%
West	23%	19%	22%	36%

These results are based on Google Map optimized routes during the typical weekday peak period and are comparable with the existing travel patterns found in the existing turning movement counts collected. Trip Distribution Data from Transportation Tomorrow Survey Results can be found in **Appendix G**.

The Site trip distribution and assignment for the generated trips is illustrated in **Figure 7** and **Figure 8**, respectively.



Legend	115 Watson Parkway North	CROZIER CONSULTING ENGINEERS	Figure 7
A.M. Peak Hour Traffic (xx) P.M. Peak Hour Traffic	Trip Distribution		Project No. 2358-6526 Date. 2023-09-21 Analyst. S.A



Legend	115 Watson Parkway North	CROZIER CONSULTING ENGINEERS	Figure 8
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	Trip Assignment		Project No. 2358-6526 Date. 2023-09-21 Analyst. S.A

6.0 Future Total Conditions

Future Total traffic volumes for horizon years consist of the following components:

- Background traffic growth from outside the study area.
- Traffic generated within the study area from other proposed developments.
- Traffic expected to be generated by the development.

6.1 Study Horizons

As confirmed with the City of Guelph, the horizon years selected to assess the impacts of the proposed development include:

- Full Build-out: 2025
- Five years from full build-out year: 2030
- Ten years from full build-out year: 2035

6.2 Intersection Operations

Intersection operations at the study intersections were analyzed following addition of volumes from associated growth rates, background developments, and expected site traffic. **Table 8**, **Table 9**, and **Table 10** summarizes the 2025, 2030, and 2035 Future Total operations, respectively. **Appendix D** contains the Level of Service definitions and **Appendix E** contains the detailed capacity analysis.

Table 8 : 2025 Future Total Conditions

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th Percentile Queue Length [3] OR 95th Percentile Queue > Storage Lane Length
Watson Parkway North at Starwood Drive/Site Access	Stop-Controlled	A.M.	**F**	Error	**5.78 (WBT)**	84 m (WBT)
		P.M.	**F**	Error	**15.96 (WBT)**	158.1 m (WBT)
Watson Parkway North at Watson Road North	Stop-Controlled	A.M.	B	12.2 s	0.10 (WBL)	13.5 m (WBL)
		P.M.	C	16.2 s	0.36 (WBL)	24.9 m (WBL)
Watson Road North at York Road	Signalized	A.M.	B	16.5 s	0.69 (SBT)	91.4 m (WBT)
		P.M.	B	12.3 s	0.58 (WBT)	79.4 m (WBT)
Watson Parkway North at York Road	Signalized	A.M.	C	25.5 s	**0.88 (SBT)**	89.8 m (SBT)
		P.M.	**E**	64.2 s	**1.47 (EBL)**	168.3 m > 68 m (EBL) 75.5 m > 67 m (NBL) 125.1 m > 102 m (SBL) 196.1 m > 112 m (SBR)
Watson Parkway North at West Site Access	Stop-Controlled	A.M.	B	14.8 s	0.07 (WBL)	12.5 m (WBL)
		P.M.	**D**	32.0	0.17 (WBL)	178.4 m (SBT)
Watson Road North at East Site Access	Stop-Controlled	A.M.	A	9.0 s	0.04 (EBL)	14 m (NBT)
		P.M.	A	1.6 s	0.03 (NBT)	3.7 m (NBT)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Note 3: 95th percentile queue lengths were derived from SimTraffic reports using 15-minute seeding, 60-minute simulation and an average of five runs.

Table 9: 2030 Future Total Conditions

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th Percentile Queue Length [3] OR 95th Percentile Queue > Storage Lane Length
Watson Parkway North at Starwood Drive/Site Access	Stop-Controlled	A.M.	**F**	Error	**14.01 (WBT)**	204.3 m (WBT)
		P.M.	**F**	Error	**31.36 (WBT)**	227.3 m (WBT)
Watson Parkway North at Watson Road North	Stop-Controlled	A.M.	B	12.4 s	0.11 (WBL)	14.6 m (WBL)
		P.M.	C	16.7 s	0.38 (WBL)	22.5 m (WBL)
Watson Road North at York Road	Signalized	A.M.	B	18.6 s	0.72 (SBT)	252.4 m (WBT)
		P.M.	B	16.2 s	0.69 (NBT)	68 m (WBT)
Watson Parkway North at York Road	Signalized	A.M.	C	29.3 s	**0.93 (SBT)**	98.9 m (SBT)
		P.M.	**F**	93.0 s	**1.78 (EBL)**	167.9 m > 68 m (EBL) 91.7 m > 67 m (NBL)
Watson Parkway North at West Site Access	Stop-Controlled	A.M.	B	14.8 s	0.07 (WBL)	13.1 m (WBL)
		P.M.	D	31.3 s	0.17 (WBL)	14.3 m (WBL)
Watson Road North at East Site Access	Stop-Controlled	A.M.	A	9.0 s	0.04 (EBL)	14 m (EBL)
		P.M.	A	1.6 s	0.03 (NBT)	5.2 m (NBT)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Note 3: 95th percentile queue lengths were derived from SimTraffic reports using 15-minute seeding, 60-minute simulation and an average of five runs.

Table 10: 2035 Future Total Conditions

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th Percentile Queue Length [3] OR 95th Percentile Queue > Storage Lane Length
Watson Parkway North at Starwood Drive/Site Access	Stop-Controlled	A.M.	**F**	Error	**Error**	183.3 m (WBT)
		P.M.	**F**	Error	**Error**	182.6 m (WBT)
Watson Parkway North at Watson Road North	Stop-Controlled	A.M.	B	12.6 s	0.11 (WBL)	101.4 m (WBL)
		P.M.	C	17.1 s	0.39 (WBL)	22.3 m (WBL)
Watson Road North at York Road	Signalized	A.M.	C	21.9 s	0.80 (WBT)	439.9 m (WBT)
		P.M.	B	19.0 s	0.78 (WBT)	83.8 m (WBT)
Watson Parkway North at York Road	Signalized	A.M.	D	37.4 s	**1.03 (SBT)**	75.7 m > 68 m (EBL) 140.2 m > 112 m (SBR)
		P.M.	**F**	135.6 s	**2.22 (EBL)**	168.3 m > 68 m (EBL) 76.5 m > 68 m (WBR) 87 m > 67 m (NBL) 124.9 m > 112 m (SBR)
Watson Parkway North at West Site Access	Stop-Controlled	A.M.	B	14.8 s	0.07 (WBL)	178.4 m (SBT)
		P.M.	D	31.4 s	0.17 (WBL)	12.5 m (WBL)
Watson Road North at East Site Access	Stop-Controlled	A.M.	A	9.0 s	0.04 (EBL)	14.4 m (EBL)
		P.M.	A	1.6 s	0.03 (NBT)	3.8 m (NBT)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Note 3: 95th percentile queue lengths were derived from SimTraffic reports using 15-minute seeding, 60-minute simulation and an average of five runs.

The signalized intersection of Watson Parkway North at Starwood Drive is anticipated to operate with a LOS of "F" during the a.m. and p.m. peak period. The maximum control delay and volume-to-capacity ratios cannot be calculated since the westbound approach is over saturated. The 95th percentile queue is expected to be a maximum of 183.3 metres.

The stop-controlled intersection of Watson Parkway North at Watson Road North is anticipated to operate with a LOS of "B" during the a.m. peak period and LOS "C" during the p.m. peak period. The intersection may experience a maximum control delay of 17.1 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 0.39. The 95th percentile queue is currently expected to be a maximum of 101.4 metres or less for this intersection.

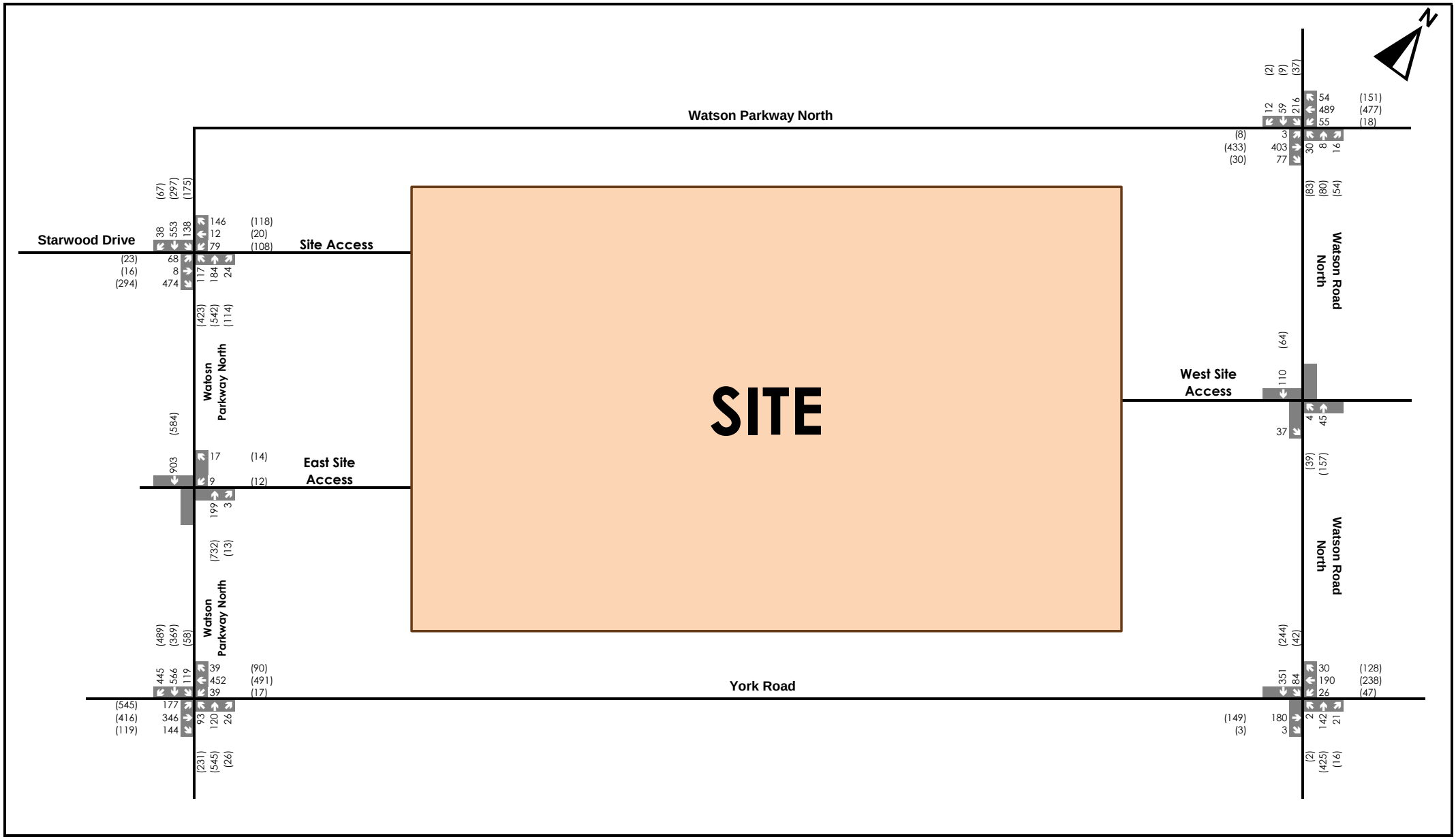
The signalized intersection of Watson Road North at York Road is expected to operate with a LOS of "C" during the a.m. period and LOS "B" during the p.m. peak periods. The intersection may experience a maximum control delay of 21.9 seconds during the a.m. peak period, and a maximum volume-to-capacity ratio of 0.80. The 95th percentile queue is currently expected to be a maximum of 439.9 metres or less for this intersection.

The signalized intersection of Watson Parkway North at York Road is anticipated to operate with a LOS of "D" during the a.m. and LOS of "F" during the p.m. peak periods. The intersection experiences a maximum control delay of 135.6 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 2.22. The 95th percentile queue may exceed the storage lane lengths during the a.m. period in the southbound right and eastbound left turning movements. During the p.m. period the 95th percentile queue length will exceed the storage lane length in the northbound left and right, eastbound left, and southbound right turning movements.

The stop-controlled intersection of Watson Parkway North at West Site Access is anticipated to operate with a LOS of "B" during the a.m. peak period and LOS "D" during the p.m. peak period. The intersection may experience a maximum control delay of 31.4 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 0.17. The 95th percentile queue is currently expected to be a maximum of 178.4 metres or less for this intersection.

The stop-controlled intersection of Watson Road North at East Site Access is anticipated to operate with a LOS of "A" during the a.m. and p.m. peak period. The intersection may experience a maximum control delay of 9.0 seconds during the a.m. peak period, and a maximum volume-to-capacity ratio of 0.04. The 95th percentile queue is currently expected to be a maximum of 14.4 metres or less for this intersection.

These results indicate that majority of the intersections in the study area are currently operating efficiently with minimal delays and with reserve capacity to accommodate future increases in traffic volume, with the exception of Watson Parkway North at Starwood Drive/Site Access and Watson Parkway North at York Road. **Figure 9** shows the 2035 Future Total conditions.



Legend	115 Watson Parkway North	CROZIER CONSULTING ENGINEERS	Figure 9
xx A.M. Peak Hour Traffic Volumes (xx) P.M. Peak Hour Traffic Volumes	2035 Future Total Volumes		Project No. 2358-6526 Date. 2023-09-21 Analyst. S.A

7.0 Traffic Control Signal Warrants

Signal warrants were conducted for the intersection of Watson Parkway and Starwood Drive/ Site Access.

The analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12", March 2012. Justifications 1 (Minimum Vehicular Volume), 2 (Delay to Cross Traffic), 3 (Combination of Justifications 1 and 2), and 4 (4-Hour Volume) were selected as the most appropriate warrants with which to assess the two study intersections.

The average hour volume was determined using the following formula from OTM Book 12:

$$AHV = (amPHV + pmPHV) / 4$$

Where;
AHV = average hour volume
PHV = peak hour volume

An "urban" operating environment was applied to the signal warrant analysis to reflect the urbanization of the corridor.

Under 2025 future total conditions, signals are warranted at the study intersections of Watson Parkway and Starwood Drive/Northern Site Access.

Appendix J contains the signal warrant sheets. It is still recommended that signalization of Watson Parkway and Starwood Drive/Northern Site Access be implemented to improve the operations of the subject intersection.

Note that left-turn warrants are not required for the other Site Accesses, as little to no traffic turns left at the stop-controlled accesses. Rather, it is assumed that most trips will use the signal at Watson Parkway and Starwood Drive, where left turns are simpler and safer.

8.0 Recommendations

To mitigate the congestion observed at Watson Parkway at Starwood Drive/Site Access and Watson Parkway at York Road, signalization and lane optimization methods were assessed.

8.1 Background Conditions

As noted in Section 4.0, the TIS's for the background improvements were not provided so no recommendations from these reports were included. It is worth noting that the concerns seen along Watson Parkway North at Starwood Drive and at York Road are seen in Background conditions.

8.2 Signalization of Watson Parkway North at Starwood Drive/Site Access

The intersection of Watson Parkway North at Starwood Drive/Site Access was signalized to alleviate congestion experienced during all three horizon years. **Table 11** summarizes the results from the 2035 Future Total scenario with the signalized recommendation.

Table 11: 2035 Future Total Conditions with Signalization

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th Percentile Queue Length [3] OR 95th Percentile Queue > Storage Lane Length
Watson Parkway North at Starwood Drive/Site Access	Signalized	A.M.	C	20.3	0.83 (WBT)	74.1 m (NBT)
		P.M.	C	21.4 s	**0.89 (WBT)**	74.1 m (NBT)
Watson Parkway North at Watson Road North	Stop-Controlled	A.M.	B	12.6 s	0.11 (WBL)	22.2 m (WBL)
		P.M.	C	17.1 s	0.39 (WBL)	21.2 m (WBL)
Watson Road North at York Road	Signalized	A.M.	C	21.9 s	0.80 (WBT)	81 m (WBT)
		P.M.	B	19.0 s	0.78 (WBT)	81 m (WBT)
Watson Parkway North at York Road	Signalized	A.M.	D	37.5 s	**1.03 (SBT)**	167.9 m > 68 m (EBL) 80.2 m > 68 m (WBR) 82.5 m > 67 m (NBL) 130 m > 112 m (SBR)
		P.M.	**F**	135.6 s	**2.22 (EBL)**	167.9 m > 68 m (EBL) 80.2 m > 68 m (WBR) 82.5 m > 67 m (NBL) 130 m > 112 m (SBR)
Watson Parkway North at West Site Access	Stop-Controlled	A.M.	C	15.9 s	0.08 (WBL)	12.1 m (WBL))
		P.M.	D	25.6 s	0.14 (WBL)	12.1 m (WBL)
Watson Road North at East Site Access	Stop-Controlled	A.M.	A	9.0 s	0.04 (EBL)	4 m (NBT)
		P.M.	A	1.6 s	0.03 (NBT)	4 m (NBT)

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

Note 3: 95th percentile queue lengths were derived from SimTraffic reports using 15-minute seeding, 60-minute simulation and an average of five runs.

The signalized intersection of Watson Parkway North at Starwood Drive is anticipated to operate with a LOS of "C" during the a.m. and p.m. peak period. The intersection may experience a maximum control delay of 21.4 seconds during the p.m. peak period, and maximum volume-to-capacity (v/c) ratio of 0.89. The 95th percentile queue may be a maximum of 74.9 metres or less.

The stop-controlled intersection of Watson Parkway North at Watson Road North is anticipated to operate with a LOS of "B" during the a.m. peak period and LOS "C" during the p.m. peak period. The intersection may experience a maximum control delay of 17.1 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 0.39. The 95th percentile queue is currently expected to be a maximum of 22.2 metres or less for this intersection.

The signalized intersection of Watson Road North at York Road is expected to operate with a LOS of "C" during the a.m. period and LOS "B" during the p.m. peak periods. The intersection may experience a maximum control delay of 21.9 seconds during the a.m. peak period, and a maximum volume-to-capacity ratio of 0.80. The 95th percentile queue is currently expected to be a maximum of 81 metres or less for this intersection.

The signalized intersection of Watson Parkway North at York Road is anticipated to operate with a LOS of "D" during the a.m. and LOS of "F" during the p.m. peak periods. The intersection experiences a maximum control delay of 135.6 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 2.22. The 95th percentile queue may exceed the storage lane lengths during the a.m. and p.m. periods in the eastbound left, westbound right, northbound left, and southbound right approaches.

The stop-controlled intersection of Watson Parkway North at West Site Access is anticipated to operate with a LOS of "C" during the a.m. peak period and LOS "D" during the p.m. peak period. The intersection may experience a maximum control delay of 25.6 seconds during the p.m. peak period, and a maximum volume-to-capacity ratio of 0.14. The 95th percentile queue is currently expected to be a maximum of 12.1 metres or less for this intersection.

The stop-controlled intersection of Watson Road North at East Site Access is anticipated to operate with a LOS of "A" during the a.m. and p.m. peak period. The intersection may experience a maximum control delay of 9.0 seconds during the a.m. peak period, and a maximum volume-to-capacity ratio of 0.04. The 95th percentile queue is currently expected to be a maximum of 4 metres or less for this intersection.

These results indicate that the majority of the intersections in the study area would operate efficiently with minimal delays and with reserve capacity to accommodate future increases in traffic volume if the intersection of Watson Parkway North at Starwood Drive were signalized.

8.3 Watson Parkway North at York Road

The intersection of Watson Parkway North at York Road is anticipated to operate with a LOS of "F" and fail in the 2030 and 2035 Future Background conditions, indicating additional site traffic did not significantly alter the performance of the intersection. Some possible solutions were examined for this intersection, but, as these are expected to fail due to background conditions, no recommendations are made in this report.

8.3.1 Double Left-Turn Lane

According to the TAC GDGCR chapter 9.17, double left turn lanes is a design consideration when the peak left-turn volumes exceed 300 vehicles per hour. During the p.m. peak hour there are 561 vehicles making a left turn from the eastbound approach. Implementing a double left turn lane improves the overall LOS of the intersection from "F" to "E". In addition to adding a double left-turn lane, the receiving lanes had to be increased from 1 to 2 on the south approach. Also, under the timing settings, the southbound right turn approach was changed from permitted (perm) to permitted and overlap (pm+ov). **Table 12** compares the recommendations outlined above to the 2035 Future Total Conditions where the intersection of Watson Parkway North at Starwood Drive/Site Access is signalized.

Table 12: Double Left-Turn Lane Recommendation

Scenario		2035 Future Total (Signalized)		2035 Future Total (Signalized with Recommended Improvements)	
Intersection	**Peak Hour**	**Level of Service (Average Delay per Vehicles)[1]**	**Critical V/C Ratio (Approach)[2]**	**Level of Service (Average Delay per Vehicles)[1]**	**Critical V/C Ratio (Approach)[2]**
Watson Parkway North at York Road	A.M.	D	**1.03 (SBT)**	D	**1.03 (SBT)**
	P.M.	**F**	**2.22 (EBL)**	E	**1.15 (NBT)**

Note 1: The Level of Service of a signalized intersection is based on the average control delay per vehicle. LOS of "E" and "F" are bolded per the City of Guelph Guidelines. *The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach.*

Note 2: The critical v/c ratio is the maximum volume to capacity ratio (v/c ratio) for movements at the intersection. In addition, all v/c ratios greater than 0.85 are outlined and highlighted.

The additional left turn on the eastbound approach in addition to updating the timing setting for the southbound right turn approach at the intersection of Watson Parkway North at York Road, improved the intersection LOS from "F" to "E". It is important to note that this intersection is expected to operate at a LOS of F in the 2035 future background conditions without the addition of the site traffic. These additional vehicles do not significantly affect the intersection's operations.

9.0 Site Access Review

It is important to check the site accesses for safety concerns for corner clearance, access spacing and sightlines. These were checked using the standards set out in the Geometric Design Guide for Canadian Roads (GDGCR) June 2017.

9.1 Vehicle Maneuvering Diagram

An AutoTURN analysis was undertaken to confirm that the expected vehicles including garbage trucks and emergency vehicles can safely maneuver throughout the site. These diagrams focused on the main paths throughout the development. The vehicle maneuvering diagrams presented in **Appendix K** found no issues with vehicle maneuverability.

9.2 Corner Clearance

Corner Clearance is the distance between site accesses and intersections. The required and provided spacing per Figure 8.8.2 in TAC GDGCR are summarized in **Table 13**. **Appendix L** contains all relevant TAC excerpts. The spacing between the accesses and the intersections meet the TAC requirements. Given the residential use of the development, the TAC requirements for both the residential access spacing are provided below.

Table 13: Minimum Spacing Requirement

Feature	Starwood Drive Site Access at Watson Parkway North	West Site Access at Watson Parkway North
Minimum Spacing Requirement	70 m	70 m
Available Spacing	190 m	130 m
Minimum Spacing Distance Satisfied?	yes	yes

9.3 Sight Distance Analysis

A review of the available sight distance at the proposed site intersections was undertaken based on Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads (June 2017). Sight distance was measured from the site access using the following assumptions:

- A standard driver eye height of 1.08 m for a passenger car.
- A 4.4 metre setback from the approximate extension of the outer curb to represent a vehicle waiting to exit the Site.

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

$$ISD = 0.278 * V\ major * tg$$

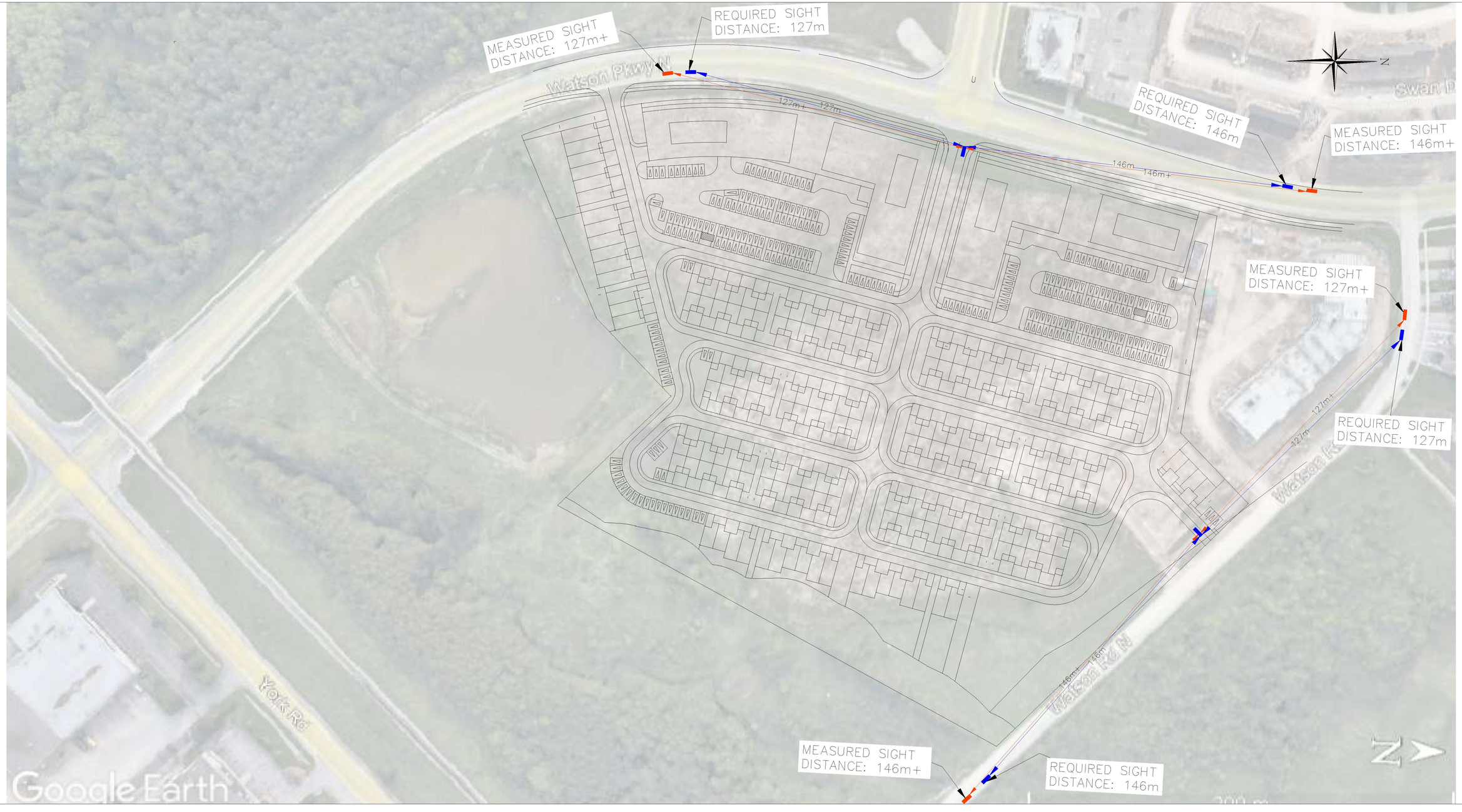
Where:
ISD = Intersection Sight Distance
V major = design speed of roadway (km/h)
tg = assumed time gap for vehicles to turn from stop onto roadway (s)

Table 14 outlines the sight distance analysis for the intersections of Watson Parkway North at West Site Access and Watson Road North at East Site Access.

Table 14: Sight Distance Analysis

Feature	Watson Parkway North at Starwood Drive/Site Access	Watson Road North at East Site Access
Access Type	Full-Movement	Full-Movement
Posted Speed Limit of Roadway	50 km/h	60 km/h
Assumed Design Speed	70 km/h	80 km/h
Base Time Gap	6.5 s (right) 7.5 s (left)	6.5 s (right) 7.5 s (left)
Grade of Roadway	Less than 3%	Less than 3%
Horizontal Alignment of Roadway	Straight	Straight
Required Sight Distance (right turn)	130 m	145 m
Available Sight Distance (right turn)	<130 m	<145 m
Required Sight Distance (left turn)	150 m	170 m
Available Sight Distance (left turn)	<150 m	<170 m
Minimum Sight Distances Satisfied?	Yes	Yes

The intersections are expected to have adequate sightline distances. **Figure 10** displays the sightline figure of the two intersections. **Appendix L** has all relevant TAC excerpts.

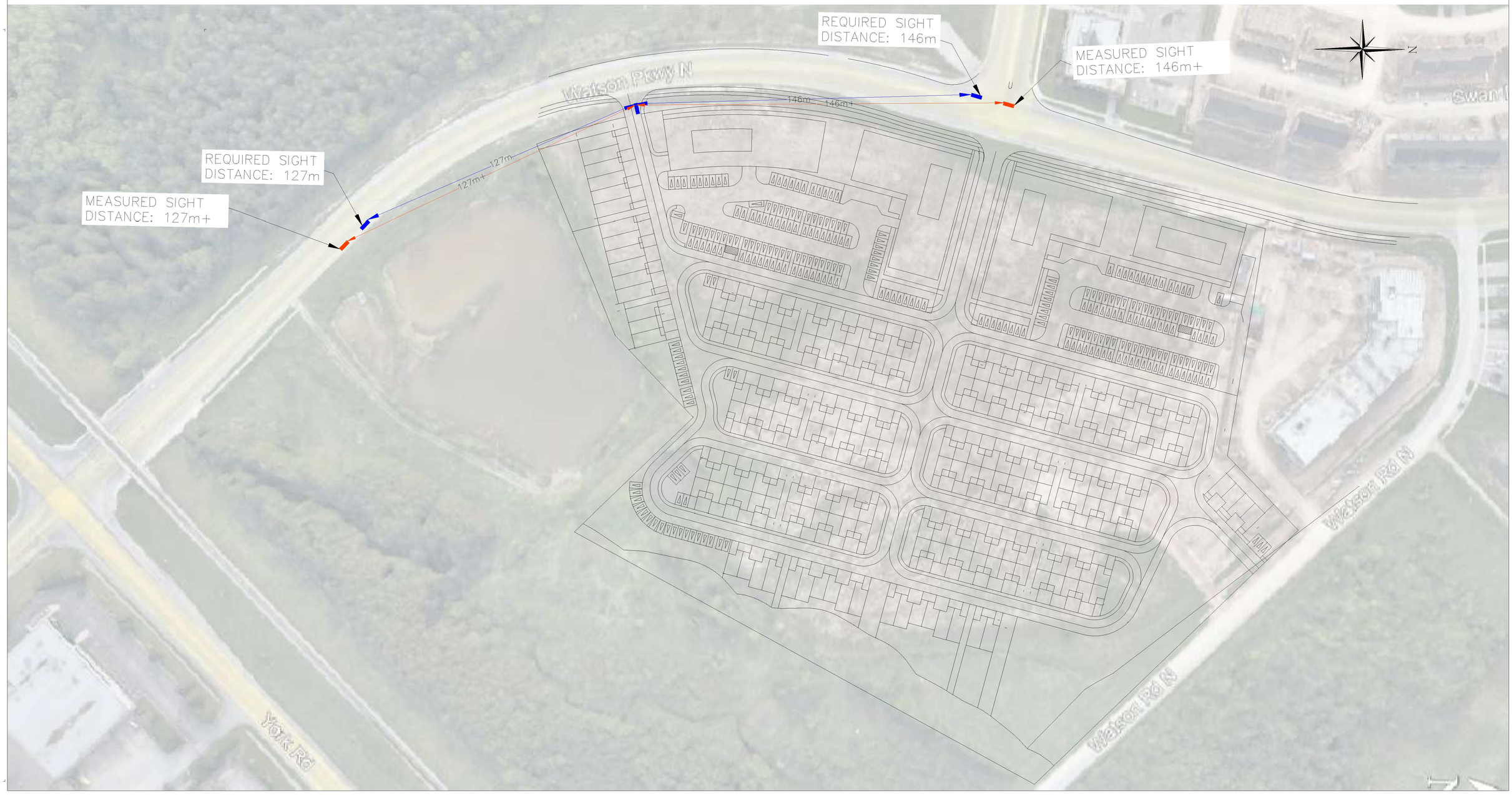


115 WATSON PROJECT N
CITY OF GURLPH

SIGHT LINE FIGURE

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 600
TORONTO, ON, M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn	Design	Project No.	
I.A./P.B.	I.A./P.B.	2358-6526-2	
Date	Check	Scale	Dwg.
06/23/2023	M.I./I.L.	N.T.S.	FIG. 10A



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Drawn	Design	Project No.	
I.A./P.B.	I.A./P.B.	2358-6526-2	
Date	Check	Scale	Dwg.
06/23/2023	M.I./I.L.	N.T.S.	FIG. 10B

10.0 Parking Review

The purpose of this section is to evaluate the parking requirements associated with the proposed development an determine whether the proposed parking supply can meet the required parking outlined in the parking Zoning By-Law.

10.1 Zoning By-Law Parking Requirements

Based on the *City of Guelph Zoning By-Law (1995)-14864* the development area is designated as a Specialized Community Shopping Centre Zones (CC-15 (H)). Per this by-law large parking areas should be situated to the side or rear of buildings to not take up the visual element of the site. There are no specialized parking rates for this zone, general parking rates were applied. The proposed parking supply was compared to the parking requirements for the development based on the *City of Guelph Zoning By-Law (1995)14864.* Relevant Zoning By-Law excerpts are provided in **Appendix H.** The table below displays the results of the findings.

Table 15: City of Guelph Zoning By-Law Vehicle Parking Requirement (1995-14864)

Type	Parking Required	Units	Required Parking
Apartment Building	1.5 spaces for the first 20 units; 1.25 spaces/unit in excess of 20	873	1097
Townhouse	1 space/unit	197	197
Retail Establishment	1 space/16.5m^2 GFA	2818.2 m^2 GFA	171
Total Parking Required	**Total Parking Provided**	**Parking Supply Difference**	
1465	1232	-233	

Table 15 displays the parking requirements per the City of Guelph parking *Zoning By-Law (1995)-14864*. The number of parking spaces proposed at this site does not meet the requirements. There is a deficit of 233 parking spaces at the site. The old By-Law does not separate residential parking spaces from visitor parking spaces. The combined parking rate for an apartment/mixed-use building is 0.4 – 0.15 larger than the parking rate proposed in the amended 2023 By-Law. This deficit can be justified since the old parking By-Law is conservative with the parking rates.

The proposed parking supply was also compared to the parking requirements for the development based on the new *City of Guelph Zoning By-Law (2023)- 20790.* Relevant Zoning By-Law excerpts are provided in **Appendix H. Table 16** below displays the results of the findings.

Table 16: City of Guelph Zoning By-Law Vehicle Parking Requirement (2023-20790)

<table>
<tr><th>Type</th><th>Minimum Parking Required[1]</th><th>Maximum Permitted</th><th>Units / GFA</th><th>Required Resident Parking</th><th>Required Visitor Parking</th></tr>
<tr><td>Mixed Use Building (Residential)</td><td>1 space/unit plus 0.1 visitor spaces/unit</td><td>1.5 spaces/unit
0.25 visitor spaces/unit</td><td>873</td><td>873
1310 (max)</td><td>88
219 (max)</td></tr>
<tr><td>Townhouse – freehold, back-to-back</td><td>1 space/unit plus 0.2 visitor spaces/unit[1]</td><td>1.5 space/unit plus 0.5 visitor spaces/unit</td><td>197</td><td>197
296 (max)</td><td>32[1]
99[1] (max)</td></tr>
<tr><td rowspan="2">Retail Establishment</td><td rowspan="2">1.5 spaces per 100 m^2 of GFA</td><td rowspan="2">3 spaces per 100 m^2 of GFA</td><td rowspan="2">2818.2 m^2</td><td colspan="2">Required Parking</td></tr>
<tr><td colspan="2">42
85 (max)</td></tr>
<tr><td colspan="2">Zoning By-Law</td><td colspan="2">Total Parking Provided</td><td colspan="2">Parking Supply Difference</td></tr>
<tr><td colspan="2" rowspan="3">1232 (min. parking requirements)
2009 (max. parking permitted)</td><td>Use</td><td>Parking Provided</td><td>Total</td><td colspan="2" rowspan="3">0</td></tr>
<tr><td>Mixed Use Building (Residential and Retail)</td><td>1003</td><td rowspan="2">1232</td></tr>
<tr><td>Townhouse</td><td>229</td></tr>
</table>

Note 1: Only back-to-back townhouses included in townhouse visitor parking space requirement calculations.

Table 16 displays the parking requirements per the 2023 City of Guelph parking Zoning By-Law. The number of parking spaces proposed at this site meets the minimum requirements. The development meets the minimum parking requirements and site does not exceed the maximum permissible parking spaces.

Despite the deficiency of parking spaces when compared to the 1995 Zoning By-Law parking requirements, the site meets the requirements of the 2023 update. This shows that the development is in line with the direction the City is moving in respect to the parking requirements. The deficiency can also be supported by the transportation demand management measures outlined in Section 11 including the transit opportunities in the area, the connection to cycling and walking facilities and the inclusion of bicycle parking for the development.

10.2 Bicycle Parking Requirements

Per the City of Guelph *Zoning By-Law (2023) - 20790 – Part C: General Provisions and Parking* the subject site must provide long term and short-term bicycle parking. **Table 17** below outlines the bicycle parking requirements.

Table 17: Bicycle Parking Requirements

Use	Required Short Term Bicycle Parking	Required Long Term Bicycle Parking	Total Bicycle Parking Needed		Bicycle Parking Provided		Surplus/Deficit	
			Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Residential – Multiple Dwelling (Apartments)	0.1 spaces/unit	1 space/unit	88	873	97	886	**+3**	**+10**
Commercial, Service, Retail	0.2 spaces/100m^2 GFA	0.1 spaces/100m^2 GFA	6	3				
Residential Townhouses (with garage)	N/A	**N/A**	N/A	N/A	N/A	N/A	N/A	N/A

The proposed development meets the bicycle requirements outlined by the City of Guelph with 97 short term and 886 long term bicycle spaces proposed.

11.0 Transportation Demand Management (TDM)

Transportation Demand Management (TDM) measures are recommended to promote alternative modes of transportation, such as transit, cycling or walking, and reduce single-occupant vehicle (SOV) trips entering and exiting the proposed development. The measures are presented in the following subsections.

11.1 Existing Transit and Active Transportation Facilities

Currently, there is existing transit within the area. The 17/18 Route travels east-west on York Road and moves north-south at the intersection of Watson Parkway and York Road. Route 4 travels east-west on York Road and services the area south of York Road as it moves through Watson Road South and Watson Parkway South. The transit map provided by the City of Guelph can be found in **Appendix I**.

Also available to the public are the City of Guelph's accessible door-to-door transportation services (ATS), which are intended for persons with physical or functional disabilities or health conditions who are unable to access fixed-route public transit, such as the Guelph Transit Lines.

Passengers connecting to a GO Transit bus or rail are eligible for a free ride on Guelph Transit as part of the Metrolinx Co-Fare Program.

11.2 Cyclist Facilities

Watson Parkway North is part of the Spine Cycling Network per the City of Guelph Transportation Master Plan. Protected cycling facilities are to be developed on Watson Parkway (between Couling Crescent and York Road) within the next 5-8 years. As such, the City will work alongside applicants to reserve the necessary space within the Right-of-Way along Watson Parkway North.

To accommodate for these bicycle trips, safe and secure bicycle parking spaces are being considered in the proposed development. The provision of bicycle parking will provide cyclists with a safe space to store their bikes and encourage cycling as another mode of transportation to reduce automobile trips. There are 983 bicycle parking spaces proposed, 97 of which would be short-term parking spaces and 886 would be long-term parking spaces.

11.3 Pedestrian Facilities

Per the City of Guelph Trail Master Plan, there are two planned trails within or adjacent to the subject Site. The first is an off-road Secondary Trail following the outer edge of the natural buffer between Watson Parkway North and Watson Road North. The second trail is to extend along Watson Road North.

There is an existing active trail located across the east site access, along the east side of Watson Road North. Existing pedestrian connections on the surrounding road network should connect to the proposed site through the proposed accesses. These paths should be well-lit to be safe and appealing to residents and visitors. Furthermore, pedestrian refuges, such as benches or fixtures, may be provided for additional aesthetic value and refuge for walking residents. There is currently a sidewalk north of the Site along Watson Parkway North, which is planned to be extended south to the intersection of Watson Parkway and York Road.

12.0 Conclusion

The findings and recommendations of our analysis are summarized as the following:

- Historical traffic counts were used for the a.m. peak hour while 2022 Spectrum traffic counts were used for the p.m. peak hour to provide conservative analysis.

- Under the 2023 Existing conditions all study intersections are expected to continue performing optimally with a Level of Service "C" or better during the a.m. and p.m. peak hours, except Watson Parkway at Starwood Drive with a LOS "E" during the p.m. peak hour.

- Under the 2035 Future Background conditions, all intersection operate with an LOS of "C" or better during the a.m. and p.m. peak period. Watson Parkway North at Starwood and Watson Parkway North at York Road are expected to operate at LOS "F".

- The proposed development is expected to generate 471 and 623 new two-way trips during the weekday a.m. and p.m. peak hours, respectively.

- With the addition of the proposed site access at Watson Parkway North, Watson Road North, and Starwood Drive under the 2035 Future Total conditions, the LOS values of the study intersections are not expected to change significantly from the 2035 Future Background conditions. The intersections are expected to operate at LOS "D" or better during the a.m. and p.m. peak hours. While Watson Parkway North at Starwood and Watson Parkway North at York Road is still anticipated to operate at LOS "F".

- Signal warrants at Watson Parkway North at Starwood Drive were warranted starting in 2024 future total conditions. Therefore, it is recommended that the intersection of Watson Parkway North at Starwood Drive, be converted from stop-controlled to signalized. The LOS of the intersection is projected to improve from LOS "F" to "D" under the 2035 Future Total conditions after signalization.

- A dual left turn lane at the eastbound approach at the intersection of Watson Parkway North at York Road was tested and found to improve the intersection LOS in addition to the southbound right turn approach being updated from permitted (perm) to permitted and overlap (pm+ov). Implementing these recommendations improved the intersection LOS at Watson Parkway North at York Road from "F" to "E" during the p.m. peak hour.

- The analysis undertaken herein was prepared using the most recent concept plan available at the time of writing this report. Any minor changes to the plan are not expected to materially affect the conclusions contained within this report.

- According to the *City of Guelph Zoning By-Law (1995)14864*, the number of required parking spaces is 1465, the development has proposed 1232 spaces and therefore has a deficit of 233 parking spaces. According to the *City of Guelph Zoning By-Law (2023) 20790*, the number of required parking spaces is 1232 and the development has proposed 1232 spaces. This shows that the development can be supported from a parking perspective.

- The existence of local transit, planned cycling facilities, combined with the provision of pedestrian infrastructure at the Site and the availability of several TDM options for the development are expected to reduce auto trips on the study road network.

- Therefore, the application can be supported from a transportation perspective given that the surrounding road network can accommodate the increase in traffic volumes attributable to the proposed development.

In conclusion, the proposed development located at 115 Watson Parkway North in the City of Guelph can be supported from a transportation operations, safety and parking perspective. We trust that this review satisfies any transportation concerns associated with the concept plan for this development.

Please feel free to contact the undersigned for any further information required.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Shaira Ahmed, EIT
Engineering Intern, Transportation

C.F. CROZIER & ASSOCIATES INC.

R. Aaron Wignall, Associate
Senior Project Manager, Transportation

C.F. CROZIER & ASSOCIATES INC.

Ian Lindley, P.Eng. MASc.
Project Engineer, Transportation

IL/sa/la

J:\2300\2358 - Guelph Watson Holdings Inc\6526 - 115 Watson Parkway N\Reports\2023.10.13_TIS Report.docx

APPENDIX A

Correspondence

From: Munshif Muccaram <Munshif.Muccaram@guelph.ca>
Sent: October 26, 2022 3:49 PM
To: Ariel Yerushalmi; Gwen Zhang
Cc: landdivisioninfo@wellington.ca; Ian Lindley; Aaron Wignall; Kate Berry; Jennifer Juste
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Ariel,

Please reached out to traffic@guelph.ca for any traffic counts and signal timing requests.

Clarifications related to #2 & #3 will be provided to you upon Gwen's return early next week.

Thank you,

Munshif Muccaram, Traffic Technologist II
Engineering and Transportation Services, **Infrastructure, Development and Enterprise**
City of Guelph
519-822-1260 extension 2043
munshif.muccaram@guelph.ca

From: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>
Sent: Wednesday, October 26, 2022 10:59 AM
To: Gwen Zhang <Gwen.Zhang@guelph.ca>
Cc: Chris DeVriendt <Chris.DeVriendt@guelph.ca>; landdivisioninfo@wellington.ca; Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>; Munshif Muccaram <Munshif.Muccaram@guelph.ca>; Kate Berry <Kate.Berry@guelph.ca>; Jennifer Juste <Jennifer.Juste@guelph.ca>
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Good morning Gwen,

Thank you for the detailed response. A few questions:

1. Can you provide the historical traffic counts for the study intersections? If not, can you please let me know where I can find them?
2. Can you please confirm that the development north of the railway track is not to be included in the study?
3. Do you have a TIS for the York Elizabeth Land Use Study Area? Additionally, what is the total GFA of the employment sites?

Kind regards,
Ariel

Ariel Yerushalmi | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

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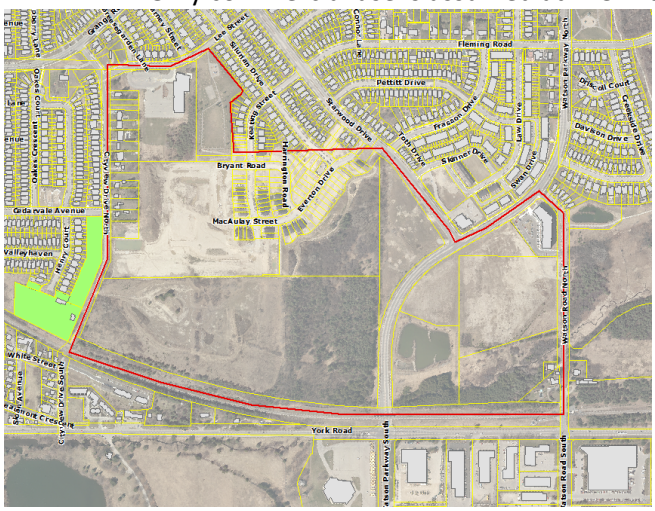
From: Gwen Zhang <Gwen.Zhang@guelph.ca>
Sent: October 25, 2022 8:47 PM
To: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>
Cc: Chris DeVriendt <Chris.DeVriendt@guelph.ca>; landdivisioninfo@wellington.ca; Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>; Munshif Muccaram <Munshif.Muccaram@guelph.ca>; Kate Berry <Kate.Berry@guelph.ca>; Jennifer Juste <Jennifer.Juste@guelph.ca>
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Hi Ariel,

We are generally in agreement with the proposed TOR. Additional requirements are offered below. Confirmations of analysis assumptions are highlighted in red.

1. Follow City's Traffic Impact Study Guidelines.
2. Follow City's Urban Design Manual Volume 3 Community Nodes for the concept design at the Watson Parkway/Starwood Drive intersection. Consider transit bus stops along Watson Parkway as suggested in the manual.
3. Determine the number of access driveway onto Watson Parkway and their associated locations.
4. Add one more future horizon year, i.e., 10 years after the full built-out.
5. The identified study area is acceptable. Please collect traffic counts at these intersections and compare them with historical traffic counts below by applying a 2% annual growth rate. Choose the higher level of traffic volumes for the base year.
    a. Watson Parkway at York Road (March 2019)
    b. Watson Road at York Road (March 2019)
    c. Watson Parkway at Starwood Drive (September 2016)
6. Traffic signal warrant analysis at the Watson Parkway/Starwood Drive intersection.
7. Turning lane warrant analysis at driveway intersections.

8. Other development sites in the surrounding area are listed below.
    a. North of the railway track. See the boundary blow.
        i. Additional single units 156; townhomes 85; apartment 525.
        ii. Only commercial use is assumed at 115 Watson Parkway so please ignore it.



    b. York Elizabeth Land Use Study Area
        i. Additional townhomes 88
        ii. Additional employment 122
9. TDM comments:
    a. Note the following planned transportation network improvements, as identified in the 2022 Transportation Master Plan (TMP):
        i. Watson Parkway North is on the Spine Cycling Network. Construction of protected cycling facilities on Watson Parkway North (from Couling Crescent to York Road) are anticipated within the next 5 to 8 years (identified as a capital project in the TMP). As such, staff will work with the applicants to reserve the necessary space within the ROW along Watson Parkway North for future protected cycling facilities.
        ii. Watson Parkway North is on the Quality Transit Network, under which it is designated for 'Potential Widening to 4 lanes'.
    b. The Active Transportation Network includes two planned trails within or adjacent to the subject site:
        i. An off-road Primary Trail (as identified in the Guelph Trails Master Plan) following the outer edge of the natural feature buffer between Watson Parkway North and Watson Road North.
        ii. A proposed trail route running north-south alongside Watson Road North.
    c. Consider pedestrian connections throughout the site and to municipal sidewalks.
    d. Transportation Demand Management measures are well-suited for this site. Please ensure the TIS includes a detailed and robust section indicating how the proposed development can support a reduction in single-occupancy vehicle trips. Suggested measures include but are not limited to: meeting but not exceeding required vehicle parking, providing high quality secure bike parking for residents on the main floor and sheltered bike parking for visitors located near to the primary entrances, providing a

bicycle repair station on-site, wayfinding signage, provision of a carshare vehicle on-site, subsidized transit passes and providing a TDM display board in a centralized location, with free transit/trails schedules and maps.

If you have any questions, please feel free to contact us.

Regards,

Gwen Zhang, M.Sc., P.Eng (she/her), Transportation Planning Engineer
Engineering and Transportation Services
T 519-822-1260 x 2638
E gwen.zhang@guelph.ca

From: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>
Sent: Friday, October 14, 2022 3:49 PM
To: Chris DeVriendt <Chris.DeVriendt@guelph.ca>; landdivisioninfo@wellington.ca
Cc: Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>
Subject: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Good afternoon,

C.F. Crozier has been retained by Tercot Communities to complete a Traffic Impact Study to support the Zoning By-Law Amendment for the proposed site located at 115 Watson Parkway North in the City of Guelph, County of Wellington. The subject lands encompass a vacant region which is proposed to transform into a residential mixed-use development. The proposed development will consist of three development parcels with a total of 647 residential units and 3,264 m^2 of retail space. Currently, access to the site is permitted through Watson Parkway North.

We kindly request that you review the ToR and provide feedback on the scope of work and request for data. Should you not be the appropriate person for correspondence, it would be appreciated if you could direct this ToR to the appropriate contact.

Study Methodology for the Traffic Impact Study

The following intersections will be analyzed as part of the study scope:

- Watson Pkwy and Starwood Dr
- Watson Pkwy and Watson Rd
- Watson Pkwy and Site Access
- Watson Rd and York Rd
- Watson Pkwy and York Rd

We kindly request that you please confirm that the noted intersections are sufficient for the study.

We currently do not possess the traffic counts necessary for the study. Please let us know if new 2022 traffic counts are acceptable, or if it is preferred that historical traffic volume counts are used to derive 2022 traffic volumes. It is important to mention that while travel patterns have generally resumed following the pandemic, some cities are not accepting new traffic counts due to COVID-19's lingering effects. In doing so, it would be appreciated if you could provide guidance should there be no recent and applicable traffic data at the study intersection.

Vehicle Maneuvering Analysis

Vehicle maneuvering analysis will be conducted using AutoTurn to confirm that expected design vehicles on site will not have any maneuvering conflicts or encroachments. The design vehicles expected on site include:

- Passenger vehicles maneuvering in and out of critical parking spaces
- Waste trucks circulating the site and maneuvering in and out of loading spaces and at the access driveways
- Fire truck circulating and entering/exiting the site
- WB-19 for commercial delivery
- Heavy Single Unit truck

All traffic geometric plans to be endorsed by Professional Engineer.

Site Access Review

We will be reviewing the sightlines, access spacing, and driveway design for the proposed accesses on Watson Parkway North based on City's Development Engineering Manual and the TAC Geometric Design Guide for Canadian Roads (GDGCR).

Analysis Periods and Scenarios

The weekday A.M. and P.M. peak hours for the 2022 existing conditions are assumed to be suffice for the study. Please confirm that this is accurate.

Further, the following horizon years for future background and future total analysis will be analyzed, consistent with the City of Guelph Traffic Impact Study Guidelines:

- 2022 existing conditions
- 2025 full build-out year
- 5-year horizon beyond build-out (2030)

Future Background Traffic Growth

~~Per the County of Wellington's Traffic Impact Study Guidelines,~~ a growth rate of 2% will be applied to the movements. Please advise whether the assumed growth rate is sufficient, or alternatively provide an appropriate growth rate to reflect expected growth in the region.

Background Developments and Transportation Improvements

We have reviewed the County of Wellington's website to determine if there are any additional background developments that should be considered within the horizon of the study and did not find any significant developments to include.

Please confirm that there are no active developments to be included as background development in the TIS. If there are developments that need to be considered, please provide the associated transportation impact studies that should be included in our analysis. Further, please advise whether there are any roadway, transit, or active transportation improvements planned within the vicinity of the site.

Analysis Procedure

~~The County of Wellington's Traffic Impact Study Guidelines will be used as guidance regarding roadway analysis.~~ The City of Guelph is a single tier municipality. Please refer to City of Guelph Traffic Impact Study Guidelines.

Standard metrics of assessment including delay, Level of Service (LOS), capacity, and 95th percentile queues will be analyzed using Synchro 11.0 analysis software. Parameters for Synchro inputs will conform to the City's Synchro guidelines, and any unspecified values will be left as defaults.

Trip Generation and Distribution

Trip generation for the proposed development will be forecasted using the Trip Generation Manual, 11th Edition, prepared by the Institute of Transportation Engineers (ITE):

- Land Use Category 221: Multifamily Housing (Mid-Rise)
- Land Use Category 822: Strip Retail Plaza (<40k)

In the case that this is not the intended use of the land, or that a more accurate Land Use Category is to be used, please let us know.

Data from the 2016 Transportation Tomorrow Survey (TTS) will be used to determine the trip distribution for the A.M. and P.M. periods to the proposed development.

Summary

We request the following information for inclusion in the study, along with any comments that arise with regards to the above Terms of Reference.

Please provide:

- Validation that the collection of 2022 traffic counts for the intersections of study is acceptable. Otherwise, please provide historical traffic counts and we will derive the traffic counts accordingly. If this is not acceptable, please advise on an appropriate method of obtaining existing conditions traffic data. See above comments.
- Confirmation of the 2% growth rate for the roadways of study. Confirmed.
- Confirmation of the land use codes. Confirmed.
- Confirmation that there are no relevant background developments to be included in our analysis. See above comments.

- Please provide details of any planned roadway or transit improvements in the surrounding study area within the horizon years, if there are any. See above comments.

Please let us know if there are any questions or concerns.

Kind regards,
Ariel

Ariel Yerushalmi | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

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From: Ariel Yerushalmi
Sent: October 26, 2022 10:59 AM
To: Gwen Zhang
Cc: Chris DeVriendt; landdivisioninfo@wellington.ca; Ian Lindley; Aaron Wignall; Munshif Muccaram; Kate Berry; Jennifer Juste
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Follow Up Flag: Follow up
Flag Status: Flagged

Good morning Gwen,

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3. Do you have a TIS for the York Elizabeth Land Use Study Area? Additionally, what is the total GFA of the employment sites?

Kind regards,
Ariel

From: Gwen Zhang <Gwen.Zhang@guelph.ca>
Sent: October 25, 2022 8:47 PM
To: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>
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Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Hi Ariel,

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2. Follow City's Urban Design Manual Volume 3 Community Nodes for the concept design at the Watson Parkway/Starwood Drive intersection. Consider transit bus stops along Watson Parkway as suggested in the manual.
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4. Add one more future horizon year, i.e., 10 years after the full built-out.
5. The identified study area is acceptable. Please collect traffic counts at these intersections and compare them with historical traffic counts below by applying a 2% annual growth rate. Choose the higher level of traffic volumes for the base year.

a. Watson Parkway at York Road (March 2019)
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7. Turning lane warrant analysis at driveway intersections.
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    a. North of the railway track. See the boundary blow.
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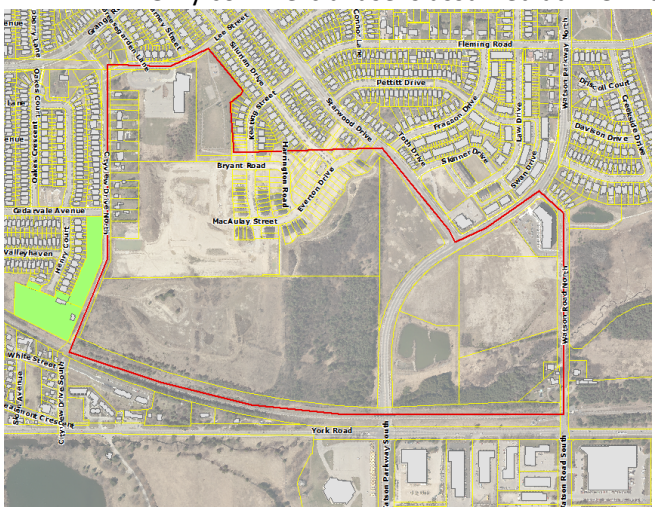

b. [York Elizabeth Land Use Study Area]
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    a. Note the following planned transportation network improvements, as identified in the 2022 Transportation Master Plan (TMP):
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    c. Consider pedestrian connections throughout the site and to municipal sidewalks.

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If you have any questions, please feel free to contact us.

Regards,

Gwen Zhang, M.Sc., P.Eng (she/her), Transportation Planning Engineer
Engineering and Transportation Services
T 519-822-1260 x 2638
E gwen.zhang@guelph.ca

From: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>
Sent: Friday, October 14, 2022 3:49 PM
To: Chris DeVriendt <Chris.DeVriendt@guelph.ca>; landdivisioninfo@wellington.ca
Cc: Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>
Subject: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Good afternoon,

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Study Methodology for the Traffic Impact Study

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- Watson Pkwy and Starwood Dr

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Vehicle Maneuvering Analysis

Vehicle maneuvering analysis will be conducted using AutoTurn to confirm that expected design vehicles on site will not have any maneuvering conflicts or encroachments. The design vehicles expected on site include:

- Passenger vehicles maneuvering in and out of critical parking spaces
- Waste trucks circulating the site and maneuvering in and out of loading spaces and at the access driveways
- Fire truck circulating and entering/exiting the site
- WB-19 for commercial delivery
- Heavy Single Unit truck

All traffic geometric plans to be endorsed by Professional Engineer.

Site Access Review

We will be reviewing the sightlines, access spacing, and driveway design for the proposed accesses on Watson Parkway North based on City's Development Engineering Manual and the TAC Geometric Design Guide for Canadian Roads (GDGCR).

Analysis Periods and Scenarios

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Further, the following horizon years for future background and future total analysis will be analyzed, consistent with the City of Guelph Traffic Impact Study Guidelines:

- 2022 existing conditions
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- 5-year horizon beyond build-out (2030)

Future Background Traffic Growth

~~Per the County of Wellington's Traffic Impact Study Guidelines,~~ a growth rate of 2% will be applied to the movements. Please advise whether the assumed growth rate is sufficient, or alternatively provide an appropriate growth rate to reflect expected growth in the region.

Background Developments and Transportation Improvements

We have reviewed the County of Wellington's website to determine if there are any additional background developments that should be considered within the horizon of the study and did not find any significant developments to include.

Please confirm that there are no active developments to be included as background development in the TIS. If there are developments that need to be considered, please provide the associated transportation impact studies that should be included in our analysis. Further, please advise whether there are any roadway, transit, or active transportation improvements planned within the vicinity of the site.

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Trip generation for the proposed development will be forecasted using the Trip Generation Manual, 11th Edition, prepared by the Institute of Transportation Engineers (ITE):

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Summary

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Please provide:

- Validation that the collection of 2022 traffic counts for the intersections of study is acceptable. Otherwise, please provide historical traffic counts and we will derive the traffic counts accordingly. If this is not acceptable, please advise on an appropriate method of obtaining existing conditions traffic data. See above comments.
- Confirmation of the 2% growth rate for the roadways of study. Confirmed.
- Confirmation of the land use codes. Confirmed.
- Confirmation that there are no relevant background developments to be included in our analysis. See above comments.
- Please provide details of any planned roadway or transit improvements in the surrounding study area within the horizon years, if there are any. See above comments.

Please let us know if there are any questions or concerns.

Kind regards,
Ariel

Ariel Yerushalmi | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

CROZIER
CONSULTING ENGINEERS

Crozier Connections:

Read our latest news and announcements here.

From: Gwen Zhang <Gwen.Zhang@guelph.ca>
Sent: October 25, 2022 8:47 PM
To: Ariel Yerushalmi
Cc: Chris DeVriendt; landdivisioninfo@wellington.ca; Ian Lindley; Aaron Wignall; Munshif Muccaram; Kate Berry; Jennifer Juste
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Ariel,

We are generally in agreement with the proposed TOR. Additional requirements are offered below. Confirmations of analysis assumptions are highlighted in red.

1. Follow City's Traffic Impact Study Guidelines.
2. Follow City's Urban Design Manual Volume 3 Community Nodes for the concept design at the Watson Parkway/Starwood Drive intersection. Consider transit bus stops along Watson Parkway as suggested in the manual.
3. Determine the number of access driveway onto Watson Parkway and their associated locations.
4. Add one more future horizon year, i.e., 10 years after the full built-out.
5. The identified study area is acceptable. Please collect traffic counts at these intersections and compare them with historical traffic counts below by applying a 2% annual growth rate. Choose the higher level of traffic volumes for the base year.
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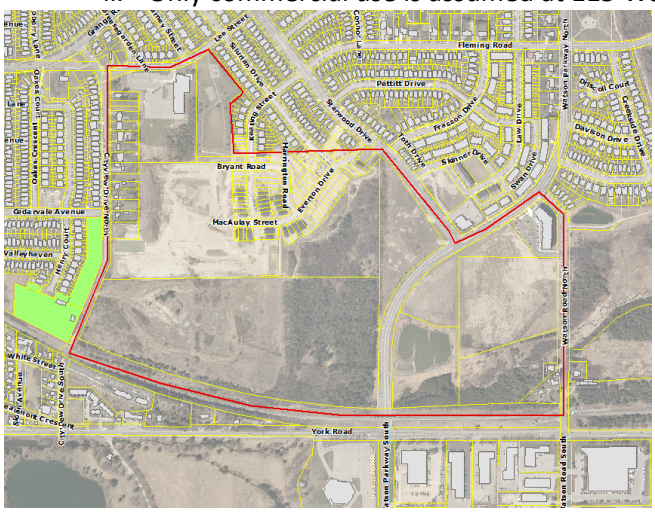
6. Traffic signal warrant analysis at the Watson Parkway/Starwood Drive intersection.
7. Turning lane warrant analysis at driveway intersections.
8. Other development sites in the surrounding area are listed below.
    a. North of the railway track. See the boundary blow.
        i. Additional single units 156; townhomes 85; apartment 525.
        ii. Only commercial use is assumed at 115 Watson Parkway so please ignore it.



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9. TDM comments:
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Ariel

Ariel Yerushalmi | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

Crozier Connections:

Read our latest news and announcements here.

From: Jana Poechman <janap@wellington.ca>
Sent: October 14, 2022 3:56 PM
To: Ariel Yerushalmi; chris.devriendt@guelph.ca; landdivisioninfo
Cc: Ian Lindley; Aaron Wignall
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Ariel.

Please note that the City of Guelph isn't within Wellington County, so we don't require this information.

Regards,
Jana

Jana Poechman
Planning Administrative Clerk
Planning and Development Department
County of Wellington
74 Woolwich Street
Guelph ON N1H 3T9
T 519.837.2600 x 2170
E janap@wellington.ca

From: Ariel Yerushalmi [mailto:ayerushalmi@cfcrozier.ca]
Sent: Friday, October 14, 2022 3:49 PM
To: chris.devriendt@guelph.ca; landdivisioninfo <landdivisioninfo@wellington.ca>
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Please let us know if there are any questions or concerns.

Kind regards,
Ariel

Ariel Yerushalmi | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

CROZIER
CONSULTING ENGINEERS

Crozier Connections:

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From: Gwen Zhang <Gwen.Zhang@guelph.ca>
Sent: October 31, 2022 10:05 AM
To: Munshif Muccaram; Ariel Yerushalmi
Cc: landdivisioninfo@wellington.ca; Ian Lindley; Aaron Wignall; Kate Berry; Jennifer Juste
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Ariel,

The development north of the railway track is not within the study area. However the trips from this area must be included as part of the background traffic.

There is no TIS for the York Elizabeth Land Use Study Area. The commercial GFA is 4,878 sq.m.

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

Regards ,

Gwen Zhang, M.Sc., P.Eng (she/her), Transportation Planning Engineer
Engineering and Transportation Services
T 519-822-1260 x 2638
E gwen.zhang@guelph.ca

From: Munshif Muccaram <Munshif.Muccaram@guelph.ca>
Sent: Wednesday, October 26, 2022 3:49 PM
To: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>; Gwen Zhang <Gwen.Zhang@guelph.ca>
Cc: landdivisioninfo@wellington.ca; Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>; Kate Berry <Kate.Berry@guelph.ca>; Jennifer Juste <Jennifer.Juste@guelph.ca>
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Hi Ariel,

Please reached out to traffic@guelph.ca for any traffic counts and signal timing requests.

Clarifications related to #2 & #3 will be provided to you upon Gwen's return early next week.

Thank you,

Munshif Muccaram, Traffic Technologist II
Engineering and Transportation Services, **Infrastructure, Development and Enterprise**
City of Guelph
519-822-1260 extension 2043

munshif.muccaram@guelph.ca

From: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>
Sent: Wednesday, October 26, 2022 10:59 AM
To: Gwen Zhang <Gwen.Zhang@guelph.ca>
Cc: Chris DeVriendt <Chris.DeVriendt@guelph.ca>; landdivisioninfo@wellington.ca; Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>; Munshif Muccaram <Munshif.Muccaram@guelph.ca>; Kate Berry <Kate.Berry@guelph.ca>; Jennifer Juste <Jennifer.Juste@guelph.ca>
Subject: RE: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Good morning Gwen,

Thank you for the detailed response. A few questions:

1. Can you provide the historical traffic counts for the study intersections? If not, can you please let me know where I can find them?
2. Can you please confirm that the development north of the railway track is not to be included in the study?
3. Do you have a TIS for the York Elizabeth Land Use Study Area? Additionally, what is the total GFA of the employment sites?

Kind regards,
Ariel

Ariel Yerushalmi | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
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To: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>
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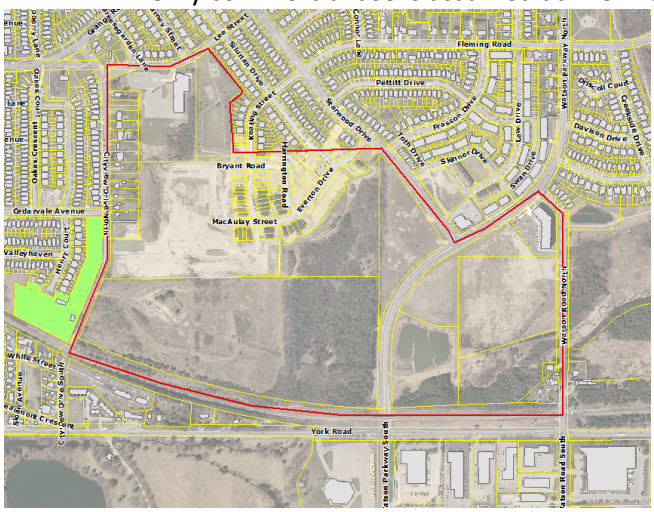

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    ii. A proposed trail route running north-south alongside Watson Road North.
c. Consider pedestrian connections throughout the site and to municipal sidewalks.
d. Transportation Demand Management measures are well-suited for this site. Please ensure the TIS includes a detailed and robust section indicating how the proposed development can support a reduction in single-occupancy vehicle trips. Suggested measures include but are not limited to: meeting but not exceeding required vehicle parking, providing high quality secure bike parking for residents on the main floor and sheltered bike parking for visitors located near to the primary entrances, providing a bicycle repair station on-site, wayfinding signage, provision of a carshare vehicle on-site, subsidized transit passes and providing a TDM display board in a centralized location, with free transit/trails schedules and maps.

If you have any questions, please feel free to contact us.

Regards,

Gwen Zhang, M.Sc., P.Eng (she/her), Transportation Planning Engineer
Engineering and Transportation Services
T 519-822-1260 x 2638
E gwen.zhang@guelph.ca

From: Ariel Yerushalmi <ayerushalmi@cfcrozier.ca>
Sent: Friday, October 14, 2022 3:49 PM
To: Chris DeVriendt <Chris.DeVriendt@guelph.ca>; landdivisioninfo@wellington.ca
Cc: Ian Lindley <ilindley@cfcrozier.ca>; Aaron Wignall <awignall@cfcrozier.ca>
Subject: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Good afternoon,

C.F. Crozier has been retained by Tercot Communities to complete a Traffic Impact Study to support the Zoning By-Law Amendment for the proposed site located at 115 Watson Parkway North in the City of Guelph, County of Wellington. The subject lands encompass a vacant region which is proposed to transform into a residential mixed-use development. The proposed development will consist of three development parcels with a total of 647 residential units and 3,264 m^2 of retail space. Currently, access to the site is permitted through Watson Parkway North.

We kindly request that you review the ToR and provide feedback on the scope of work and request for data. Should you not be the appropriate person for correspondence, it would be appreciated if you could direct this ToR to the appropriate contact.

Study Methodology for the Traffic Impact Study

The following intersections will be analyzed as part of the study scope:

- Watson Pkwy and Starwood Dr
- Watson Pkwy and Watson Rd
- Watson Pkwy and Site Access
- Watson Rd and York Rd
- Watson Pkwy and York Rd

We kindly request that you please confirm that the noted intersections are sufficient for the study.

We currently do not possess the traffic counts necessary for the study. Please let us know if new 2022 traffic counts are acceptable, or if it is preferred that historical traffic volume counts are used to derive 2022 traffic volumes. It is important to mention that while travel patterns have generally resumed following the pandemic, some cities are not accepting new traffic counts due to COVID-19's lingering effects. In doing so, it would be appreciated if you could provide guidance should there be no recent and applicable traffic data at the study intersection.

Vehicle Maneuvering Analysis

Vehicle maneuvering analysis will be conducted using AutoTurn to confirm that expected design vehicles on site will not have any maneuvering conflicts or encroachments. The design vehicles expected on site include:

- Passenger vehicles maneuvering in and out of critical parking spaces
- Waste trucks circulating the site and maneuvering in and out of loading spaces and at the access driveways
- Fire truck circulating and entering/exiting the site
- WB-19 for commercial delivery
- Heavy Single Unit truck

All traffic geometric plans to be endorsed by Professional Engineer.

Site Access Review

We will be reviewing the sightlines, access spacing, and driveway design for the proposed accesses on Watson Parkway North based on City's Development Engineering Manual and the TAC Geometric Design Guide for Canadian Roads (GDGCR).

Analysis Periods and Scenarios

The weekday A.M. and P.M. peak hours for the 2022 existing conditions are assumed to be suffice for the study. Please confirm that this is accurate.

Further, the following horizon years for future background and future total analysis will be analyzed, consistent with the City of Guelph Traffic Impact Study Guidelines:

- 2022 existing conditions
- 2025 full build-out year
- 5-year horizon beyond build-out (2030)

Future Background Traffic Growth

~~Per the County of Wellington's Traffic Impact Study Guidelines,~~ a growth rate of 2% will be applied to the movements. Please advise whether the assumed growth rate is sufficient, or alternatively provide an appropriate growth rate to reflect expected growth in the region.

Background Developments and Transportation Improvements

We have reviewed the County of Wellington's website to determine if there are any additional background developments that should be considered within the horizon of the study and did not find any significant developments to include.

Please confirm that there are no active developments to be included as background development in the TIS. If there are developments that need to be considered, please provide the associated transportation impact studies that should be included in our analysis. Further, please advise whether there are any roadway, transit, or active transportation improvements planned within the vicinity of the site.

Analysis Procedure

~~The County of Wellington's Traffic Impact Study Guidelines will be used as guidance regarding roadway analysis.~~ The City of Guelph is a single tier municipality. Please refer to City of Guelph Traffic Impact Study Guidelines.

Standard metrics of assessment including delay, Level of Service (LOS), capacity, and 95th percentile queues will be analyzed using Synchro 11.0 analysis software. Parameters for Synchro inputs will conform to the City's Synchro guidelines, and any unspecified values will be left as defaults.

Trip Generation and Distribution

Trip generation for the proposed development will be forecasted using the Trip Generation Manual, 11th Edition, prepared by the Institute of Transportation Engineers (ITE):

- Land Use Category 221: Multifamily Housing (Mid-Rise)
- Land Use Category 822: Strip Retail Plaza (<40k)

In the case that this is not the intended use of the land, or that a more accurate Land Use Category is to be used, please let us know.

Data from the 2016 Transportation Tomorrow Survey (TTS) will be used to determine the trip distribution for the A.M. and P.M. periods to the proposed development.

Summary

We request the following information for inclusion in the study, along with any comments that arise with regards to the above Terms of Reference.

Please provide:

- Validation that the collection of 2022 traffic counts for the intersections of study is acceptable. Otherwise, please provide historical traffic counts and we will derive the traffic counts accordingly. If this is not acceptable, please advise on an appropriate method of obtaining existing conditions traffic data. See above comments.
- Confirmation of the 2% growth rate for the roadways of study. Confirmed.
- Confirmation of the land use codes. Confirmed.
- Confirmation that there are no relevant background developments to be included in our analysis. See above comments.
- Please provide details of any planned roadway or transit improvements in the surrounding study area within the horizon years, if there are any. See above comments.

Please let us know if there are any questions or concerns.

Kind regards,
Ariel

Ariel Yerushalmi | Engineering Intern
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
T: 905.875.0026

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CONSULTING ENGINEERS

Crozier Connections:

Read our latest news and announcements here.

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From: Ariel Yerushalmi
Sent: October 14, 2022 3:49 PM
To: chris.devriendt@guelph.ca; landdivisioninfo@wellington.ca
Cc: Ian Lindley; Aaron Wignall
Subject: Terms of Reference for Mixed-Use Residential Development at 115 Watson Parkway North, Guelph

Follow Up Flag: Follow up
Flag Status: Flagged

Good afternoon,

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- Waste trucks circulating the site and maneuvering in and out of loading spaces

- Fire truck circulating and entering/exiting the site

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- Confirmation of the 2% growth rate for the roadways of study.
- Confirmation of the land use codes.
- Confirmation that there are no relevant background developments to be included in our analysis.
- Please provide details of any planned roadway or transit improvements in the surrounding study area within the horizon years, if there are any.

Please let us know if there are any questions or concerns.

Kind regards,
Ariel

Masoud Imaniboossejin

From: Chris DeVriendt <Chris.DeVriendt@guelph.ca>
Sent: June 22, 2023 9:57 AM
To: Masoud Imaniboossejin
Cc: Ian Lindley; Gwen Zhang; Lindsay Sulatycki
Subject: RE: Parking Justification Study Terms of Reference: 115 Watson parkway North, City of Guelph (2358-6526)

Follow Up Flag: Follow up
Flag Status: Flagged

Hello Masoud,

Planning staff have now had a chance to review and can offer a couple comments to address your questions.

First, the Mixed Use Building parking rate can be used for the mixed use buildings in Blocks 1 and 2. However, you would need to use the townhouse parking rate for the proposed 197 townhouses in Block 3.

Further, the multi-unit commercial rate makes sense if there are 2 or more commercial units within the mixed-use building.

As indicated in your TOR, justification would need to be provided for any proposed reduction to these minimum parking requirements.

While the TOR for this study does appear to be satisfactory, please be aware that additional information may be requested through the review of your application.

Please be advised that Lindsay Sulatycki is the Senior Planner project managing this file.

Thank you.

Chris DeVriendt, MCIP, RPP | Manager of Development Planning
Planning and Building Services
Infrastructure, Development and Enterprise
City of Guelph
T 519-822-1260 x 2360
E chris.devriendt@guelph.ca

From: Chris DeVriendt
Sent: Wednesday, June 21, 2023 9:14 AM
To: Masoud Imaniboossejin <mimaniboossejin@cfcrozier.ca>
Cc: Ian Lindley <ilindley@cfcrozier.ca>; Gwen Zhang <Gwen.Zhang@guelph.ca>
Subject: RE: Parking Justification Study Terms of Reference: 115 Watson parkway North, City of Guelph (2358-6526)

Hello Masoud,

Planning staff are currently reviewing and will plan to provide a response by the end of the week.

Chris DeVriendt, MCIP, RPP | Manager of Development Planning
Planning and Building Services
Infrastructure, Development and Enterprise
City of Guelph
T 519-822-1260 x 2360
E chris.devriendt@guelph.ca

From: Gwen Zhang <Gwen.Zhang@guelph.ca>
Sent: Tuesday, June 20, 2023 4:41 PM
To: Masoud Imaniboossejin <mimaniboossejin@cfcrozier.ca>
Cc: Ian Lindley <ilindley@cfcrozier.ca>
Subject: RE: Parking Justification Study Terms of Reference: 115 Watson parkway North, City of Guelph (2358-6526)

Hi Masoud, I am forwarding your email again to our Planning Department. Hopefully you will hear back from them soon. If not, please give me a call.

Gwen Zhang, M.Sc., P.Eng (she/her), Transportation Planning Engineer
Engineering and Transportation Services
T 519-822-1260 x 2638
E gwen.zhang@guelph.ca

From: Masoud Imaniboossejin <mimaniboossejin@cfcrozier.ca>
Sent: Tuesday, June 20, 2023 4:35 PM
To: Gwen Zhang <Gwen.Zhang@guelph.ca>
Cc: Ian Lindley <ilindley@cfcrozier.ca>
Subject: RE: Parking Justification Study Terms of Reference: 115 Watson parkway North, City of Guelph (2358-6526)

Hi Gwen,

Following up on this Terms of Reference as our submission deadline is approaching fast. Could you please provide feedback/confirm as soon as possible? I would appreciate it if you could also share the contact information of the Planning Department Staff working on this file.

Thanks,
Masoud

Masoud Imaniboossejin
Engineering Intern, Transportation
211 Yonge Street, Suite 600 | Toronto, ON M5B 1M4
T: 416.477.3392

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From: Gwen Zhang <Gwen.Zhang@guelph.ca>
Sent: Wednesday, June 14, 2023 3:30 PM
To: Masoud Imaniboossejin <mimaniboossejin@cfcrozier.ca>
Cc: Ian Lindley <ilindley@cfcrozier.ca>
Subject: RE: Parking Justification Study Terms of Reference: 115 Watson parkway North, City of Guelph (2358-6526)

Hi Masound,

Staff from Planning department will review the parking study ToR. You will hear from them shortly as I have forwarded your email.

Regards,
Gwen Zhang, M.Sc., P.Eng (she/her), Transportation Planning Engineer
Engineering and Transportation Services
T 519-822-1260 x 2638
E gwen.zhang@guelph.ca

From: Masoud Imaniboossejin <mimaniboossejin@cfcrozier.ca>
Sent: Wednesday, June 14, 2023 2:41 PM
To: Gwen Zhang <Gwen.Zhang@guelph.ca>
Cc: Ian Lindley <ilindley@cfcrozier.ca>
Subject: Parking Justification Study Terms of Reference: 115 Watson parkway North, City of Guelph (2358-6526)

Good afternoon Gwen,

Reaching out to present a Parking Justification Study Terms of Reference for a development proposal located at 115 Watson Parkway North, City of Guelph. We ask if the City would provide feedback on and confirm our proposed methodology for the study. Thank you.

Terms of Reference:

The subject lands encompass a vacant region which is proposed to transform into a residential mixed-use development. The proposed development will consist of three development parcels with a total of 779 residential units (582 apartment units and 197 townhouse units) and 1,501.3 m^2 of ground floor retail space. Per the attached site plan the following is being proposed:

- Block 1: 288 apartment units and 750.6 sq.m of ground floor retail

- Block 2: 294 apartment units and 750.7 sq.m of ground floor retail
- Block 3: 160 back-to-back townhouses and 37 freehold townhouses
- A total vehicle parking supply of 971 spaces

Given the mixed-use nature of the development, we propose using **Mixed-use building** minimum parking requirement rate of 1.1 per dwelling unit (1 space per dwelling unit plus 0.1 visitor spaces per dwelling unit) for the 582 apartment units. Further, **Multi-unit building,** commercial use rates will be used to estimate the minimum parking requirements for the 1,501.3 sq.m retail. **Please confirm the appropriateness of these selected uses and rates per the New City of Guelph Zoning Bylaw (2023)-20790.**

For the Parking Study, we will complete the following:

- Review the minimum vehicle parking requirements for the proposed development per the **New City of Guelph Zoning Bylaw (2023)-20790** and compare the requirements with the proposed supply.
- Should the site be deficient per the by-law above, Forecast the peak parking demand at the site based on ITE Parking Generation Manual.
- Identify Transportation Demand Management (TDM) opportunities available at the site to assess potential site-specific measures that may be used to further support a reduced parking supply.
- Based on the findings, confirm the adequacy of the proposed parking supply to support the development.

Please feel free to reach out should there be any questions.

Kind Regards,
Masoud

Masoud Imaniboossejin
Engineering Intern, Transportation
211 Yonge Street, Suite 600 | Toronto, ON M5B 1M4
T: 416.477.3392

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Read our latest news and announcements here.

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APPENDIX B

Relevant Map Excerpts


City of Guelph
Street Map
N
E
S
W
Legend
City Boundary
Hanlon Expressway
Arterial Road
Collector Road
Local Road
Railway
Rivers
Parks
City Facility
0 300 600 900 m
1:15,000
Downtown Guelph
0 100 200 400 m 1:7,500
City Facilities
1. City Hall
2. Ontario Court of Justice
3. Guelph Police Services
4. Guelph Public Library
5. Museum
6. River Run Centre
7. Sleeman Centre
8. Guelph Central Station
9. Bullfrog Library
10. Centennial Arena
11. Delhi Community Centre
12. East Side Branch
13. Eastview Road Landfill Site
14. Evergreen Seniors Centre
15. Exhibition Park Arena
16. Guelph Transit
17. Operations
18. Riverside Park
19. Scottsdale Library
20. South End Emergency Complex
21. Victoria Road Community Centre
22. Wastewater Treatment Plant
23. Waterworks
24. West End Community Centre
25. Westminster Square Branch Library
26. Wet-Dry Recycling Centre
CITY OF Guelph
Making a Difference
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Produced by the City of Guelph
Infrastructure, Development & Enterprise
Engineering and Transportation Services
March 11, 2022

APPENDIX C

Traffic Data

Spectrum

Turning Movement Count
Location Name: WATSON PKWY & YORK RD
Date: Tue, Nov 08, 2022 Deployment Lead: Peter Ilias

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Turning Movement Count (4 . WATSON PKWY & YORK RD)

Start Time	N Approach WATSON PARKWAY						E Approach YORK RD						S Approach WATSON PARKWAY						W Approach YORK RD						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	12	54	6	0	0	72	1	29	3	0	0	33	0	13	9	0	1	22	43	38	6	0	0	87	214	
06:15:00	23	35	15	0	0	73	1	19	0	0	0	20	2	9	13	0	0	24	20	40	8	0	0	68	185	
06:30:00	33	39	15	0	0	87	0	27	3	0	0	30	2	9	12	0	0	23	26	60	7	0	1	93	233	
06:45:00	39	40	9	0	0	88	0	41	1	0	0	42	6	18	12	0	1	36	29	68	21	0	0	118	284	916
07:00:00	27	38	17	0	0	82	2	26	3	0	0	31	3	7	12	0	1	22	19	65	16	0	0	100	235	937
07:15:00	51	55	19	0	0	125	1	40	4	0	0	45	1	17	11	0	1	29	16	65	8	0	2	89	288	1040
07:30:00	63	75	11	0	0	149	4	76	7	0	0	87	0	20	10	0	2	30	27	70	24	0	0	121	387	1194
07:45:00	66	74	12	0	1	152	3	83	3	0	0	89	4	29	12	0	0	45	26	74	28	0	0	128	414	1324
08:00:00	74	69	14	0	0	157	4	69	4	0	0	77	6	29	17	0	0	52	32	77	23	0	0	132	418	1507
08:15:00	68	76	11	0	0	155	6	86	6	0	0	98	7	34	20	0	0	61	18	55	34	0	0	107	421	1640
08:30:00	82	77	17	0	2	176	8	103	9	0	0	120	3	32	25	0	0	60	21	63	26	0	2	110	466	1719
08:45:00	52	58	4	0	0	114	5	93	3	0	0	101	3	39	15	0	0	57	30	85	19	0	0	134	406	1711
09:00:00	48	49	5	0	0	102	3	49	9	0	0	61	3	17	18	0	0	38	20	75	28	0	0	123	324	1617
09:15:00	32	38	5	1	0	76	5	76	3	0	0	84	3	24	19	0	0	46	21	67	27	0	0	115	321	1517
09:30:00	31	35	9	0	0	75	2	53	4	0	0	59	0	22	20	0	0	42	18	53	35	0	0	106	282	1333
09:45:00	47	41	8	0	0	96	8	62	7	0	0	77	5	25	20	0	0	50	15	56	23	0	0	94	317	1244
BREAK																										
15:00:00	44	51	2	0	0	97	8	56	5	0	0	69	6	58	52	0	0	116	15	69	35	0	1	119	401	
15:15:00	44	43	3	0	0	90	7	54	8	0	0	69	5	49	29	0	1	83	16	72	49	0	1	137	379	
15:30:00	46	65	7	0	0	118	11	77	6	0	0	94	7	63	49	0	1	119	26	76	47	0	0	149	480	
15:45:00	49	44	3	0	0	96	13	74	8	0	0	95	2	78	35	0	0	115	26	65	38	0	0	129	435	1695
16:00:00	47	46	5	0	0	98	18	77	2	0	0	97	2	86	46	0	0	134	24	77	57	0	1	158	487	1781
16:15:00	47	54	6	0	1	107	13	84	3	0	1	100	5	107	63	0	0	175	24	91	61	0	1	176	558	1960
16:30:00	48	59	2	0	0	109	20	113	4	1	0	138	7	77	45	0	0	129	15	80	69	0	0	164	540	2020
16:45:00	45	66	5	0	0	116	14	90	2	0	0	106	5	105	31	0	0	141	24	76	65	0	0	165	528	2113
17:00:00	48	49	5	0	0	102	20	100	4	0	0	124	3	101	43	0	0	147	25	75	58	0	1	158	531	2157
17:15:00	44	57	4	0	0	105	14	73	7	0	1	94	0	107	36	0	0	143	12	74	72	0	1	158	500	2099
17:30:00	58	65	3	0	0	126	10	67	2	0	0	79	3	75	25	0	0	103	19	56	54	0	0	129	437	1996
17:45:00	49	47	6	0	0	102	9	72	3	0	0	84	3	60	10	0	0	73	14	51	50	0	0	115	374	1842
18:00:00	36	35	4	0	0	75	8	51	2	0	0	61	0	58	29	0	0	87	11	67	47	0	0	125	348	1659
18:15:00	44	31	1	0	1	76	12	45	3	0	0	60	3	51	11	0	0	65	20	44	48	0	1	112	313	1472
18:30:00	44	38	4	0	0	86	10	54	4	0	0	68	2	62	18	0	0	82	22	45	36	0	0	103	339	1374
18:45:00	42	37	7	0	0	86	4	42	6	0	0	52	5	51	20	0	0	76	7	47	33	0	0	87	301	1301
Grand Total	1483	1640	244	1	5	3368	244	2061	138	1	2	2444	106	1532	787	0	8	2425	681	2076	1152	0	12	3909	**12146**	-
Approach%	44%	48.7%	7.2%	0%		-	10%	84.3%	5.6%	0%		-	4.4%	63.2%	32.5%	0%		-	17.4%	53.1%	29.5%	0%		-	**-**	-
Totals %	12.2%	13.5%	2%	0%		27.7%	2%	17%	1.1%	0%		20.1%	0.9%	12.6%	6.5%	0%		20%	5.6%	17.1%	9.5%	0%		32.2%	**-**	-
Heavy	44	46	5	0		-	12	103	30	0		-	31	57	91	0		-	59	160	35	0		-	**-**	-
Heavy %	3%	2.8%	2%	0%		-	4.9%	5%	21.7%	0%		-	29.2%	3.7%	11.6%	0%		-	8.7%	7.7%	3%	0%		-	**-**	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	**-**	-

Spectrum

Turning Movement Count
Location Name: WATSON PKWY & YORK RD
Date: Tue, Nov 08, 2022 Deployment Lead: Peter Ilias

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 07:45 AM - 08:45 AM Weather: Few Clouds (0.68 °C)

Start Time	N Approach WATSON PARKWAY						E Approach YORK RD						S Approach WATSON PARKWAY						W Approach YORK RD						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	
07:45:00	66	74	12	0	1	152	3	83	3	0	0	89	4	29	12	0	0	45	26	74	28	0	0	128	414
08:00:00	74	69	14	0	0	157	4	69	4	0	0	77	6	29	17	0	0	52	32	77	23	0	0	132	418
08:15:00	68	76	11	0	0	155	6	86	6	0	0	98	7	34	20	0	0	61	18	55	34	0	0	107	421
08:30:00	82	77	17	0	2	176	8	103	9	0	0	120	3	32	25	0	0	60	21	63	26	0	2	110	466
Grand Total	290	296	54	0	3	640	21	341	22	0	0	384	20	124	74	0	0	218	97	269	111	0	2	477	**1719**
Approach%	45.3%	46.3%	8.4%	0%		-	5.5%	88.8%	5.7%	0%		-	9.2%	56.9%	33.9%	0%		-	20.3%	56.4%	23.3%	0%		-	**-**
Totals %	16.9%	17.2%	3.1%	0%		37.2%	1.2%	19.8%	1.3%	0%		22.3%	1.2%	7.2%	4.3%	0%		12.7%	5.6%	15.6%	6.5%	0%		27.7%	**-**
PHF	0.88	0.96	0.79	0		0.91	0.66	0.83	0.61	0		0.8	0.71	0.91	0.74	0		0.89	0.76	0.87	0.82	0		0.9	**-**
Heavy	6	10	0	0		16	5	23	5	0		33	6	15	9	0		30	10	24	11	0		45	**-**
Heavy %	2.1%	3.4%	0%	0%		2.5%	23.8%	6.7%	22.7%	0%		8.6%	30%	12.1%	12.2%	0%		13.8%	10.3%	8.9%	9.9%	0%		9.4%	**-**
Lights	284	285	54	0		623	16	318	17	0		351	14	108	65	0		187	86	245	100	0		431	**-**
Lights %	97.9%	96.3%	100%	0%		97.3%	76.2%	93.3%	77.3%	0%		91.4%	70%	87.1%	87.8%	0%		85.8%	88.7%	91.1%	90.1%	0%		90.4%	**-**
Single-Unit Trucks	0	4	0	0		4	3	13	3	0		19	1	4	3	0		8	7	12	4	0		23	**-**
Single-Unit Trucks %	0%	1.4%	0%	0%		0.6%	14.3%	3.8%	13.6%	0%		4.9%	5%	3.2%	4.1%	0%		3.7%	7.2%	4.5%	3.6%	0%		4.8%	**-**
Buses	6	1	0	0		7	1	6	0	0		7	0	3	5	0		8	1	6	7	0		14	**-**
Buses %	2.1%	0.3%	0%	0%		1.1%	4.8%	1.8%	0%	0%		1.8%	0%	2.4%	6.8%	0%		3.7%	1%	2.2%	6.3%	0%		2.9%	**-**
Articulated Trucks	0	5	0	0		5	1	4	2	0		7	5	8	1	0		14	2	6	0	0		8	**-**
Articulated Trucks %	0%	1.7%	0%	0%		0.8%	4.8%	1.2%	9.1%	0%		1.8%	25%	6.5%	1.4%	0%		6.4%	2.1%	2.2%	0%	0%		1.7%	**-**
Bicycles on Road	0	1	0	0		1	0	0	0	0		0	0	1	0	0		1	1	0	0	0		1	**-**
Bicycles on Road %	0%	0.3%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.8%	0%	0%		0.5%	1%	0%	0%	0%		0.2%	**-**
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	40%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	40%		**-**
Bicycles on Crosswalk	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	20%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

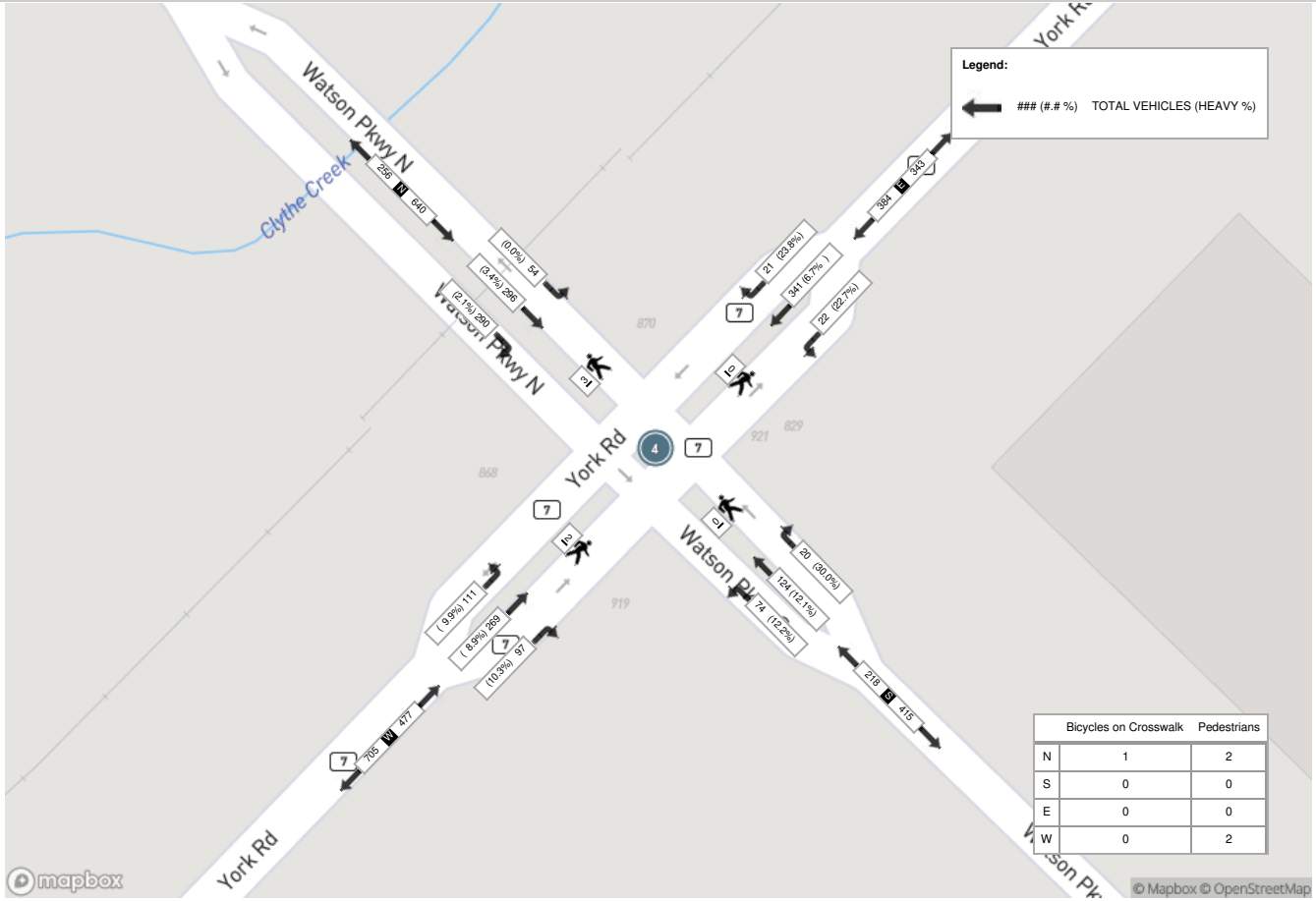
Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:15 PM - 05:15 PM Weather: Clear Sky (9.8 °C)

Start Time	N Approach WATSON PARKWAY						E Approach YORK RD						S Approach WATSON PARKWAY						W Approach YORK RD						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	
16:15:00	47	54	6	0	1	107	13	84	3	0	1	100	5	107	63	0	0	175	24	91	61	0	1	176	558
16:30:00	48	59	2	0	0	109	20	113	4	1	0	138	7	77	45	0	0	129	15	80	69	0	0	164	540
16:45:00	45	66	5	0	0	116	14	90	2	0	0	106	5	105	31	0	0	141	24	76	65	0	0	165	528
17:00:00	48	49	5	0	0	102	20	100	4	0	0	124	3	101	43	0	0	147	25	75	58	0	1	158	531
Grand Total	188	228	18	0	1	434	67	387	13	1	1	468	20	390	182	0	0	592	88	322	253	0	2	663	**2157**
Approach%	43.3%	52.5%	4.1%	0%		-	14.3%	82.7%	2.8%	0.2%		-	3.4%	65.9%	30.7%	0%		-	13.3%	48.6%	38.2%	0%		-	**-**
Totals %	8.7%	10.6%	0.8%	0%		20.1%	3.1%	17.9%	0.6%	0%		21.7%	0.9%	18.1%	8.4%	0%		27.4%	4.1%	14.9%	11.7%	0%		30.7%	**-**
PHF	0.98	0.86	0.75	0		0.94	0.84	0.86	0.81	0.25		0.85	0.71	0.91	0.72	0		0.85	0.88	0.88	0.92	0		0.94	**-**
Heavy	9	5	1	0		15	0	9	1	0		10	3	8	12	0		23	2	15	5	0		22	**-**
Heavy %	4.8%	2.2%	5.6%	0%		3.5%	0%	2.3%	7.7%	0%		2.1%	15%	2.1%	6.6%	0%		3.9%	2.3%	4.7%	2%	0%		3.3%	**-**
Lights	178	223	17	0		418	67	378	12	1		458	17	381	170	0		568	86	307	247	0		640	**-**
Lights %	94.7%	97.8%	94.4%	0%		96.3%	100%	97.7%	92.3%	100%		97.9%	85%	97.7%	93.4%	0%		95.9%	97.7%	95.3%	97.6%	0%		96.5%	**-**
Single-Unit Trucks	2	2	1	0		5	0	4	0	0		4	1	3	7	0		11	0	7	2	0		9	**-**
Single-Unit Trucks %	1.1%	0.9%	5.6%	0%		1.2%	0%	1%	0%	0%		0.9%	5%	0.8%	3.8%	0%		1.9%	0%	2.2%	0.8%	0%		1.4%	**-**
Buses	5	3	0	0		8	0	2	0	0		2	0	3	4	0		7	0	2	3	0		5	**-**
Buses %	2.7%	1.3%	0%	0%		1.8%	0%	0.5%	0%	0%		0.4%	0%	0.8%	2.2%	0%		1.2%	0%	0.6%	1.2%	0%		0.8%	**-**
Articulated Trucks	2	0	0	0		2	0	3	1	0		4	2	2	1	0		5	2	6	0	0		8	**-**
Articulated Trucks %	1.1%	0%	0%	0%		0.5%	0%	0.8%	7.7%	0%		0.9%	10%	0.5%	0.5%	0%		0.8%	2.3%	1.9%	0%	0%		1.2%	**-**
Bicycles on Road	1	0	0	0		1	0	0	0	0		0	0	1	0	0		1	0	0	1	0		1	**-**
Bicycles on Road %	0.5%	0%	0%	0%		0.2%	0%	0%	0%	0%		0%	0%	0.3%	0%	0%		0.2%	0%	0%	0.4%	0%		0.2%	**-**
Pedestrians	-	-	-	-	1	-	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	-	25%		-	-	-	-	25%		-	-	-	-	0%		-	-	-	-	50%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 07:45 AM - 08:45 AM **Weather: Few Clouds (0.68 °C)**



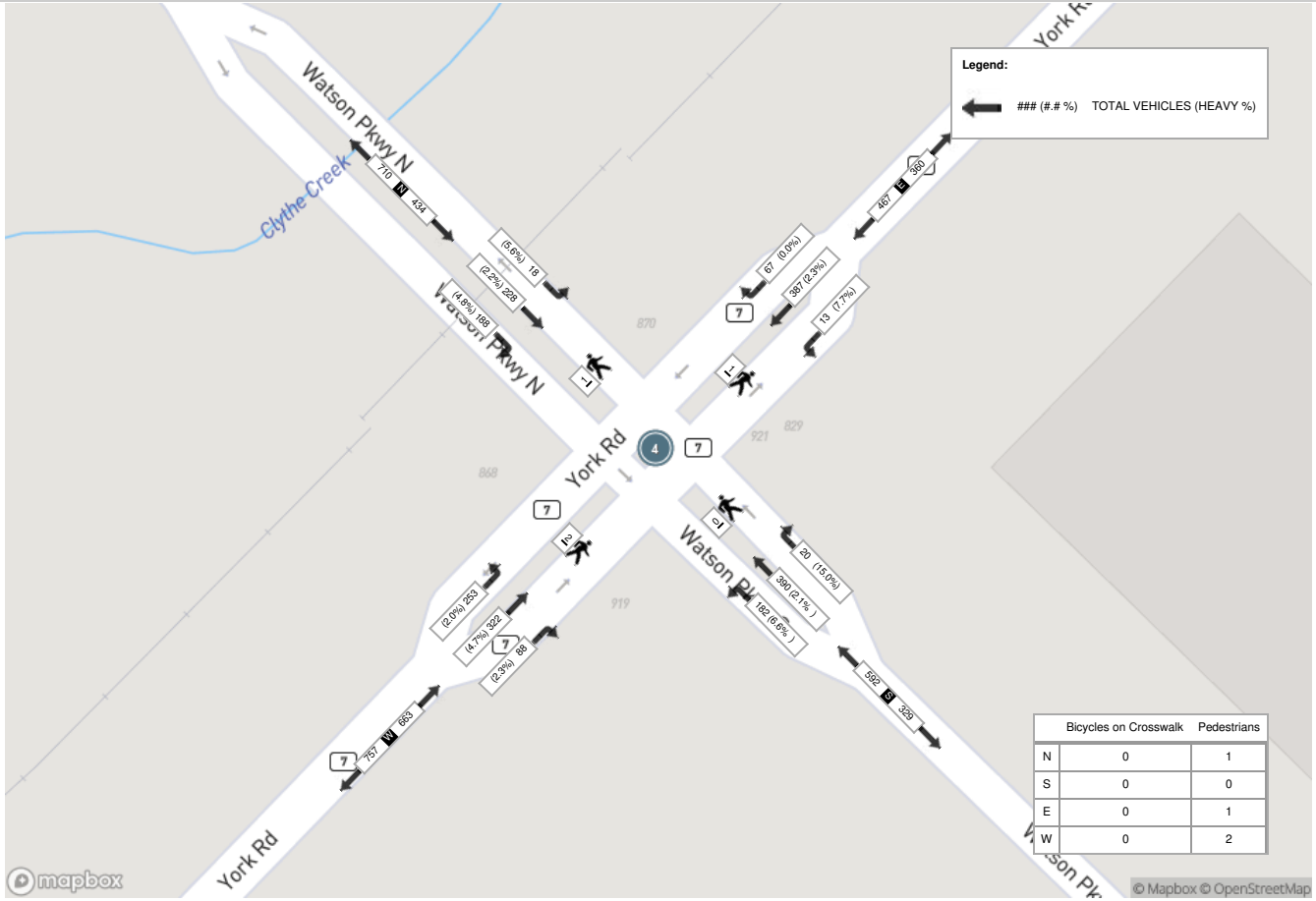
	Bicycles on Crosswalk	Pedestrians
N	1	2
S	0	0
E	0	0
W	0	2

Spectrum

Turning Movement Count
Location Name: WATSON PKWY & YORK RD
Date: Tue, Nov 08, 2022 Deployment Lead: Peter Ilias

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:15 PM - 05:15 PM **Weather: Clear Sky (9.8 °C)**



Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Turning Movement Count (1 . WATSON PKWY N & STARWOOD DR)

Start Time	N Approach WATSON PKWY N					S Approach WATSON PKWY N					W Approach STARWOOD DR					Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	U-Turn N:N	Peds N:	Approach Total	Thru S:N	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Left W:N	U-Turn W:W	Peds W:	Approach Total		
06:00:00	0	44	0	0	44	7	13	0	0	20	30	9	0	0	39	103	
06:15:00	3	33	0	0	36	10	9	0	0	19	37	1	0	0	38	93	
06:30:00	1	35	0	1	36	13	4	0	0	17	53	5	0	0	58	111	
06:45:00	3	41	0	0	44	18	19	0	0	37	45	4	0	0	49	130	437
07:00:00	2	45	0	0	47	18	10	0	0	28	47	9	0	0	56	131	465
07:15:00	2	81	0	0	83	15	11	0	0	26	50	5	0	0	55	164	536
07:30:00	3	104	0	0	107	29	17	0	0	46	65	3	0	0	68	221	646
07:45:00	4	80	0	0	84	43	17	0	0	60	70	8	0	0	78	222	738
08:00:00	3	80	0	0	83	29	24	0	0	53	75	6	0	0	81	217	824
08:15:00	7	79	0	0	86	38	35	0	0	73	66	6	0	0	72	231	891
08:30:00	3	91	0	0	94	40	27	0	0	67	82	8	0	0	90	251	921
08:45:00	5	56	0	0	61	41	21	0	0	62	57	5	0	0	62	185	884
09:00:00	2	58	0	0	60	28	21	0	0	49	45	2	0	0	47	156	823
09:15:00	3	49	0	0	52	38	21	0	0	59	34	4	0	0	38	149	741
09:30:00	3	41	0	0	44	38	18	0	0	56	32	2	0	0	34	134	624
09:45:00	4	48	0	0	52	36	22	0	0	58	45	2	0	0	47	157	596
BREAK																	
15:00:00	1	54	0	0	55	67	38	0	0	105	45	4	0	1	49	209	
15:15:00	5	40	0	0	45	68	34	0	0	102	45	2	0	0	47	194	
15:30:00	10	60	0	0	70	73	51	0	0	124	60	3	0	0	63	257	
15:45:00	6	43	0	0	49	74	56	0	0	130	50	2	0	0	52	231	891
16:00:00	3	52	0	0	55	97	67	0	0	164	49	5	0	1	54	273	955
16:15:00	5	54	0	0	59	101	71	1	0	173	55	5	0	0	60	292	1053
16:30:00	9	62	0	1	71	97	76	0	0	173	42	4	0	0	46	290	1086
16:45:00	12	60	0	0	72	106	79	0	0	185	58	5	0	0	63	320	1175
17:00:00	11	60	0	0	71	106	77	0	0	183	49	7	1	0	57	311	1213
17:15:00	7	51	0	0	58	107	84	0	0	191	42	2	0	2	44	293	1214
17:30:00	6	56	0	0	62	74	62	0	0	136	70	4	0	0	74	272	1196
17:45:00	7	58	0	0	65	66	56	0	0	122	46	3	0	0	49	236	1112
18:00:00	6	37	0	0	43	51	61	0	0	112	40	3	0	0	43	198	999
18:15:00	5	38	0	0	43	55	60	0	0	115	36	7	0	0	43	201	907
18:30:00	5	40	0	1	45	61	37	0	0	98	45	8	0	0	53	196	831
18:45:00	5	43	0	0	48	52	38	0	0	90	42	1	0	0	43	181	776

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Grand Total	151	1773	0	3	1924	1696	1236	1	0	2933	1607	144	1	4	1752	**6609**	-
Approach%	7.8%	92.2%	0%		-	57.8%	42.1%	0%		-	91.7%	8.2%	0.1%		-	**-**	-
Totals %	2.3%	26.8%	0%		29.1%	25.7%	18.7%	0%		44.4%	24.3%	2.2%	0%		26.5%	**-**	-
Heavy	20	80	0		-	87	17	0		-	13	6	0		-	**-**	-
Heavy %	13.2%	4.5%	0%		-	5.1%	1.4%	0%		-	0.8%	4.2%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 07:45 AM - 08:45 AM Weather: Few Clouds (0.68 °C)

Start Time	N Approach WATSON PKWY N					S Approach WATSON PKWY N					W Approach STARWOOD DR					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
07:45:00	4	80	0	0	84	43	17	0	0	60	70	8	0	0	78	222
08:00:00	3	80	0	0	83	29	24	0	0	53	75	6	0	0	81	217
08:15:00	7	79	0	0	86	38	35	0	0	73	66	6	0	0	72	231
08:30:00	3	91	0	0	94	40	27	0	0	67	82	8	0	0	90	251
Grand Total	17	330	0	0	347	150	103	0	0	253	293	28	0	0	321	**921**
Approach%	4.9%	95.1%	0%		-	59.3%	40.7%	0%		-	91.3%	8.7%	0%		-	**-**
Totals %	1.8%	35.8%	0%		37.7%	16.3%	11.2%	0%		27.5%	31.8%	3%	0%		34.9%	**-**
PHF	0.61	0.91	0		0.92	0.87	0.74	0		0.87	0.89	0.88	0		0.89	**-**
Heavy	3	13	0		16	24	5	0		29	2	2	0		4	**-**
Heavy %	17.6%	3.9%	0%		4.6%	16%	4.9%	0%		11.5%	0.7%	7.1%	0%		1.2%	**-**
Lights	14	317	0		331	125	98	0		223	291	26	0		317	**-**
Lights %	82.4%	96.1%	0%		95.4%	83.3%	95.1%	0%		88.1%	99.3%	92.9%	0%		98.8%	**-**
Single-Unit Trucks	0	5	0		5	7	3	0		10	0	1	0		1	**-**
Single-Unit Trucks %	0%	1.5%	0%		1.4%	4.7%	2.9%	0%		4%	0%	3.6%	0%		0.3%	**-**
Buses	3	3	0		6	9	2	0		11	2	1	0		3	**-**
Buses %	17.6%	0.9%	0%		1.7%	6%	1.9%	0%		4.3%	0.7%	3.6%	0%		0.9%	**-**
Articulated Trucks	0	5	0		5	8	0	0		8	0	0	0		0	**-**
Articulated Trucks %	0%	1.5%	0%		1.4%	5.3%	0%	0%		3.2%	0%	0%	0%		0%	**-**
Bicycles on Road	0	0	0		0	1	0	0		1	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%		0%	0.7%	0%	0%		0.4%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	0%		**-**

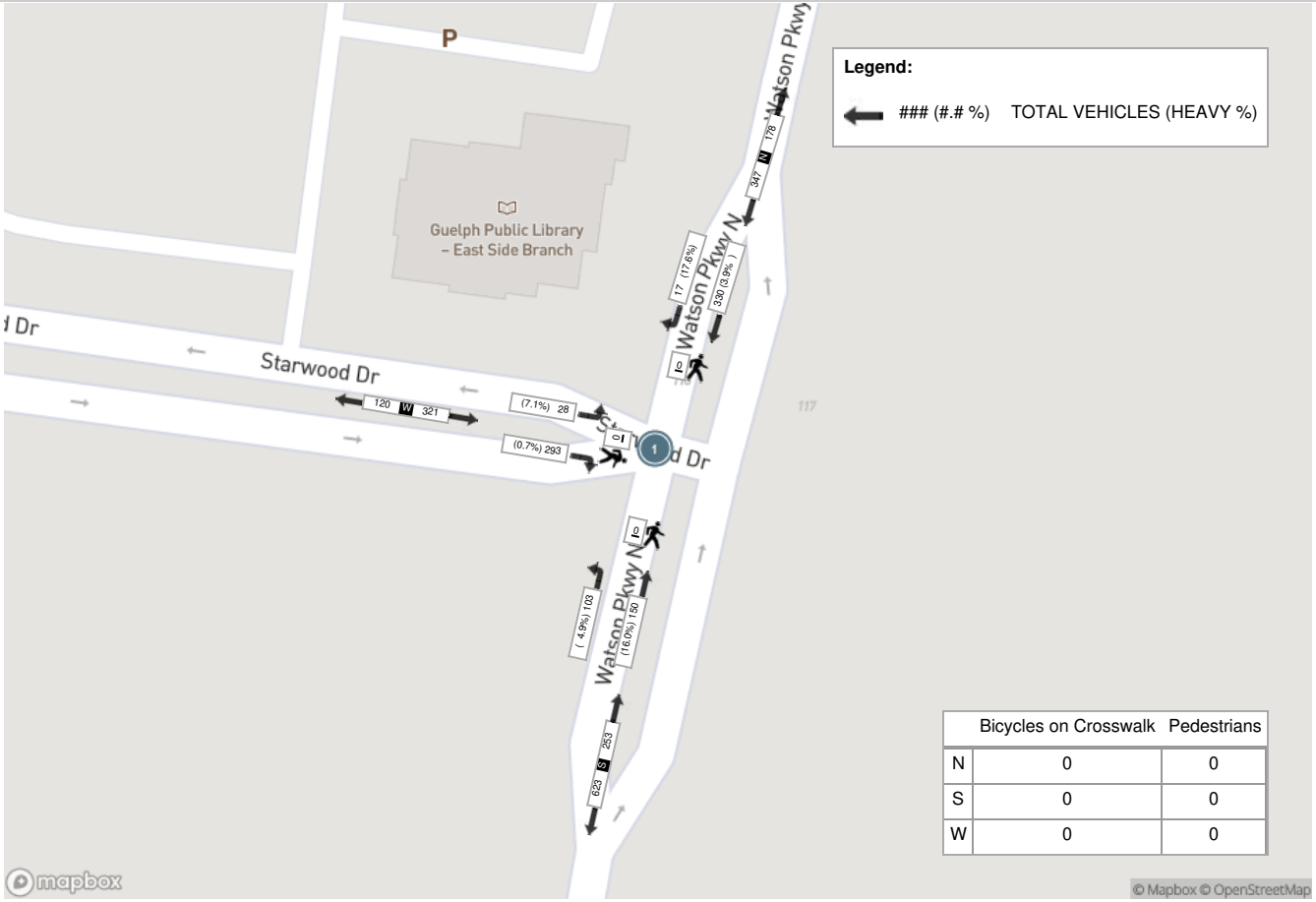
Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (9.8 °C)

Start Time	N Approach WATSON PKWY N					S Approach WATSON PKWY N					W Approach STARWOOD DR					Int. Total (15 min)
	Right	Thru	U-Turn	Peds	Approach Total	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	
16:30:00	9	62	0	1	71	97	76	0	0	173	42	4	0	0	46	290
16:45:00	12	60	0	0	72	106	79	0	0	185	58	5	0	0	63	320
17:00:00	11	60	0	0	71	106	77	0	0	183	49	7	1	0	57	311
17:15:00	7	51	0	0	58	107	84	0	0	191	42	2	0	2	44	293
Grand Total	39	233	0	1	272	416	316	0	0	732	191	18	1	2	210	**1214**
Approach%	14.3%	85.7%	0%		-	56.8%	43.2%	0%		-	91%	8.6%	0.5%		-	**-**
Totals %	3.2%	19.2%	0%		22.4%	34.3%	26%	0%		60.3%	15.7%	1.5%	0.1%		17.3%	**-**
PHF	0.81	0.94	0		0.94	0.97	0.94	0		0.96	0.82	0.64	0.25		0.83	**-**
Heavy	4	8	0		12	7	2	0		9	3	0	0		3	**-**
Heavy %	10.3%	3.4%	0%		4.4%	1.7%	0.6%	0%		1.2%	1.6%	0%	0%		1.4%	**-**
Lights	35	223	0		258	409	314	0		723	188	18	1		207	**-**
Lights %	89.7%	95.7%	0%		94.9%	98.3%	99.4%	0%		98.8%	98.4%	100%	100%		98.6%	**-**
Single-Unit Trucks	1	2	0		3	3	1	0		4	2	0	0		2	**-**
Single-Unit Trucks %	2.6%	0.9%	0%		1.1%	0.7%	0.3%	0%		0.5%	1%	0%	0%		1%	**-**
Buses	3	3	0		6	3	1	0		4	1	0	0		1	**-**
Buses %	7.7%	1.3%	0%		2.2%	0.7%	0.3%	0%		0.5%	0.5%	0%	0%		0.5%	**-**
Articulated Trucks	0	3	0		3	1	0	0		1	0	0	0		0	**-**
Articulated Trucks %	0%	1.3%	0%		1.1%	0.2%	0%	0%		0.1%	0%	0%	0%		0%	**-**
Bicycles on Road	0	2	0		2	0	0	0		0	0	0	0		0	**-**
Bicycles on Road %	0%	0.9%	0%		0.7%	0%	0%	0%		0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	1	-	-	-	-	0	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	33.3%		-	-	-	0%		-	-	-	33.3%		**-**
Bicycles on Crosswalk	-	-	-	0	-	-	-	-	0	-	-	-	-	1	-	**-**
Bicycles on Crosswalk%	-	-	-	0%		-	-	-	0%		-	-	-	33.3%		**-**

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

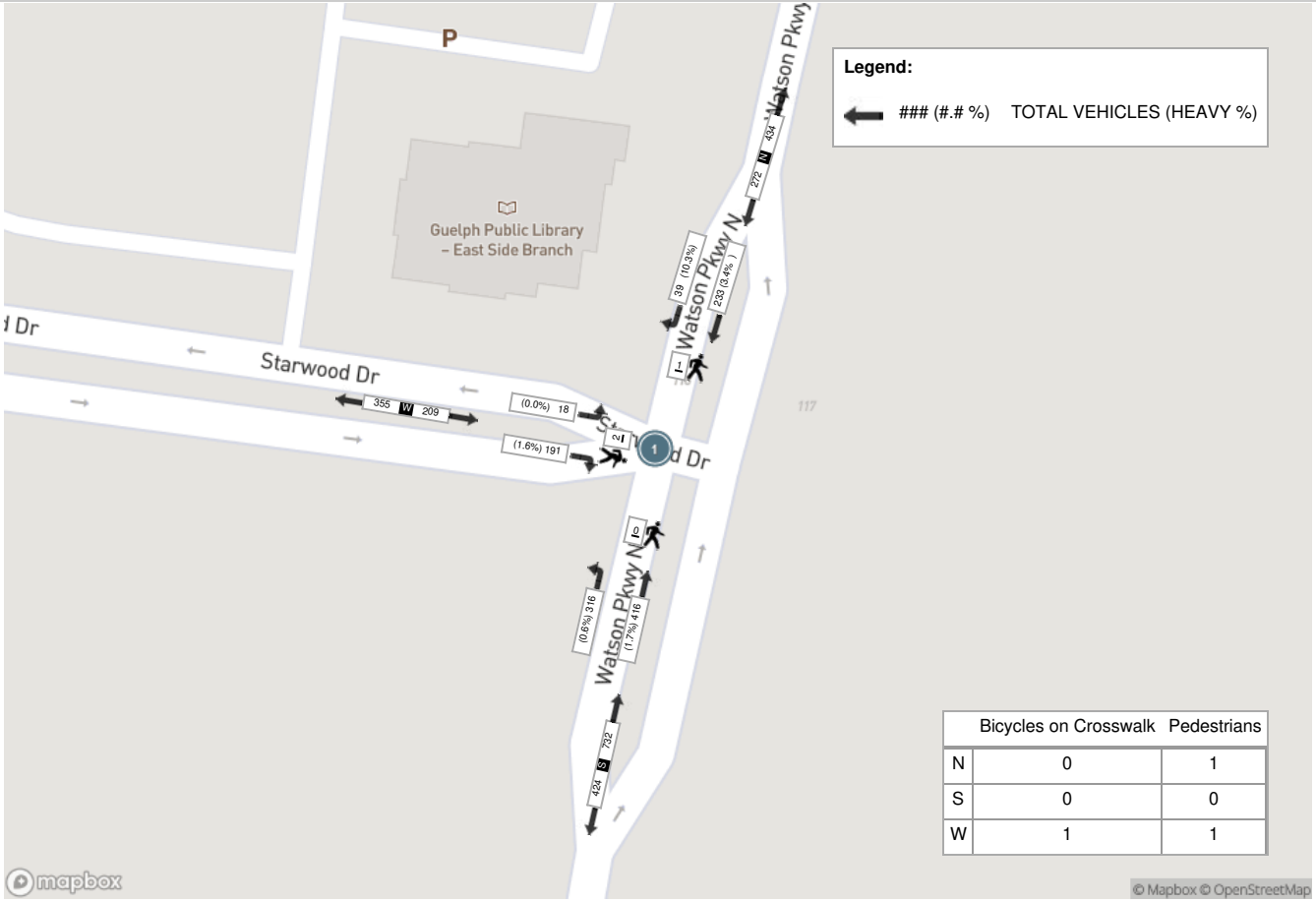
Peak Hour: 07:45 AM - 08:45 AM Weather: Few Clouds (0.68 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
W	0	0

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (9.8 °C)



	Bicycles on Crosswalk	Pedestrians
N	0	1
S	0	0
W	1	1

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Turning Movement Count (2 . WATSON PKWY N & WATSON RD N)

Start Time	N Approach WATSON PARKWAY					E Approach WATSON RD					S Approach WATSON PARKWAY					Int. Total (15 min)	Int. Total (1 hr)
	Thru N:S	Left N:E	U-Turn N:N	Peds N:	Approach Total	Right E:N	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Thru S:N	U-Turn S:S	Peds S:	Approach Total		
06:00:00	45	11	0	0	56	6	0	0	0	6	9	7	0	0	16	78	
06:15:00	36	21	0	0	57	5	0	0	0	5	2	9	0	0	11	73	
06:30:00	36	21	0	0	57	6	0	0	0	6	5	13	0	0	18	81	
06:45:00	45	29	0	0	74	4	1	0	0	5	4	18	0	4	22	101	333
07:00:00	45	13	0	0	58	4	3	0	0	7	7	19	0	0	26	91	346
07:15:00	83	29	0	0	112	5	2	0	0	7	5	15	0	1	20	139	412
07:30:00	102	21	0	1	123	7	2	0	0	9	3	29	0	0	32	164	495
07:45:00	83	27	0	1	110	8	2	0	1	10	6	41	0	0	47	167	561
08:00:00	81	16	0	1	97	5	4	0	0	9	4	32	0	0	36	142	612
08:15:00	85	20	0	0	105	10	4	0	0	14	3	40	0	0	43	162	635
08:30:00	85	13	0	0	98	9	4	0	4	13	5	41	0	0	46	157	628
08:45:00	59	21	0	0	80	7	3	0	0	10	4	44	0	0	48	138	599
09:00:00	58	10	0	1	68	7	1	0	1	8	2	29	0	0	31	107	564
09:15:00	48	9	0	0	57	4	2	0	0	6	4	38	0	0	42	105	507
09:30:00	43	5	0	0	48	7	1	0	1	8	2	35	0	0	37	93	443
09:45:00	53	9	0	0	62	9	2	0	1	11	1	38	0	0	39	112	417
BREAK																	
15:00:00	51	12	0	0	63	13	2	0	0	15	2	67	0	0	69	147	
15:15:00	41	17	0	0	58	13	2	0	4	15	1	70	0	0	71	144	
15:30:00	66	7	0	1	73	16	3	0	1	19	3	73	0	0	76	168	
15:45:00	44	5	0	0	49	15	5	0	0	20	2	71	0	0	73	142	601
16:00:00	55	15	0	0	70	35	2	0	1	37	3	105	0	0	108	215	669
16:15:00	55	9	0	0	64	23	1	0	0	24	4	101	0	0	105	193	718
16:30:00	62	13	0	0	75	45	10	0	0	55	4	94	0	2	98	228	778
16:45:00	67	10	0	1	77	30	4	0	0	34	2	113	0	0	115	226	862
17:00:00	59	8	0	0	67	37	12	0	0	49	2	111	0	0	113	229	876
17:15:00	56	11	0	0	67	16	3	0	4	19	4	107	0	0	111	197	880
17:30:00	58	13	0	0	71	23	3	0	0	26	5	73	0	0	78	175	827
17:45:00	62	8	0	0	70	22	4	0	0	26	2	67	0	0	69	165	766
18:00:00	39	7	0	0	46	14	3	0	1	17	2	51	0	1	53	116	653
18:15:00	43	9	0	0	52	15	1	0	2	16	5	58	0	1	63	131	587
18:30:00	40	8	0	0	48	17	3	0	0	20	5	67	0	0	72	140	552
18:45:00	47	3	0	0	50	6	1	0	0	7	1	54	0	0	55	112	499

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Grand Total	1832	430	0	6	2262	443	90	0	21	533	113	1730	0	9	1843	**4638**	-
Approach%	81%	19%	0%		-	83.1%	16.9%	0%		-	6.1%	93.9%	0%		-	**-**	-
Totals %	39.5%	9.3%	0%		48.8%	9.6%	1.9%	0%		11.5%	2.4%	37.3%	0%		39.7%	**-**	-
Heavy	99	8	0		-	7	1	0		-	1	91	0		-	**-**	-
Heavy %	5.4%	1.9%	0%		-	1.6%	1.1%	0%		-	0.9%	5.3%	0%		-	**-**	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	**-**	-

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 07:30 AM - 08:30 AM Weather: Few Clouds (0.68 °C)

Start Time	N Approach WATSON PARKWAY					E Approach WATSON RD					S Approach WATSON PARKWAY					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	
07:30:00	102	21	0	1	123	7	2	0	0	9	3	29	0	0	32	164
07:45:00	83	27	0	1	110	8	2	0	1	10	6	41	0	0	47	167
08:00:00	81	16	0	1	97	5	4	0	0	9	4	32	0	0	36	142
08:15:00	85	20	0	0	105	10	4	0	0	14	3	40	0	0	43	162
Grand Total	351	84	0	3	435	30	12	0	1	42	16	142	0	0	158	**635**
Approach%	80.7%	19.3%	0%		-	71.4%	28.6%	0%		-	10.1%	89.9%	0%		-	**-**
Totals %	55.3%	13.2%	0%		68.5%	4.7%	1.9%	0%		6.6%	2.5%	22.4%	0%		24.9%	**-**
PHF	0.86	0.78	0		0.88	0.75	0.75	0		0.75	0.67	0.87	0		0.84	**-**
Heavy	15	0	0		15	2	0	0		2	0	21	0		21	**-**
Heavy %	4.3%	0%	0%		3.4%	6.7%	0%	0%		4.8%	0%	14.8%	0%		13.3%	**-**
Lights	336	84	0		420	28	12	0		40	16	120	0		136	**-**
Lights %	95.7%	100%	0%		96.6%	93.3%	100%	0%		95.2%	100%	84.5%	0%		86.1%	**-**
Single-Unit Trucks	3	0	0		3	1	0	0		1	0	7	0		7	**-**
Single-Unit Trucks %	0.9%	0%	0%		0.7%	3.3%	0%	0%		2.4%	0%	4.9%	0%		4.4%	**-**
Buses	6	0	0		6	1	0	0		1	0	8	0		8	**-**
Buses %	1.7%	0%	0%		1.4%	3.3%	0%	0%		2.4%	0%	5.6%	0%		5.1%	**-**
Articulated Trucks	6	0	0		6	0	0	0		0	0	6	0		6	**-**
Articulated Trucks %	1.7%	0%	0%		1.4%	0%	0%	0%		0%	0%	4.2%	0%		3.8%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	0	1	0		1	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0.7%	0%		0.6%	**-**
Pedestrians	-	-	-	3	-	-	-	-	1	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	75%		-	-	-	25%		-	-	-	0%		**-**

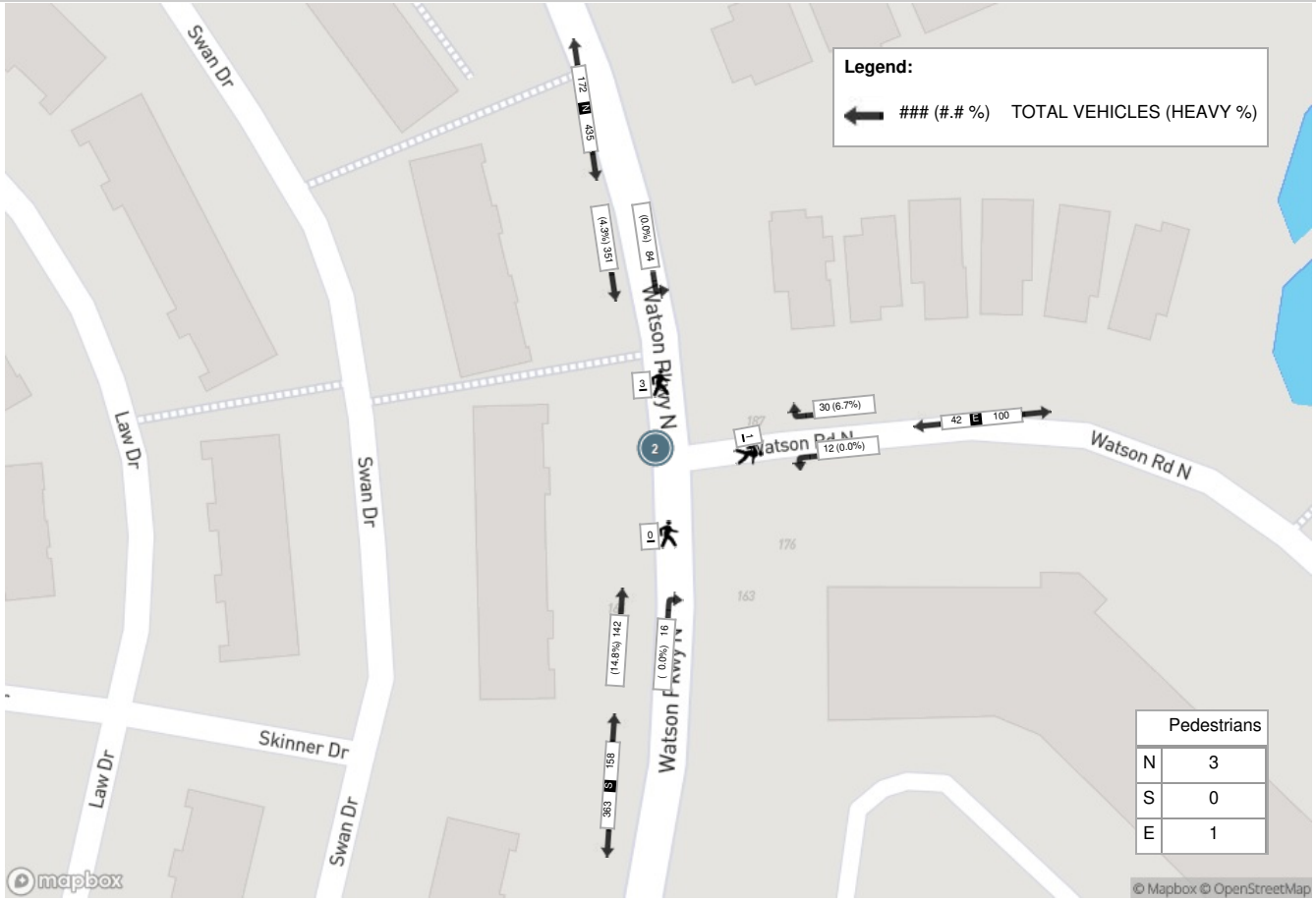
Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (9.8 °C)

Start Time	N Approach WATSON PARKWAY					E Approach WATSON RD					S Approach WATSON PARKWAY					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	
16:30:00	62	13	0	0	75	45	10	0	0	55	4	94	0	2	98	228
16:45:00	67	10	0	1	77	30	4	0	0	34	2	113	0	0	115	226
17:00:00	59	8	0	0	67	37	12	0	0	49	2	111	0	0	113	229
17:15:00	56	11	0	0	67	16	3	0	4	19	4	107	0	0	111	197
Grand Total	244	42	0	1	286	128	29	0	4	157	12	425	0	2	437	**880**
Approach%	85.3%	14.7%	0%		-	81.5%	18.5%	0%		-	2.7%	97.3%	0%		-	**-**
Totals %	27.7%	4.8%	0%		32.5%	14.5%	3.3%	0%		17.8%	1.4%	48.3%	0%		49.7%	**-**
PHF	0.91	0.81	0		0.93	0.71	0.6	0		0.71	0.75	0.94	0		0.95	**-**
Heavy	11	1	0		12	1	1	0		2	0	6	0		6	**-**
Heavy %	4.5%	2.4%	0%		4.2%	0.8%	3.4%	0%		1.3%	0%	1.4%	0%		1.4%	**-**
Lights	233	41	0		274	127	28	0		155	11	419	0		430	**-**
Lights %	95.5%	97.6%	0%		95.8%	99.2%	96.6%	0%		98.7%	91.7%	98.6%	0%		98.4%	**-**
Single-Unit Trucks	2	0	0		2	1	1	0		2	0	2	0		2	**-**
Single-Unit Trucks %	0.8%	0%	0%		0.7%	0.8%	3.4%	0%		1.3%	0%	0.5%	0%		0.5%	**-**
Buses	6	1	0		7	0	0	0		0	0	3	0		3	**-**
Buses %	2.5%	2.4%	0%		2.4%	0%	0%	0%		0%	0%	0.7%	0%		0.7%	**-**
Articulated Trucks	3	0	0		3	0	0	0		0	0	1	0		1	**-**
Articulated Trucks %	1.2%	0%	0%		1%	0%	0%	0%		0%	0%	0.2%	0%		0.2%	**-**
Bicycles on Road	0	0	0		0	0	0	0		0	1	0	0		1	**-**
Bicycles on Road %	0%	0%	0%		0%	0%	0%	0%		0%	8.3%	0%	0%		0.2%	**-**
Pedestrians	-	-	-	1	-	-	-	-	4	-	-	-	-	2	-	**-**
Pedestrians%	-	-	-	14.3%		-	-	-	57.1%		-	-	-	28.6%		**-**

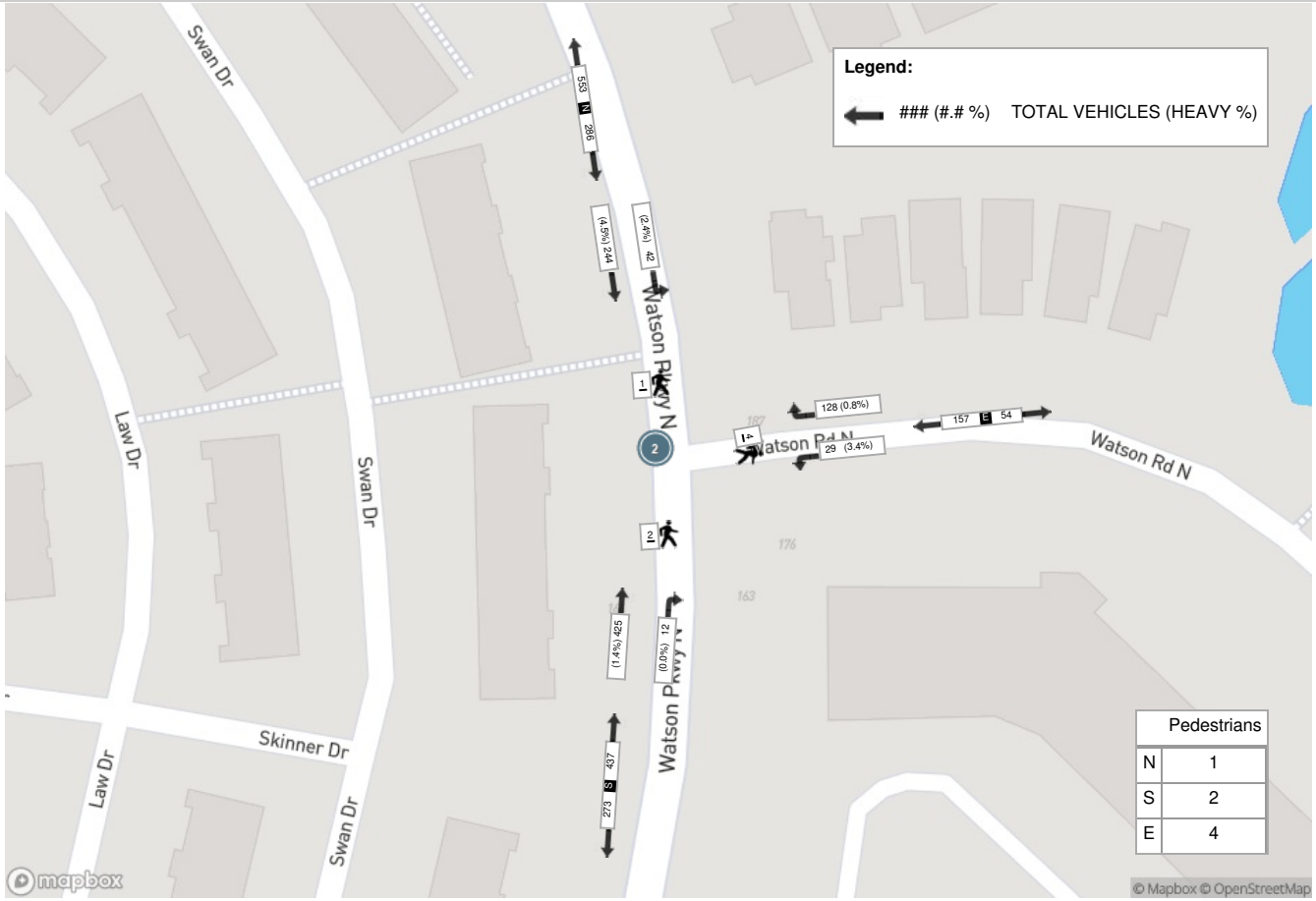
Crozier & Associates
Suite 100 2800 HIGH POINT
DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 07:30 AM - 08:30 AM Weather: Few Clouds (0.68 °C)



Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:30 PM - 05:30 PM Weather: Clear Sky (9.8 °C)



Spectrum

Turning Movement Count
Location Name: WATSON RD & YORK RD
Date: Tue, Nov 08, 2022 Deployment Lead: Peter Ilias

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Turning Movement Count (3 . WATSON RD & YORK RD)

Start Time	N Approach WATSON RD						E Approach YORK RD						S Approach WATSON RD						W Approach YORK RD						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	6	14	0	0	20	5	33	5	0	0	43	0	0	1	0	0	1	5	41	0	0	0	46	110	
06:15:00	1	3	19	0	0	23	3	18	3	0	0	24	1	2	1	0	0	4	8	48	0	0	0	56	107	
06:30:00	1	11	16	0	0	28	3	27	8	0	0	38	4	1	1	0	0	6	14	57	0	0	0	71	143	
06:45:00	1	11	19	0	0	31	2	40	10	0	0	52	2	2	3	0	0	7	18	51	0	0	0	69	159	519
07:00:00	1	5	17	0	0	23	5	29	4	0	0	38	2	1	3	0	1	6	12	67	0	0	0	79	146	555
07:15:00	2	8	23	0	0	33	1	47	5	0	0	53	4	3	5	0	1	12	10	63	0	0	0	73	171	619
07:30:00	1	8	18	0	0	27	8	77	10	0	0	95	2	1	4	0	0	7	9	68	0	0	0	77	206	682
07:45:00	2	18	14	0	1	34	5	82	10	0	0	97	4	0	5	0	0	9	17	62	0	0	0	79	219	742
08:00:00	3	6	18	0	0	27	5	81	10	0	0	96	7	2	5	0	0	14	8	79	0	0	0	87	224	820
08:15:00	2	7	13	0	0	22	8	82	12	0	0	102	7	3	5	0	0	15	5	56	0	0	0	61	200	849
08:30:00	2	5	11	0	0	18	6	93	4	0	0	103	7	0	4	0	0	11	4	77	1	0	0	82	214	857
08:45:00	1	8	15	0	0	24	5	85	7	0	0	97	5	2	5	0	0	12	12	74	1	0	0	87	220	858
09:00:00	2	2	8	0	0	12	5	49	4	0	0	58	4	3	5	0	0	12	11	63	0	0	0	74	156	790
09:15:00	1	4	8	0	0	13	4	65	5	0	0	74	3	0	6	0	0	9	7	64	0	0	0	71	167	757
09:30:00	1	3	3	0	0	7	5	55	7	0	0	67	6	0	2	0	0	8	4	54	0	0	0	58	140	683
09:45:00	1	3	4	0	0	8	9	64	2	0	0	75	4	1	3	0	0	8	9	57	0	0	0	66	157	620
BREAK																										
15:00:00	3	2	7	0	0	12	7	46	3	0	0	56	4	6	9	0	0	19	8	64	1	0	0	73	160	
15:15:00	0	7	8	0	0	15	7	60	2	0	0	69	12	7	14	0	0	33	8	69	2	0	0	79	196	
15:30:00	0	4	8	0	0	12	8	80	4	0	0	92	13	12	8	0	0	33	5	82	1	0	0	88	225	
15:45:00	2	2	4	0	0	8	10	70	8	0	0	88	5	7	10	0	0	22	10	59	1	0	0	70	188	769
16:00:00	1	5	10	0	0	16	12	64	3	0	0	79	21	20	18	0	0	59	8	83	1	0	0	92	246	855
16:15:00	0	1	7	0	0	8	16	83	5	0	0	104	12	8	9	0	0	29	5	93	2	0	0	100	241	900
16:30:00	1	3	8	0	0	12	21	89	1	0	2	111	10	29	36	0	0	75	4	80	2	0	1	86	284	959
16:45:00	0	2	9	0	0	11	22	95	4	0	0	121	9	7	8	0	0	24	4	81	2	0	0	87	243	1014
17:00:00	0	1	5	0	0	6	29	98	4	0	0	131	11	19	12	0	0	42	3	74	0	0	0	77	256	1024
17:15:00	0	3	9	0	0	12	12	85	3	0	0	100	6	3	4	0	0	13	1	81	0	0	1	82	207	990
17:30:00	0	2	12	0	0	14	24	70	0	0	0	94	2	6	2	0	1	10	2	56	1	0	0	59	177	883
17:45:00	1	5	4	0	0	10	17	73	5	0	0	95	4	4	1	0	0	9	2	55	2	0	0	59	173	813
18:00:00	0	1	5	0	0	6	11	57	0	0	0	68	4	4	7	0	0	15	1	58	3	0	0	62	151	708
18:15:00	0	3	8	0	0	11	9	60	4	0	0	73	2	7	4	0	0	13	4	52	0	0	0	56	153	654
18:30:00	1	1	8	0	0	10	14	60	1	0	0	75	1	7	1	0	0	9	2	48	2	0	0	52	146	623
18:45:00	0	0	2	0	0	2	3	59	0	0	0	62	2	2	2	0	0	6	5	54	1	0	0	60	130	580
Grand Total	31	150	334	0	1	515	301	2076	153	0	2	2530	180	169	203	0	3	552	225	2070	23	0	2	2318	**5915**	-
Approach%	6%	29.1%	64.9%	0%		-	11.9%	82.1%	6%	0%		-	32.6%	30.6%	36.8%	0%		-	9.7%	89.3%	1%	0%		-	-	-
Totals %	0.5%	2.5%	5.6%	0%		8.7%	5.1%	35.1%	2.6%	0%		42.8%	3%	2.9%	3.4%	0%		9.3%	3.8%	35%	0.4%	0%		39.2%	-	-
Heavy	1	5	1	0		-	2	103	30	0		-	38	3	33	0		-	44	133	1	0		-	-	-
Heavy %	3.2%	3.3%	0.3%	0%		-	0.7%	5%	19.6%	0%		-	21.1%	1.8%	16.3%	0%		-	19.6%	6.4%	4.3%	0%		-	-	-
Bicycles	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-
Bicycle %	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-

Spectrum

Turning Movement Count
Location Name: WATSON RD & YORK RD
Date: Tue, Nov 08, 2022 Deployment Lead: Peter Ilias

Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 08:00 AM - 09:00 AM Weather: Few Clouds (0.68 °C)

Start Time	N Approach WATSON RD						E Approach YORK RD						S Approach WATSON RD						W Approach YORK RD						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	
08:00:00	3	6	18	0	0	27	5	81	10	0	0	96	7	2	5	0	0	14	8	79	0	0	0	87	224
08:15:00	2	7	13	0	0	22	8	82	12	0	0	102	7	3	5	0	0	15	5	56	0	0	0	61	200
08:30:00	2	5	11	0	0	18	6	93	4	0	0	103	7	0	4	0	0	11	4	77	1	0	0	82	214
08:45:00	1	8	15	0	0	24	5	85	7	0	0	97	5	2	5	0	0	12	12	74	1	0	0	87	220
Grand Total	8	26	57	0	0	91	24	341	33	0	0	398	26	7	19	0	0	52	29	286	2	0	0	317	**858**
Approach%	8.8%	28.6%	62.6%	0%		-	6%	85.7%	8.3%	0%		-	50%	13.5%	36.5%	0%		-	9.1%	90.2%	0.6%	0%		-	**-**
Totals %	0.9%	3%	6.6%	0%		10.6%	2.8%	39.7%	3.8%	0%		46.4%	3%	0.8%	2.2%	0%		6.1%	3.4%	33.3%	0.2%	0%		36.9%	**-**
PHF	0.67	0.81	0.79	0		0.84	0.75	0.92	0.69	0		0.97	0.93	0.58	0.95	0		0.87	0.6	0.91	0.5	0		0.91	**-**
Heavy	0	3	0	0		3	0	22	9	0		31	10	0	8	0		18	3	21	0	0		24	**-**
Heavy %	0%	11.5%	0%	0%		3.3%	0%	6.5%	27.3%	0%		7.8%	38.5%	0%	42.1%	0%		34.6%	10.3%	7.3%	0%	0%		7.6%	**-**
Lights	8	23	57	0		88	24	319	24	0		367	16	7	11	0		34	26	265	2	0		293	**-**
Lights %	100%	88.5%	100%	0%		96.7%	100%	93.5%	72.7%	0%		92.2%	61.5%	100%	57.9%	0%		65.4%	89.7%	92.7%	100%	0%		92.4%	**-**
Single-Unit Trucks	0	2	0	0		2	0	11	2	0		13	8	0	5	0		13	0	9	0	0		9	**-**
Single-Unit Trucks %	0%	7.7%	0%	0%		2.2%	0%	3.2%	6.1%	0%		3.3%	30.8%	0%	26.3%	0%		25%	0%	3.1%	0%	0%		2.8%	**-**
Buses	0	0	0	0		0	0	7	2	0		9	0	0	1	0		1	3	3	0	0		6	**-**
Buses %	0%	0%	0%	0%		0%	0%	2.1%	6.1%	0%		2.3%	0%	0%	5.3%	0%		1.9%	10.3%	1%	0%	0%		1.9%	**-**
Articulated Trucks	0	1	0	0		1	0	4	5	0		9	2	0	2	0		4	0	9	0	0		9	**-**
Articulated Trucks %	0%	3.8%	0%	0%		1.1%	0%	1.2%	15.2%	0%		2.3%	7.7%	0%	10.5%	0%		7.7%	0%	3.1%	0%	0%		2.8%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Spectrum

Turning Movement Count
Location Name: WATSON RD & YORK RD
Date: Tue, Nov 08, 2022 Deployment Lead: Peter Ilias

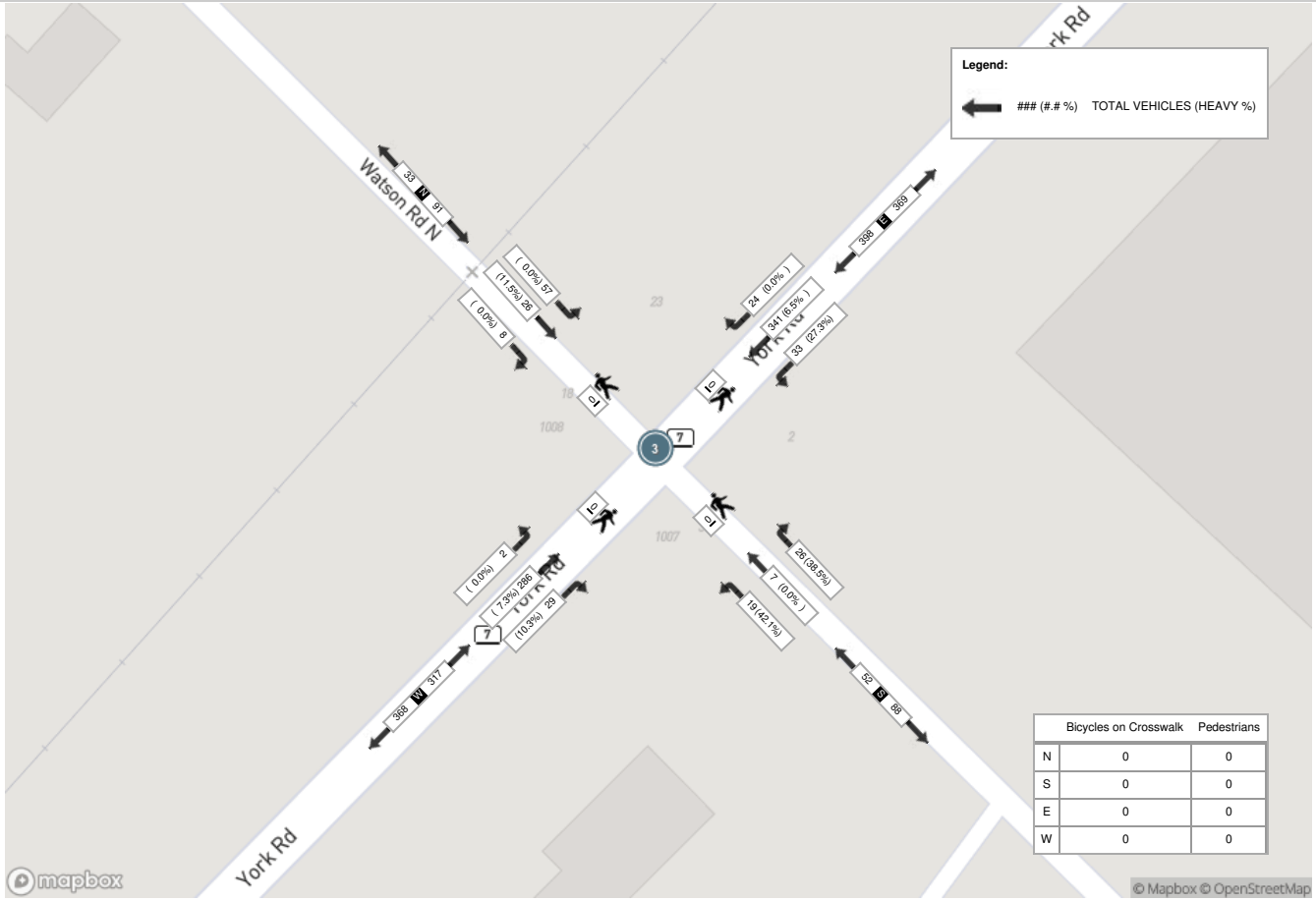
Crozier & Associates
Suite 100 2800 HIGH POINT DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:15 PM - 05:15 PM **Weather: Clear Sky (9.8 °C)**

Start Time	N Approach WATSON RD						E Approach YORK RD						S Approach WATSON RD						W Approach YORK RD						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	
16:15:00	0	1	7	0	0	8	16	83	5	0	0	104	12	8	9	0	0	29	5	93	2	0	0	100	241
16:30:00	1	3	8	0	0	12	21	89	1	0	2	111	10	29	36	0	0	75	4	80	2	0	1	86	284
16:45:00	0	2	9	0	0	11	22	95	4	0	0	121	9	7	8	0	0	24	4	81	2	0	0	87	243
17:00:00	0	1	5	0	0	6	29	98	4	0	0	131	11	19	12	0	0	42	3	74	0	0	0	77	256
Grand Total	1	7	29	0	0	37	88	365	14	0	2	467	42	63	65	0	0	170	16	328	6	0	1	350	**1024**
Approach%	2.7%	18.9%	78.4%	0%		-	18.8%	78.2%	3%	0%		-	24.7%	37.1%	38.2%	0%		-	4.6%	93.7%	1.7%	0%		-	**-**
Totals %	0.1%	0.7%	2.8%	0%		3.6%	8.6%	35.6%	1.4%	0%		45.6%	4.1%	6.2%	6.3%	0%		16.6%	1.6%	32%	0.6%	0%		34.2%	**-**
PHF	0.25	0.58	0.81	0		0.77	0.76	0.93	0.7	0		0.89	0.88	0.54	0.45	0		0.57	0.8	0.88	0.75	0		0.88	**-**
Heavy	0	1	0	0		1	0	12	1	0		13	3	0	0	0		3	3	16	1	0		20	**-**
Heavy %	0%	14.3%	0%	0%		2.7%	0%	3.3%	7.1%	0%		2.8%	7.1%	0%	0%	0%		1.8%	18.8%	4.9%	16.7%	0%		5.7%	**-**
Lights	1	6	29	0		36	88	353	13	0		454	39	63	65	0		167	13	312	5	0		330	**-**
Lights %	100%	85.7%	100%	0%		97.3%	100%	96.7%	92.9%	0%		97.2%	92.9%	100%	100%	0%		98.2%	81.3%	95.1%	83.3%	0%		94.3%	**-**
Single-Unit Trucks	0	0	0	0		0	0	5	0	0		5	0	0	0	0		0	1	7	1	0		9	**-**
Single-Unit Trucks %	0%	0%	0%	0%		0%	0%	1.4%	0%	0%		1.1%	0%	0%	0%	0%		0%	6.3%	2.1%	16.7%	0%		2.6%	**-**
Buses	0	1	0	0		1	0	3	0	0		3	1	0	0	0		1	1	1	0	0		2	**-**
Buses %	0%	14.3%	0%	0%		2.7%	0%	0.8%	0%	0%		0.6%	2.4%	0%	0%	0%		0.6%	6.3%	0.3%	0%	0%		0.6%	**-**
Articulated Trucks	0	0	0	0		0	0	4	1	0		5	2	0	0	0		2	1	8	0	0		9	**-**
Articulated Trucks %	0%	0%	0%	0%		0%	0%	1.1%	7.1%	0%		1.1%	4.8%	0%	0%	0%		1.2%	6.3%	2.4%	0%	0%		2.6%	**-**
Bicycles on Road	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	**-**
Bicycles on Road %	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	0%	0%	0%	0%		0%	**-**
Pedestrians	-	-	-	-	0	-	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	1	-	**-**
Pedestrians%	-	-	-	-	0%		-	-	-	-	66.7%		-	-	-	-	0%		-	-	-	-	33.3%		**-**
Bicycles on Crosswalk	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	**-**
Bicycles on Crosswalk%	-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		-	-	-	-	0%		**-**

Crozier & Associates
Suite 100 2800 HIGH POINT
DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 08:00 AM - 09:00 AM **Weather: Few Clouds (0.68 °C)**



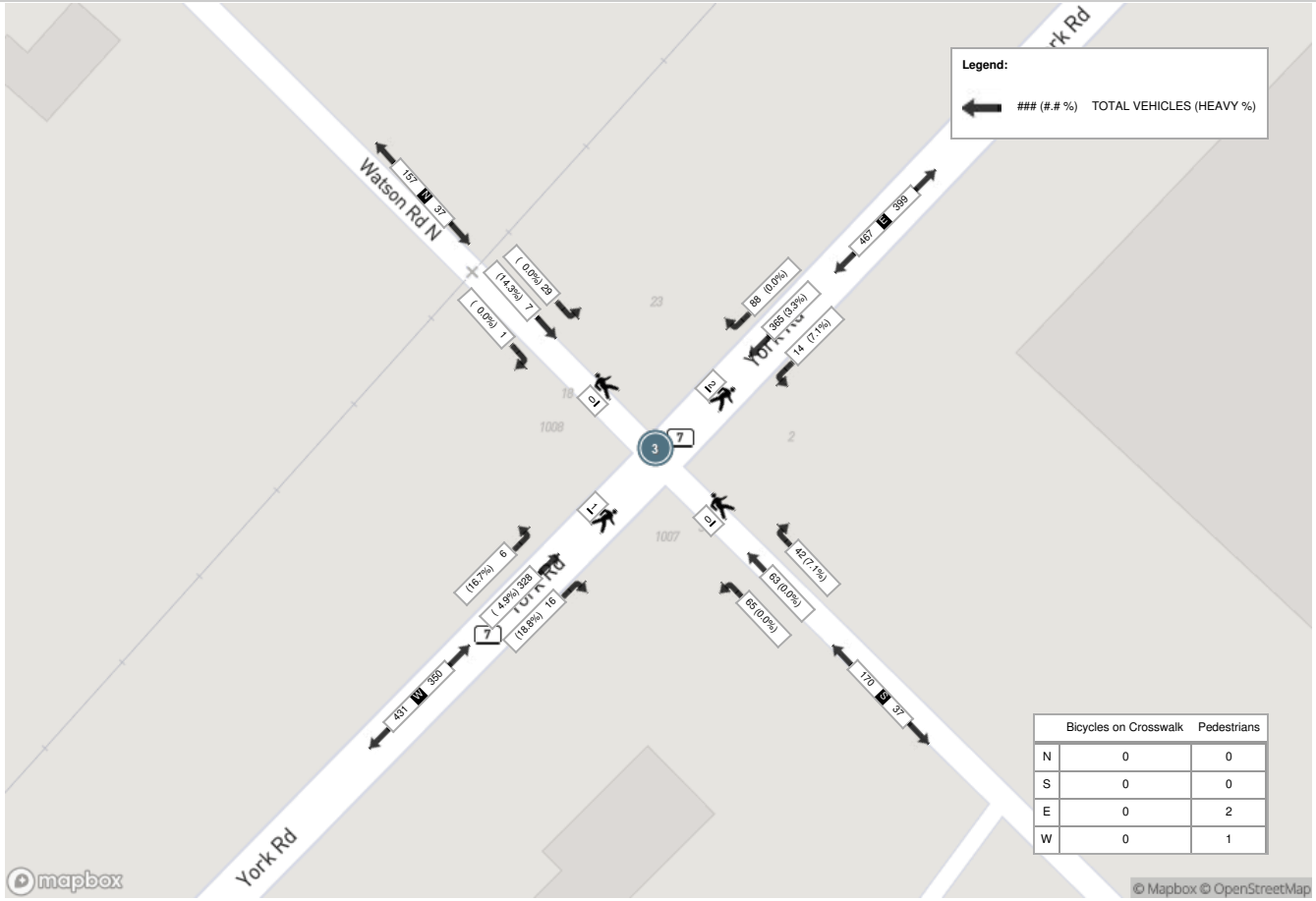
	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	0	0
W	0	0

Spectrum

Turning Movement Count
Location Name: WATSON RD & YORK RD
Date: Tue, Nov 08, 2022 Deployment Lead: Peter Ilias

Crozier & Associates
Suite 100 2800 HIGH POINT
DRIVE
MILTON ONTARIO, L9T 6P4
CANADA

Peak Hour: 04:15 PM - 05:15 PM **Weather: Clear Sky (9.8 °C)**



	Bicycles on Crosswalk	Pedestrians
N	0	0
S	0	0
E	0	2
W	0	1

SIM Traffic Consultants

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:30:00
To: 8:30:00

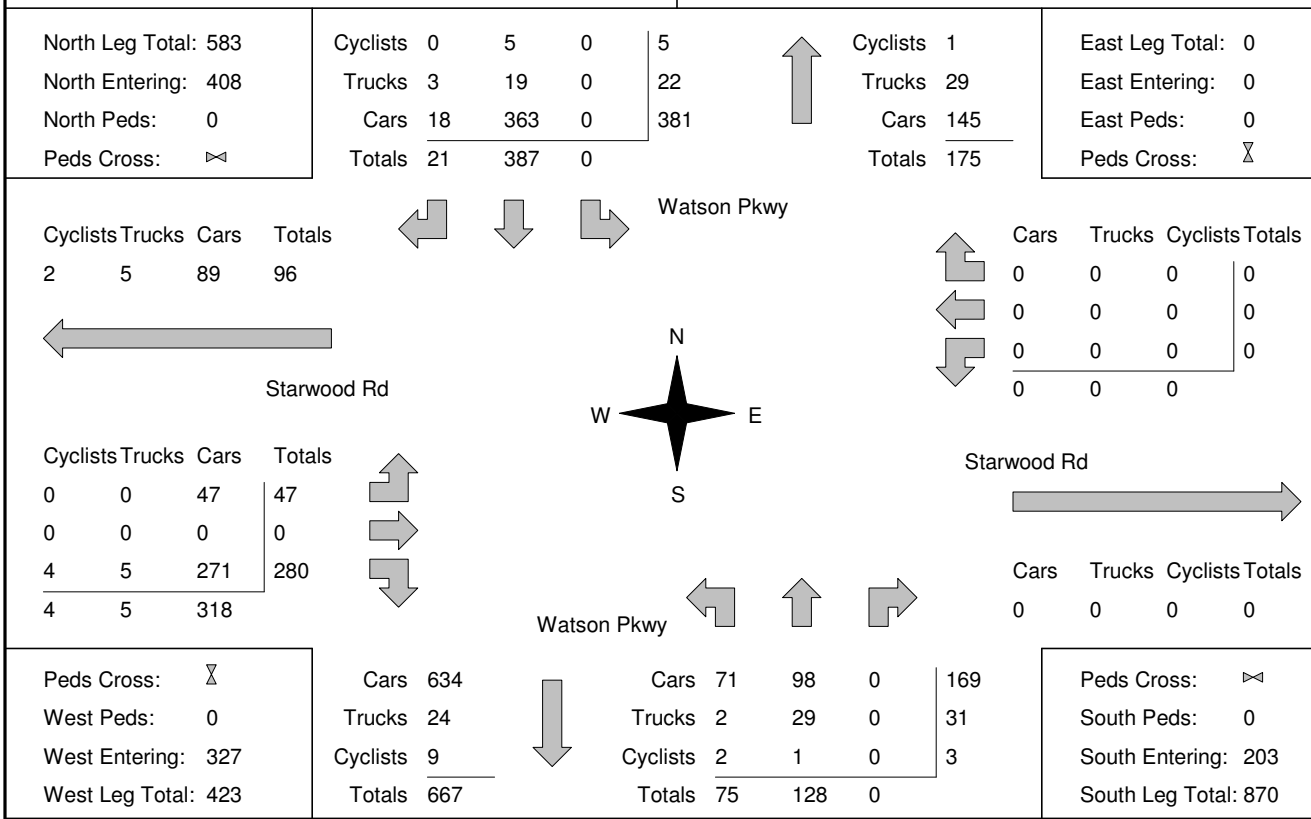
Municipality: GUELPH
Site #: 0000000008
Intersection: Starwood Rd & Watson Pkwy
TFR File #: 1
Count date: 15-Sep-2016

Weather conditions:
Sunny

Person(s) who counted:
Marko

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

Major Road: Starwood Rd runs W/E



Comments

SIM Traffic Consultants

Mid-day Peak Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

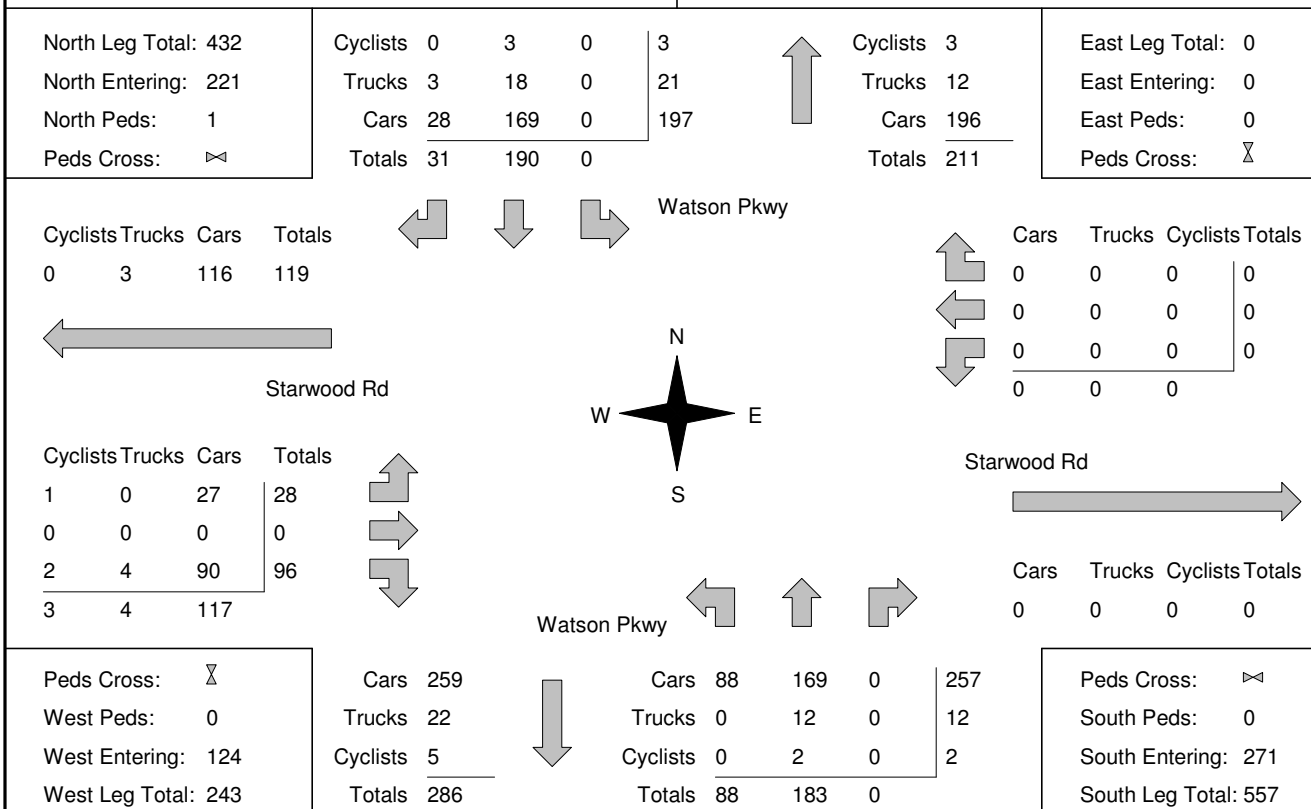
Municipality: GUELPH
Site #: 0000000008
Intersection: Starwood Rd & Watson Pkwy
TFR File #: 1
Count date: 15-Sep-2016

Weather conditions:
Sunny

Person(s) who counted:
Marko

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

Major Road: Starwood Rd runs W/E



Comments

SIM Traffic Consultants

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

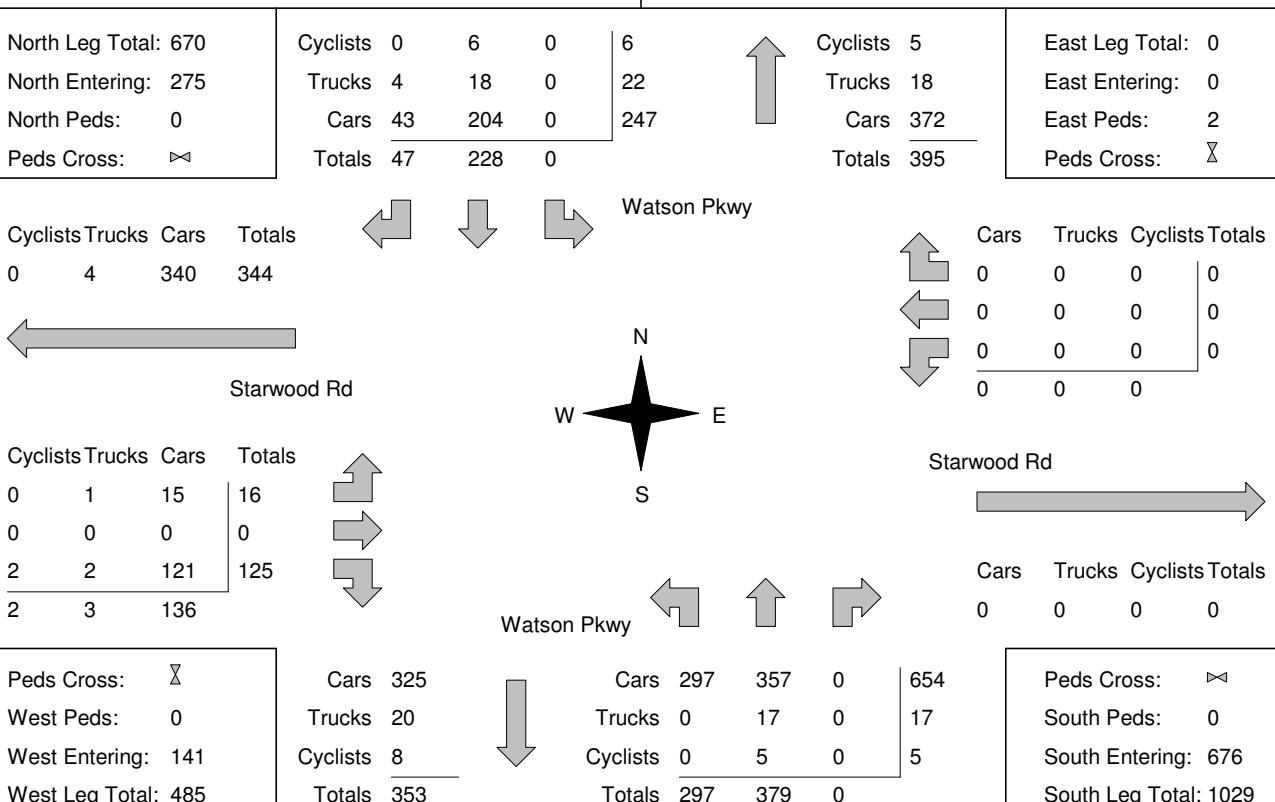
Municipality: GUELPH
Site #: 0000000008
Intersection: Starwood Rd & Watson Pkwy
TFR File #: 1
Count date: 15-Sep-2016

Weather conditions:
Sunny

Person(s) who counted:
Marko

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

Major Road: Starwood Rd runs W/E



Comments

SIM Traffic Consultants

Eight Hour Peak Diagram

Eight Hour Peak
From: 7:45:00
To: 15:45:00

Municipality: GUELPH
Site #: 0000000008
Intersection: Starwood Rd & Watson Pkwy
TFR File #: 1
Count date: 15-Sep-2016

Weather conditions:
Sunny

Person(s) who counted:
Marko

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

Major Road: Starwood Rd runs W/E

North Leg Total: 2290
North Entering: 1292
North Peds: 1
Peds Cross: ⋈

Cyclists	1	14	0	15
Trucks	16	78	0	94
Cars	126	1057	0	1183
Totals	143	1149	0	

Cyclists	9
Trucks	78
Cars	911
Totals	998

East Leg Total: 0
East Entering: 0
East Peds: 0
Peds Cross: ⧖

Watson Pkwy

Cyclists	Trucks	Cars	Totals
6	25	632	663

Cars	Trucks	Cyclists	Totals
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	

Starwood Rd

N
W E
S

Cyclists	Trucks	Cars	Totals
3	1	122	126
0	0	0	0
6	17	690	713
9	18	812	

Starwood Rd

Cars	Trucks	Cyclists	Totals
0	0	0	0

Watson Pkwy

Peds Cross: ⧖
West Peds: 1
West Entering: 839
West Leg Total: 1502

Cars	1747			
Trucks	95			
Cyclists	20			
Totals	1862			

Cars	506	789	0	1295
Trucks	9	77	0	86
Cyclists	5	6	0	11
Totals	520	872	0	

Peds Cross: ⋈
South Peds: 3
South Entering: 1392
South Leg Total: 3254

Comments

SIM Traffic Consultants

Total Count Diagram

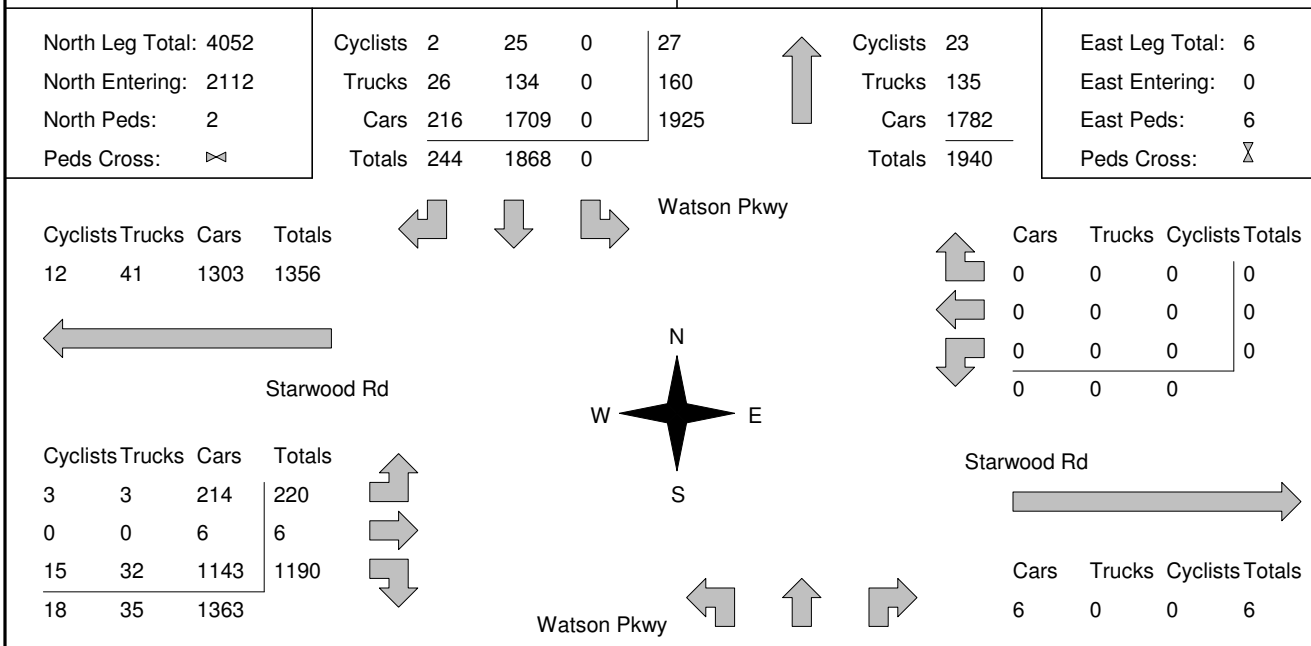
Municipality: GUELPH
Site #: 0000000008
Intersection: Starwood Rd & Watson Pkwy
TFR File #: 1
Count date: 15-Sep-2016

Weather conditions:
Sunny

Person(s) who counted:
Marko

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

Major Road: Starwood Rd runs W/E



Comments

SIM Traffic Consultants
Traffic Count Summary

Intersection: Starwood Rd & Watson Pkwy | **Count Date:** 15-Sep-2016 | **Municipality:** GUELPH

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	5	0	5	0	7
8:00:00	0	308	16	324	0	504
9:00:00	0	376	29	405	0	609
11:00:00	0	6	0	6	0	9
12:00:00	0	163	31	194	0	400
13:00:00	0	190	31	221	1	492
14:00:00	0	167	14	181	0	424
15:00:00	0	5	0	5	0	14
16:00:00	0	221	38	259	0	755
17:00:00	0	205	48	253	1	839
18:00:00	0	221	37	258	0	889
Totals:	0	1867	244	2111	2	4942

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	2	0	2	0
8:00:00	68	112	0	180	1
9:00:00	80	124	0	204	0
11:00:00	3	0	0	3	0
12:00:00	68	138	0	206	1
13:00:00	88	183	0	271	0
14:00:00	98	145	0	243	0
15:00:00	4	5	0	9	0
16:00:00	199	297	0	496	2
17:00:00	238	348	0	586	0
18:00:00	266	365	0	631	0
Totals:	1112	1719	0	2831	4

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	3
8:00:00	0	0	0	0	0	328
9:00:00	0	0	0	0	0	266
11:00:00	0	0	0	0	0	4
12:00:00	0	0	0	0	0	122
13:00:00	0	0	0	0	0	124
14:00:00	0	0	0	0	0	127
15:00:00	0	0	0	0	0	0
16:00:00	0	0	0	0	0	135
17:00:00	0	0	0	0	3	179
18:00:00	0	0	0	0	3	128
Totals:	0	0	0	0	6	1416

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Cyclists: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	3	3	0
8:00:00	61	0	267	328	0
9:00:00	33	0	233	266	0
11:00:00	0	0	4	4	0
12:00:00	20	0	102	122	0
13:00:00	28	0	96	124	0
14:00:00	19	0	108	127	0
15:00:00	0	0	0	0	0
16:00:00	18	0	117	135	2
17:00:00	17	6	156	179	2
18:00:00	24	0	104	128	0
Totals:	220	6	1190	1416	4

Calculated Values for Traffic Crossing Major Street

Hours Ending:	8:00	9:00	12:00	13:00	14:00	16:00	17:00	18:00
Crossing Values:	376	456	231	278	265	498	591	634

Horizon Data Services Ltd

318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Watson Parkway N From North					York Rd From East					Watson Parkway S From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	35	48	23	0	106	6	23	4	0	33	5	16	8	0	29	15	60	11	0	86	254
07:15 AM	29	69	15	0	113	5	39	5	0	49	1	20	5	0	26	24	74	11	0	109	297
07:30 AM	35	78	12	0	125	3	65	2	0	70	4	17	9	0	30	30	64	14	0	108	333
07:45 AM	46	98	18	0	162	3	75	6	0	84	8	23	11	0	42	29	81	26	0	136	424
Total	145	293	68	0	506	17	202	17	0	236	18	76	33	0	127	98	279	62	0	439	1308
08:00 AM	49	94	17	0	160	10	78	9	0	97	3	21	18	0	42	32	68	13	0	113	412
08:15 AM	49	83	15	0	147	7	95	9	0	111	2	23	22	0	47	22	55	17	0	94	399
08:30 AM	54	90	9	0	153	5	87	4	0	96	5	13	17	0	35	21	50	18	0	89	373
08:45 AM	41	68	12	0	121	4	59	3	0	66	2	24	20	0	46	21	67	17	0	105	338
Total	193	335	53	0	581	26	319	25	0	370	12	81	77	0	170	96	240	65	0	401	1522
11:00 AM	22	21	7	0	50	2	56	6	0	64	1	22	17	0	40	21	45	15	0	81	235
11:15 AM	22	23	2	0	47	4	76	7	0	87	6	28	18	0	52	20	55	9	0	84	270
11:30 AM	28	22	8	0	58	3	60	7	0	70	4	31	18	0	53	21	44	28	0	93	274
11:45 AM	16	29	8	0	53	9	67	5	0	81	1	28	24	0	53	24	64	21	0	109	296
Total	88	95	25	0	208	18	259	25	0	302	12	109	77	0	198	86	208	73	0	367	1075
12:00 PM	22	36	12	0	70	12	68	5	0	85	2	24	25	0	51	19	62	21	0	102	308
12:15 PM	27	35	5	0	67	4	72	5	0	81	7	41	24	0	72	23	40	11	0	74	294
12:30 PM	25	29	6	0	60	4	63	8	0	75	4	30	21	0	55	16	62	24	0	102	292
12:45 PM	27	35	9	0	71	5	51	4	0	60	3	28	27	0	58	35	62	17	0	114	303
Total	101	135	32	0	268	25	254	22	0	301	16	123	97	0	236	93	226	73	0	392	1197
01:00 PM	15	28	10	0	53	7	63	7	0	77	6	21	36	0	63	27	59	17	0	103	296
01:15 PM	23	31	6	0	60	6	55	3	0	64	8	25	18	0	51	23	60	15	0	98	273
01:30 PM	20	33	10	0	63	9	63	6	0	78	1	34	20	0	55	23	56	16	0	95	291
01:45 PM	25	45	7	0	77	10	49	6	0	65	11	50	26	0	87	35	65	24	0	124	353
Total	83	137	33	0	253	32	230	22	0	284	26	130	100	0	256	108	240	72	0	420	1213
03:00 PM	30	32	5	0	67	9	59	6	0	74	6	41	40	0	87	21	69	30	1	121	349
03:15 PM	25	33	5	0	63	12	53	3	0	68	2	60	25	0	87	16	56	22	0	94	312

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318 Simonston Blvd
Thornhill, ON L3T 4T5

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File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Watson Parkway N From North					York Rd From East					Watson Parkway S From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:30 PM	35	53	4	0	92	11	72	4	0	87	4	67	33	0	104	23	67	26	0	116	399
03:45 PM	37	56	7	1	101	11	75	5	1	92	2	80	38	0	120	17	94	28	1	140	453
Total	127	174	21	1	323	43	259	18	1	321	14	248	136	0	398	77	286	106	2	471	1513
04:00 PM	33	46	4	0	83	17	87	9	0	113	5	92	64	0	161	20	62	29	0	111	468
04:15 PM	25	37	3	0	65	14	89	6	0	109	4	105	88	0	197	20	95	44	0	159	530
04:30 PM	19	38	15	0	72	14	123	8	0	145	6	99	57	0	162	37	90	41	0	168	547
04:45 PM	24	51	7	1	83	26	65	7	0	98	2	99	40	0	141	21	88	45	0	154	476
Total	101	172	29	1	303	71	364	30	0	465	17	395	249	0	661	98	335	159	0	592	2021
05:00 PM	30	36	6	0	72	14	97	10	0	121	2	75	46	0	123	26	81	52	1	160	476
05:15 PM	39	40	2	0	81	15	90	8	0	113	3	122	37	0	162	22	91	44	0	157	513
05:30 PM	28	46	6	0	80	26	72	5	0	103	1	83	27	0	111	28	83	36	1	148	442
05:45 PM	23	37	12	0	72	13	83	3	0	99	1	86	17	0	104	31	58	38	0	127	402
Total	120	159	26	0	305	68	342	26	0	436	7	366	127	0	500	107	313	170	2	592	1833
Grand Total	958	1500	287	2	2747	300	2229	185	1	2715	122	1528	896	0	2546	763	2127	780	4	3674	11682
Apprch %	34.9	54.6	10.4	0.1		11	82.1	6.8	0		4.8	60	35.2	0		20.8	57.9	21.2	0.1		
Total %	8.2	12.8	2.5	0	23.5	2.6	19.1	1.6	0	23.2	1	13.1	7.7	0	21.8	6.5	18.2	6.7	0	31.5	
Cars	918	1455	279	2	2654	290	2056	162	1	2509	98	1475	824	0	2397	703	1953	744	4	3404	10964
% Cars	95.8	97	97.2	100	96.6	96.7	92.2	87.6	100	92.4	80.3	96.5	92	0	94.1	92.1	91.8	95.4	100	92.7	93.9
Trucks	12	17	5	0	34	5	54	5	0	64	2	11	18	0	31	23	43	10	0	76	205
% Trucks	1.3	1.1	1.7	0	1.2	1.7	2.4	2.7	0	2.4	1.6	0.7	2	0	1.2	3	2	1.3	0	2.1	1.8
Heavys	27	26	3	0	56	5	117	18	0	140	22	41	52	0	115	35	129	26	0	190	501
% Heavys	2.8	1.7	1	0	2	1.7	5.2	9.7	0	5.2	18	2.7	5.8	0	4.5	4.6	6.1	3.3	0	5.2	4.3
Cyclists	1	2	0	0	3	0	2	0	0	2	0	1	2	0	3	2	2	0	0	4	12
% Cyclists	0.1	0.1	0	0	0.1	0	0.1	0	0	0.1	0	0.1	0.2	0	0.1	0.3	0.1	0	0	0.1	0.1

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318 Simonston Blvd
Thornhill, ON L3T 4T5

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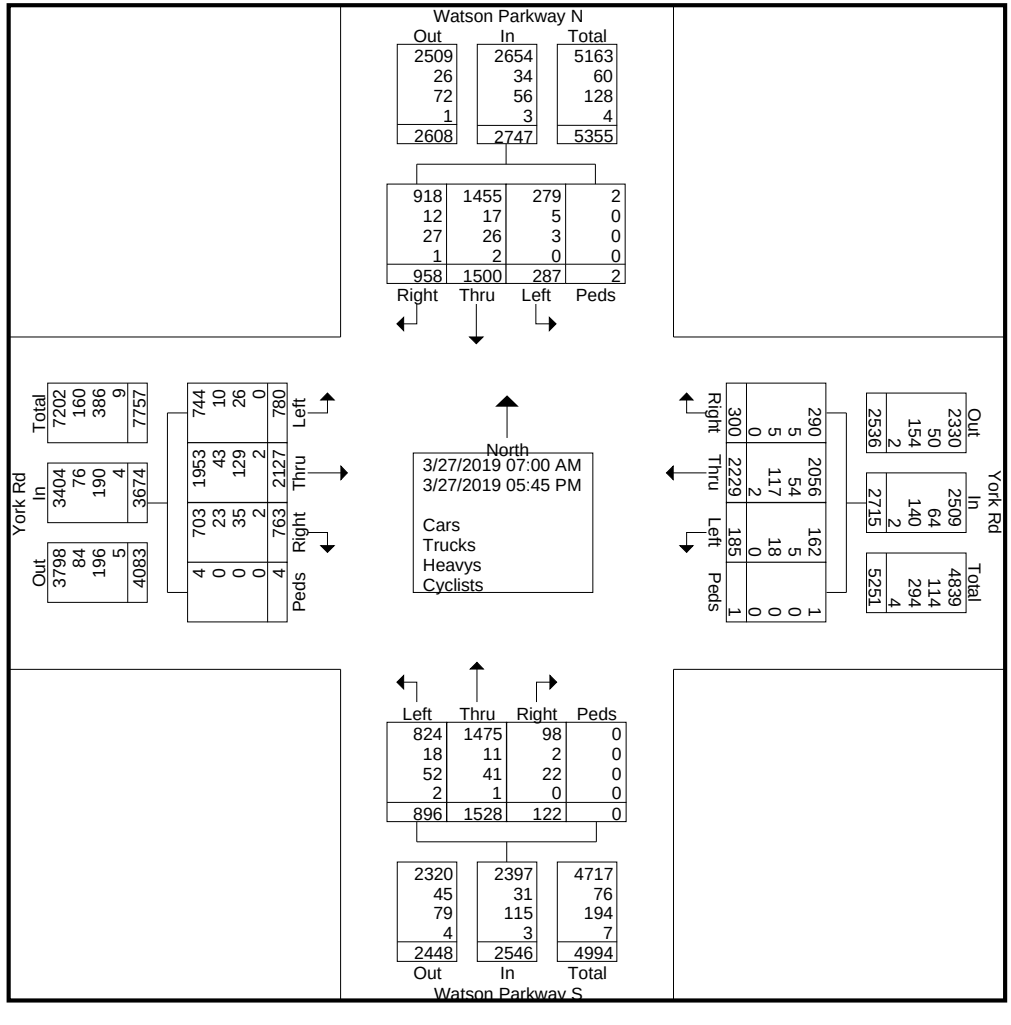
File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019



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File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019
Page No : 4

	Watson Parkway N From North					York Rd From East					Watson Parkway S From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	46	**98**	**18**	0	**162**	3	75	6	0	84	**8**	**23**	11	0	42	29	**81**	**26**	0	**136**	**424**
08:00 AM	49	94	17	0	160	**10**	78	**9**	0	97	3	21	18	0	42	**32**	68	13	0	113	412
08:15 AM	49	83	15	0	147	7	**95**	9	0	**111**	2	23	**22**	0	**47**	22	55	17	0	94	399
08:30 AM	**54**	90	9	0	153	5	87	4	0	96	5	13	17	0	35	21	50	18	0	89	373
Total Volume	198	365	59	0	622	25	335	28	0	388	18	80	68	0	166	104	254	74	0	432	1608
% App. Total	31.8	58.7	9.5	0		6.4	86.3	7.2	0		10.8	48.2	41	0		24.1	58.8	17.1	0		
PHF	.917	.931	.819	.000	.960	.625	.882	.778	.000	.874	.563	.870	.773	.000	.883	.813	.784	.712	.000	.794	.948
Cars	190	358	56	0	604	24	309	25	0	358	13	71	60	0	144	98	237	65	0	400	1506
% Cars	96.0	98.1	94.9	0	97.1	96.0	92.2	89.3	0	92.3	72.2	88.8	88.2	0	86.7	94.2	93.3	87.8	0	92.6	93.7
Trucks	4	2	0	0	6	0	10	2	0	12	0	2	0	0	2	2	7	3	0	12	32
% Trucks	2.0	0.5	0	0	1.0	0	3.0	7.1	0	3.1	0	2.5	0	0	1.2	1.9	2.8	4.1	0	2.8	2.0
Heavys	4	5	3	0	12	1	16	1	0	18	5	7	8	0	20	4	10	6	0	20	70
% Heavys	2.0	1.4	5.1	0	1.9	4.0	4.8	3.6	0	4.6	27.8	8.8	11.8	0	12.0	3.8	3.9	8.1	0	4.6	4.4
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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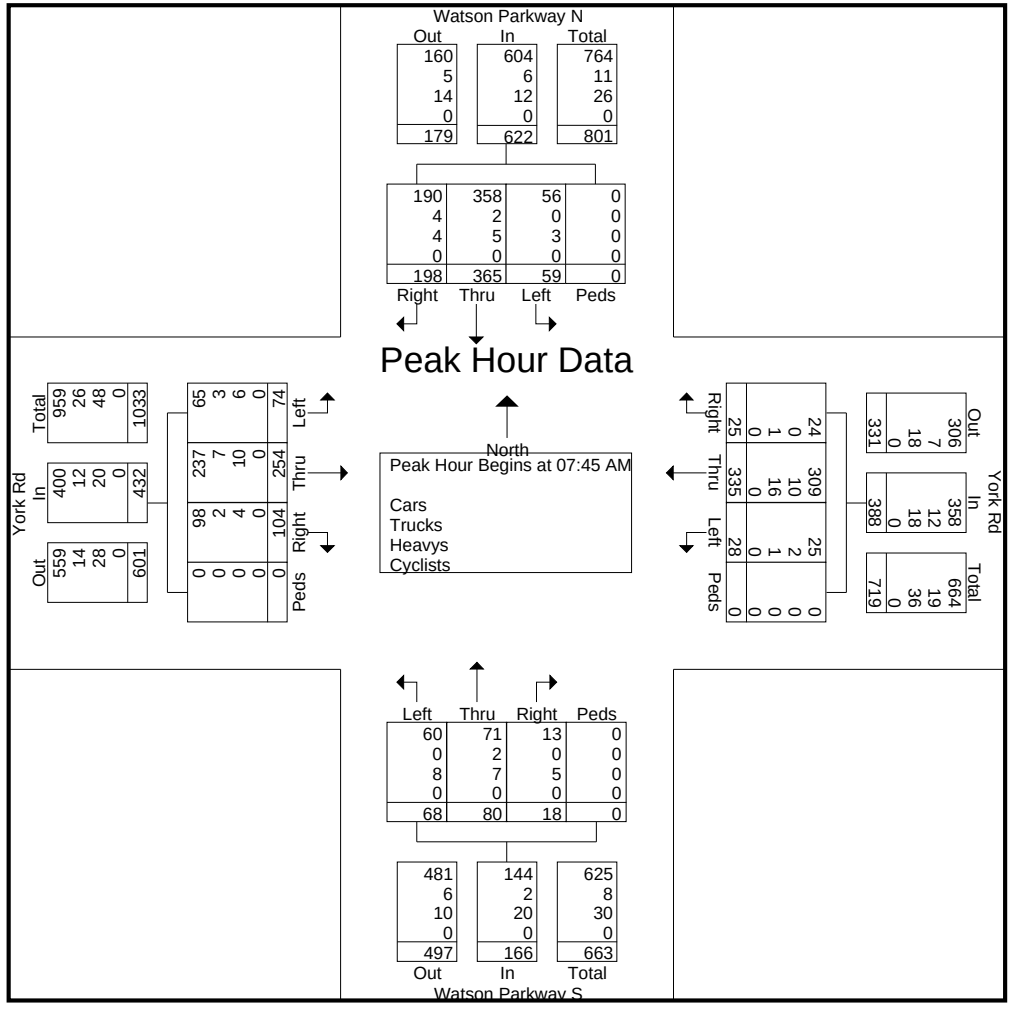
File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019
Page No : 5



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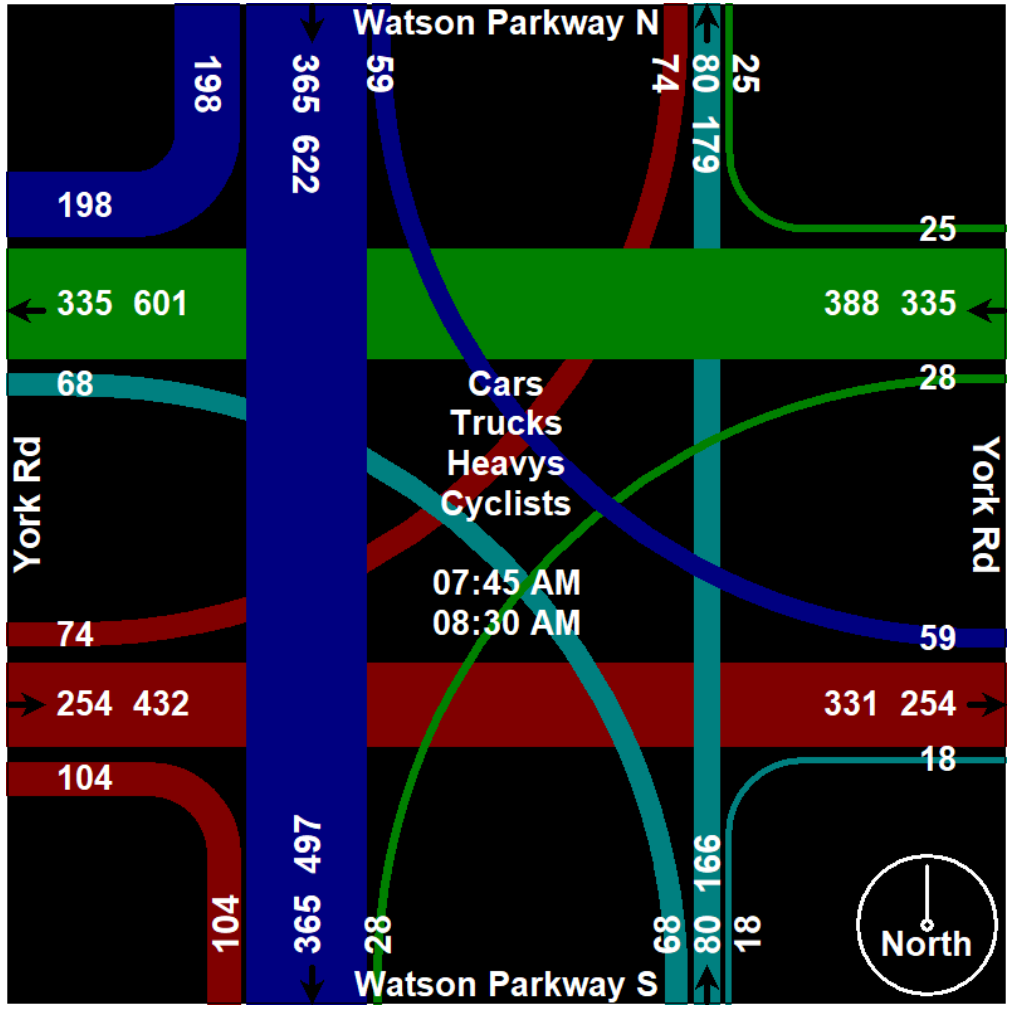
File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019
Page No : 6



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Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019

	Watson Parkway N From North					York Rd From East					Watson Parkway S From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 01:00 PM																					
01:00 PM	15	28	**10**	0	53	7	**63**	**7**	0	77	6	21	**36**	0	63	27	59	17	0	103	296
01:15 PM	23	31	6	0	60	6	55	3	0	64	8	25	18	0	51	23	60	15	0	98	273
01:30 PM	20	33	10	0	63	9	63	6	0	**78**	1	34	20	0	55	23	56	16	0	95	291
01:45 PM	**25**	**45**	7	0	**77**	**10**	49	6	0	65	**11**	**50**	26	0	**87**	**35**	**65**	**24**	0	**124**	**353**
Total Volume	83	137	33	0	253	32	230	22	0	284	26	130	100	0	256	108	240	72	0	420	1213
% App. Total	32.8	54.2	13	0		11.3	81	7.7	0		10.2	50.8	39.1	0		25.7	57.1	17.1	0		
PHF	.830	.761	.825	.000	.821	.800	.913	.786	.000	.910	.591	.650	.694	.000	.736	.771	.923	.750	.000	.847	.859
Cars	78	134	31	0	243	29	209	21	0	259	23	126	89	0	238	97	217	69	0	383	1123
% Cars	94.0	97.8	93.9	0	96.0	90.6	90.9	95.5	0	91.2	88.5	96.9	89.0	0	93.0	89.8	90.4	95.8	0	91.2	92.6
Trucks	1	3	2	0	6	1	7	0	0	8	0	0	1	0	1	4	10	1	0	15	30
% Trucks	1.2	2.2	6.1	0	2.4	3.1	3.0	0	0	2.8	0	0	1.0	0	0.4	3.7	4.2	1.4	0	3.6	2.5
Heavys	3	0	0	0	3	2	14	1	0	17	3	4	10	0	17	7	13	2	0	22	59
% Heavys	3.6	0	0	0	1.2	6.3	6.1	4.5	0	6.0	11.5	3.1	10.0	0	6.6	6.5	5.4	2.8	0	5.2	4.9
Cyclists	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
% Cyclists	1.2	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1

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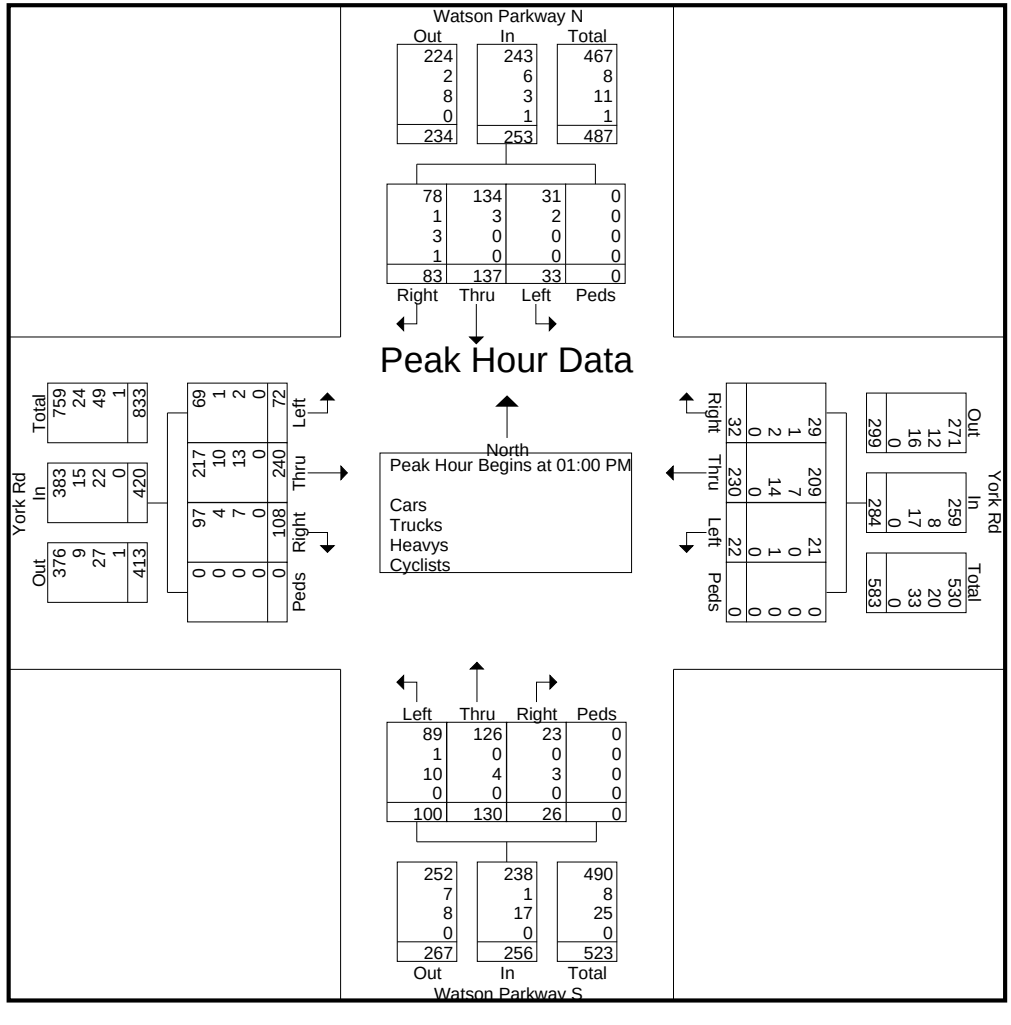
File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019
Page No : 8



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318 Simonston Blvd
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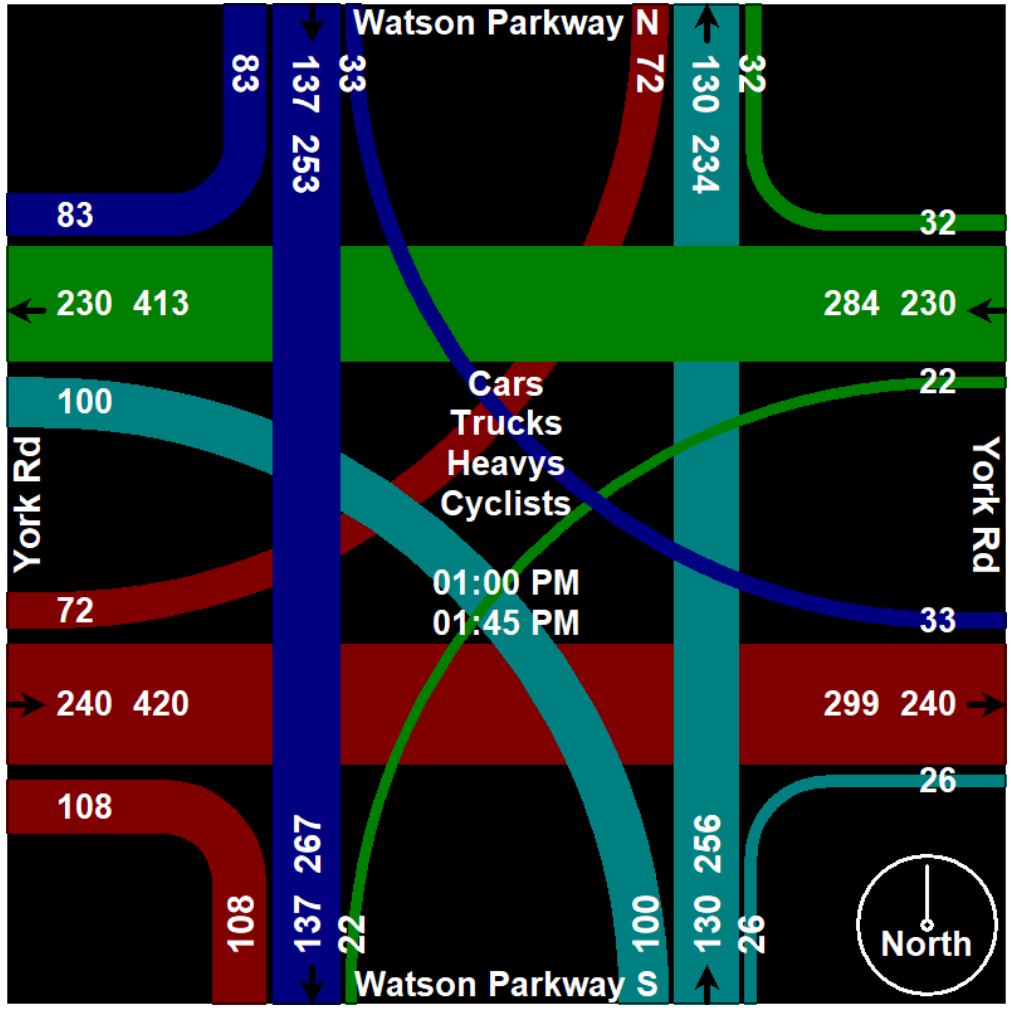
File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019
Page No : 9



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318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019

	Watson Parkway N From North					York Rd From East					Watson Parkway S From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	25	37	3	0	65	14	89	6	0	109	4	**105**	**88**	0	**197**	20	**95**	44	0	159	530
04:30 PM	19	38	**15**	0	72	14	**123**	8	0	**145**	**6**	99	57	0	162	**37**	90	41	0	**168**	**547**
04:45 PM	24	**51**	7	**1**	**83**	**26**	65	7	0	98	2	99	40	0	141	21	88	45	0	154	476
05:00 PM	**30**	36	6	0	72	14	97	**10**	0	121	2	75	46	0	123	26	81	**52**	**1**	160	476
Total Volume	98	162	31	1	292	68	374	31	0	473	14	378	231	0	623	104	354	182	1	641	2029
% App. Total	33.6	55.5	10.6	0.3		14.4	79.1	6.6	0		2.2	60.7	37.1	0		16.2	55.2	28.4	0.2		
PHF	.817	.794	.517	.250	.880	.654	.760	.775	.000	.816	.583	.900	.656	.000	.791	.703	.932	.875	.250	.954	.927
Cars	95	156	31	1	283	68	355	27	0	450	10	371	220	0	601	97	338	180	1	616	1950
% Cars	96.9	96.3	100	100	96.9	100	94.9	87.1	0	95.1	71.4	98.1	95.2	0	96.5	93.3	95.5	98.9	100	96.1	96.1
Trucks	0	2	0	0	2	0	6	0	0	6	0	3	3	0	6	3	4	0	0	7	21
% Trucks	0	1.2	0	0	0.7	0	1.6	0	0	1.3	0	0.8	1.3	0	1.0	2.9	1.1	0	0	1.1	1.0
Heavys	3	4	0	0	7	0	13	4	0	17	4	4	7	0	15	4	12	2	0	18	57
% Heavys	3.1	2.5	0	0	2.4	0	3.5	12.9	0	3.6	28.6	1.1	3.0	0	2.4	3.8	3.4	1.1	0	2.8	2.8
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0.2	0	0	0	0	0	0.0

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318 Simonston Blvd
Thornhill, ON L3T 4T5

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File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019
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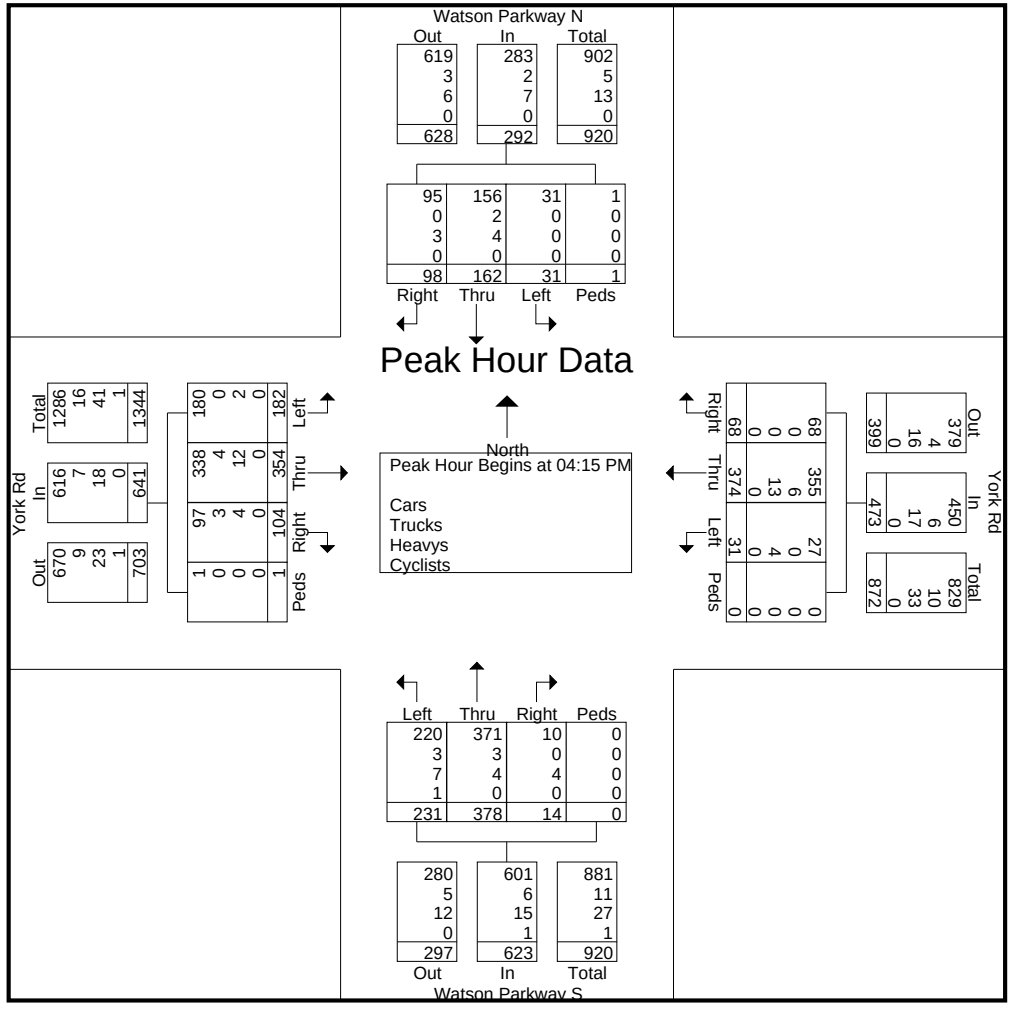
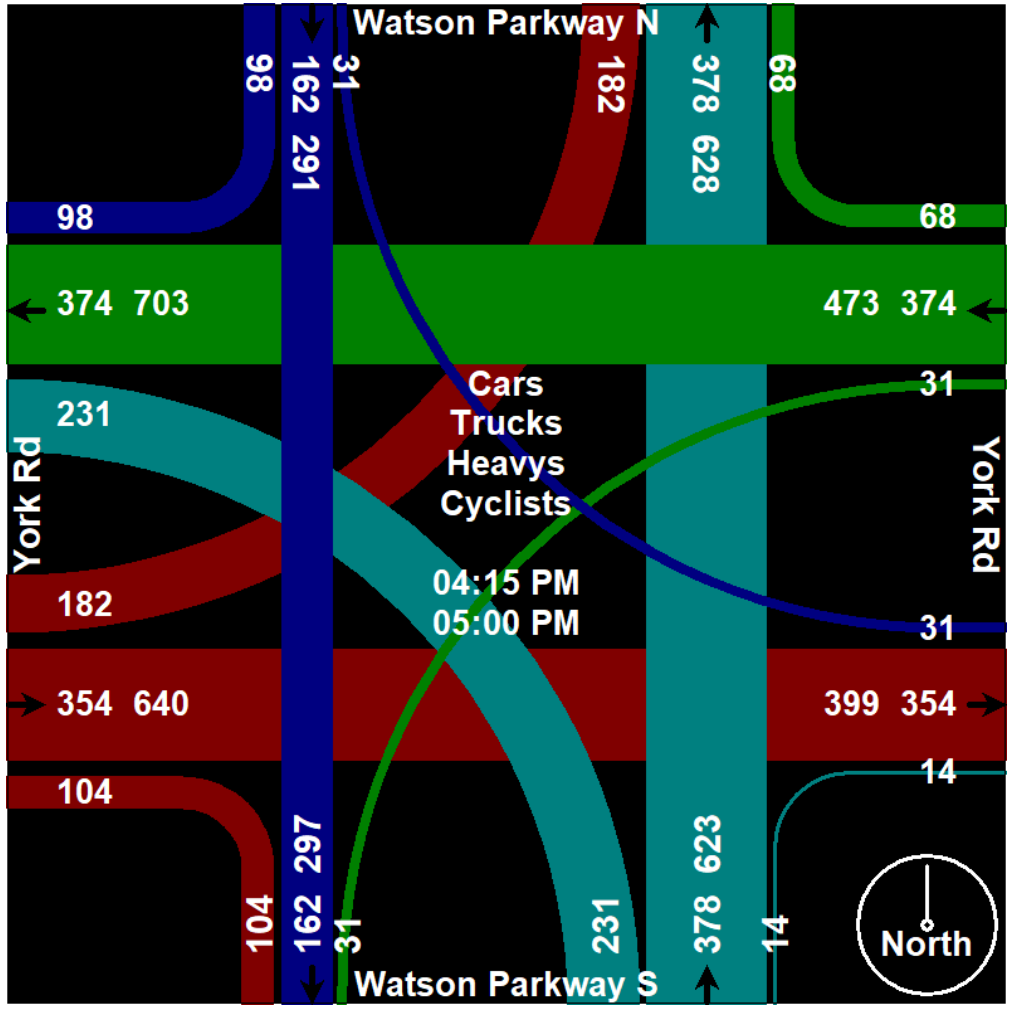


Horizon Data Services Ltd

318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Parkway at York Rd
Site Code : 00000000
Start Date : 3/27/2019
Page No : 12



Horizon Data Services Ltd

318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019
Page No : 1

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Watson Rd From North					York Rd From East					Watson Rd From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	1	3	63	0	67	4	36	6	0	46	5	2	3	0	10	17	71	0	0	88	211
07:15 AM	1	9	57	0	67	2	40	4	0	46	4	3	5	0	12	9	78	0	0	87	212
07:30 AM	1	6	53	0	60	9	81	4	0	94	8	3	2	0	13	8	68	1	0	77	244
07:45 AM	2	18	41	0	61	9	75	12	0	96	6	4	4	0	14	19	81	0	0	100	271
Total	5	36	214	0	255	24	232	26	0	282	23	12	14	0	49	53	298	1	0	352	938
08:00 AM	2	5	43	0	50	6	88	8	0	102	2	1	2	0	5	7	75	1	0	83	240
08:15 AM	3	5	26	0	34	11	85	8	0	104	2	0	7	0	9	9	61	0	0	70	217
08:30 AM	1	15	22	0	38	10	104	12	0	126	1	0	8	0	9	13	68	0	0	81	254
08:45 AM	1	6	18	0	25	10	95	4	0	109	9	0	10	0	19	12	76	0	0	88	241
Total	7	31	109	0	147	37	372	32	0	441	14	1	27	0	42	41	280	1	0	322	952
11:00 AM	0	5	13	0	18	8	50	5	0	63	6	2	3	0	11	5	42	1	0	48	140
11:15 AM	1	5	7	0	13	6	55	4	0	65	5	2	6	0	13	9	49	2	0	60	151
11:30 AM	1	2	7	0	10	4	47	2	0	53	3	3	7	0	13	7	53	0	0	60	136
11:45 AM	0	2	6	0	8	6	55	5	0	66	5	4	10	0	19	7	60	0	0	67	160
Total	2	14	33	0	49	24	207	16	0	247	19	11	26	0	56	28	204	3	0	235	587
12:00 PM	1	3	8	0	12	10	72	3	0	85	5	13	19	0	37	11	53	2	0	66	200
12:15 PM	0	7	8	0	15	5	59	4	1	69	9	2	7	0	18	12	38	0	0	50	152
12:30 PM	1	2	9	0	12	4	65	5	0	74	3	2	10	0	15	12	55	0	0	67	168
12:45 PM	0	8	14	0	22	11	49	10	0	70	11	3	8	0	22	9	66	0	0	75	189
Total	2	20	39	0	61	30	245	22	1	298	28	20	44	0	92	44	212	2	0	258	709
01:00 PM	1	4	10	0	15	7	54	7	0	68	6	6	5	0	17	8	61	0	0	69	169
01:15 PM	0	1	7	0	8	9	54	0	0	63	4	5	5	0	14	4	42	0	0	46	131
01:30 PM	0	4	5	0	9	7	59	9	0	75	13	3	4	0	20	8	59	0	0	67	171
01:45 PM	0	3	6	0	9	8	58	6	0	72	5	4	9	0	18	6	60	0	0	66	165
Total	1	12	28	0	41	31	225	22	0	278	28	18	23	0	69	26	222	0	0	248	636
03:00 PM	1	2	2	0	5	13	64	2	0	79	12	9	16	0	37	11	59	0	0	70	191
03:15 PM	0	3	6	0	9	9	80	5	0	94	5	8	13	0	26	11	70	0	0	81	210

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318 Simonston Blvd
Thornhill, ON L3T 4T5
"we always count...never estimated"

File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019
Page No : 2

Groups Printed- Cars - Trucks - Heavys - Cyclists

	Watson Rd From North					York Rd From East					Watson Rd From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
03:30 PM	1	2	9	0	12	14	67	4	0	85	6	12	15	0	33	8	70	0	0	78	208
03:45 PM	0	2	9	0	11	22	70	3	0	95	11	7	10	0	28	9	95	0	0	104	238
Total	2	9	26	0	37	58	281	14	0	353	34	36	54	0	124	39	294	0	0	333	847
04:00 PM	1	4	3	0	8	14	83	5	0	102	15	20	29	0	64	4	83	0	0	87	261
04:15 PM	0	3	10	0	13	30	91	5	0	126	17	11	18	0	46	3	81	1	0	85	270
04:30 PM	1	0	11	0	12	26	98	8	0	132	15	27	32	0	74	8	96	2	0	106	324
04:45 PM	0	2	9	0	11	30	91	2	0	123	17	12	11	0	40	2	104	1	0	107	281
Total	2	9	33	0	44	100	363	20	0	483	64	70	90	0	224	17	364	4	0	385	1136
05:00 PM	0	1	7	0	8	31	91	2	0	124	9	21	10	1	41	3	85	1	0	89	262
05:15 PM	0	3	7	0	10	27	86	5	0	118	11	3	5	0	19	3	80	1	0	84	231
05:30 PM	0	0	11	0	11	38	84	5	0	127	7	4	5	0	16	4	87	1	0	92	246
05:45 PM	0	2	6	0	8	17	94	9	0	120	4	1	1	0	6	3	67	1	0	71	205
Total	0	6	31	0	37	113	355	21	0	489	31	29	21	1	82	13	319	4	0	336	944
Grand Total	21	137	513	0	671	417	2280	173	1	2871	241	197	299	1	738	261	2193	15	0	2469	6749
Apprch %	3.1	20.4	76.5	0		14.5	79.4	6	0		32.7	26.7	40.5	0.1		10.6	88.8	0.6	0		
Total %	0.3	2	7.6	0	9.9	6.2	33.8	2.6	0	42.5	3.6	2.9	4.4	0	10.9	3.9	32.5	0.2	0	36.6	
Cars	20	129	506	0	655	409	2110	143	1	2663	201	184	264	1	650	212	2056	15	0	2283	6251
% Cars	95.2	94.2	98.6	0	97.6	98.1	92.5	82.7	100	92.8	83.4	93.4	88.3	100	88.1	81.2	93.8	100	0	92.5	92.6
Trucks	0	5	3	0	8	3	53	6	0	62	12	6	10	0	28	6	26	0	0	32	130
% Trucks	0	3.6	0.6	0	1.2	0.7	2.3	3.5	0	2.2	5	3	3.3	0	3.8	2.3	1.2	0	0	1.3	1.9
Heavys	1	3	4	0	8	5	117	24	0	146	28	6	25	0	59	43	111	0	0	154	367
% Heavys	4.8	2.2	0.8	0	1.2	1.2	5.1	13.9	0	5.1	11.6	3	8.4	0	8	16.5	5.1	0	0	6.2	5.4
Cyclists	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0.1	0	0	0	0	0	0

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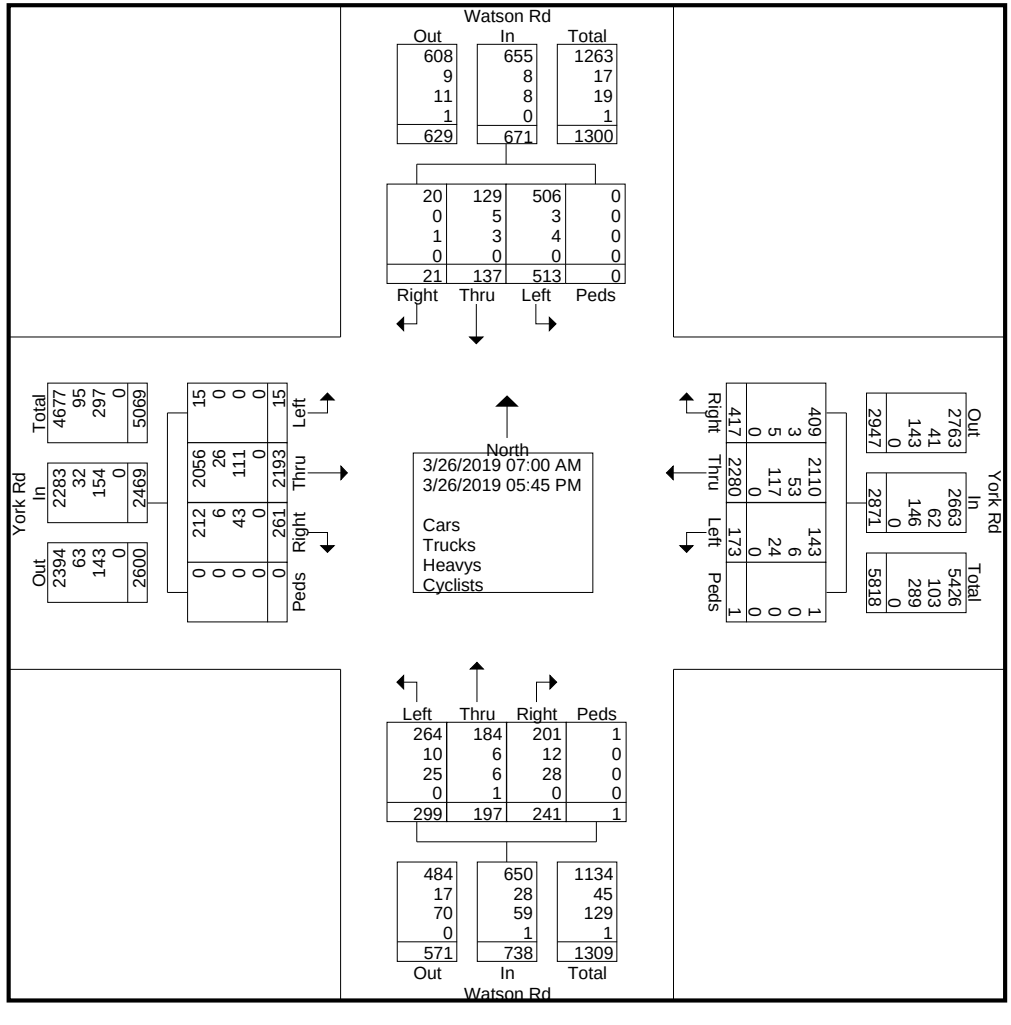
File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019



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318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019

	Watson Rd From North					York Rd From East					Watson Rd From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:45 AM																					
07:45 AM	2	**18**	41	0	**61**	9	75	**12**	0	96	**6**	**4**	4	0	**14**	**19**	**81**	0	0	**100**	**271**
08:00 AM	2	5	**43**	0	50	6	88	8	0	102	2	1	2	0	5	7	75	**1**	0	83	240
08:15 AM	**3**	5	26	0	34	**11**	85	8	0	104	2	0	7	0	9	9	61	0	0	70	217
08:30 AM	1	15	22	0	38	10	**104**	12	0	**126**	1	0	**8**	0	9	13	68	0	0	81	254
Total Volume	8	43	132	0	183	36	352	40	0	428	11	5	21	0	37	48	285	1	0	334	982
% App. Total	4.4	23.5	72.1	0		8.4	82.2	9.3	0		29.7	13.5	56.8	0		14.4	85.3	0.3	0		
PHF	.667	.597	.767	.000	.750	.818	.846	.833	.000	.849	.458	.313	.656	.000	.661	.632	.880	.250	.000	.835	.906
Cars	8	41	130	0	179	35	322	38	0	395	10	3	11	0	24	43	269	1	0	313	911
% Cars	100	95.3	98.5	0	97.8	97.2	91.5	95.0	0	92.3	90.9	60.0	52.4	0	64.9	89.6	94.4	100	0	93.7	92.8
Trucks	0	1	0	0	1	0	9	0	0	9	1	1	3	0	5	2	5	0	0	7	22
% Trucks	0	2.3	0	0	0.5	0	2.6	0	0	2.1	9.1	20.0	14.3	0	13.5	4.2	1.8	0	0	2.1	2.2
Heavys	0	1	2	0	3	1	21	2	0	24	0	1	7	0	8	3	11	0	0	14	49
% Heavys	0	2.3	1.5	0	1.6	2.8	6.0	5.0	0	5.6	0	20.0	33.3	0	21.6	6.3	3.9	0	0	4.2	5.0
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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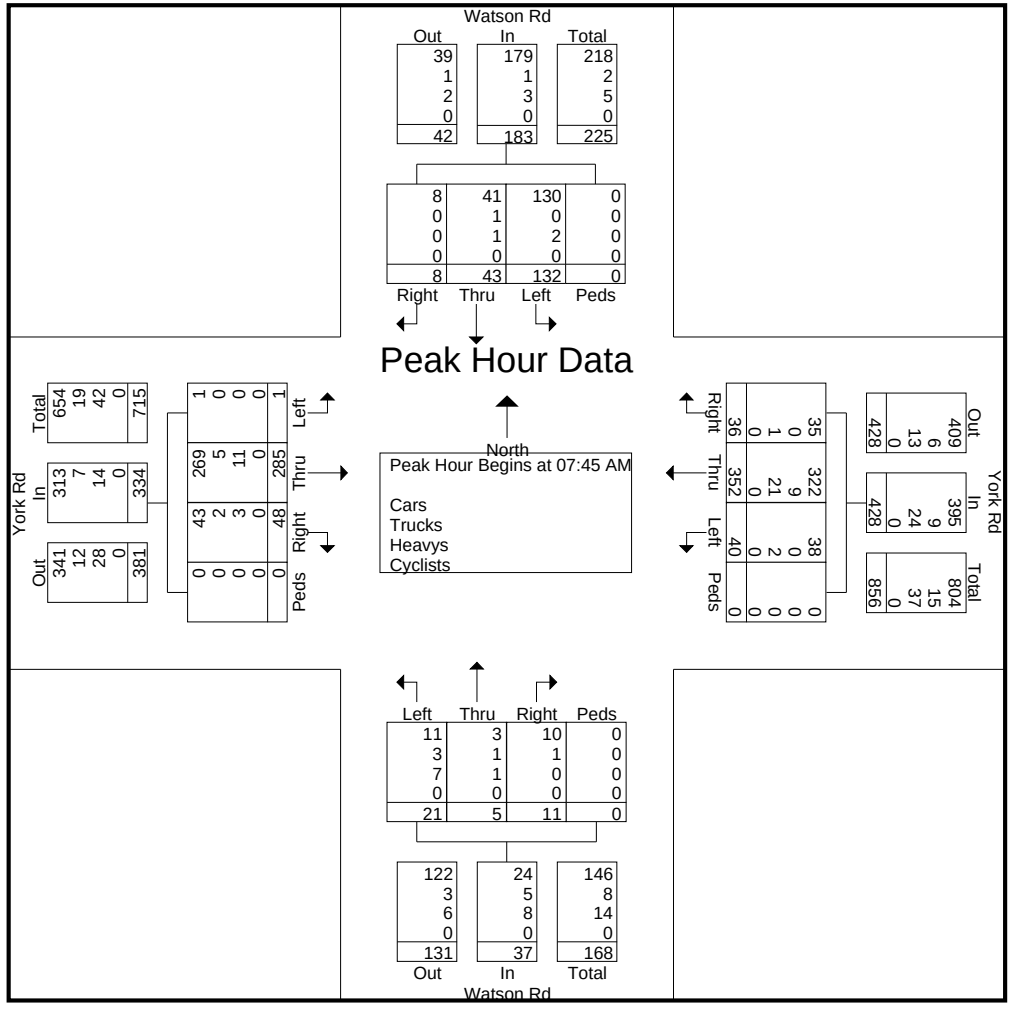
File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019
Page No : 5



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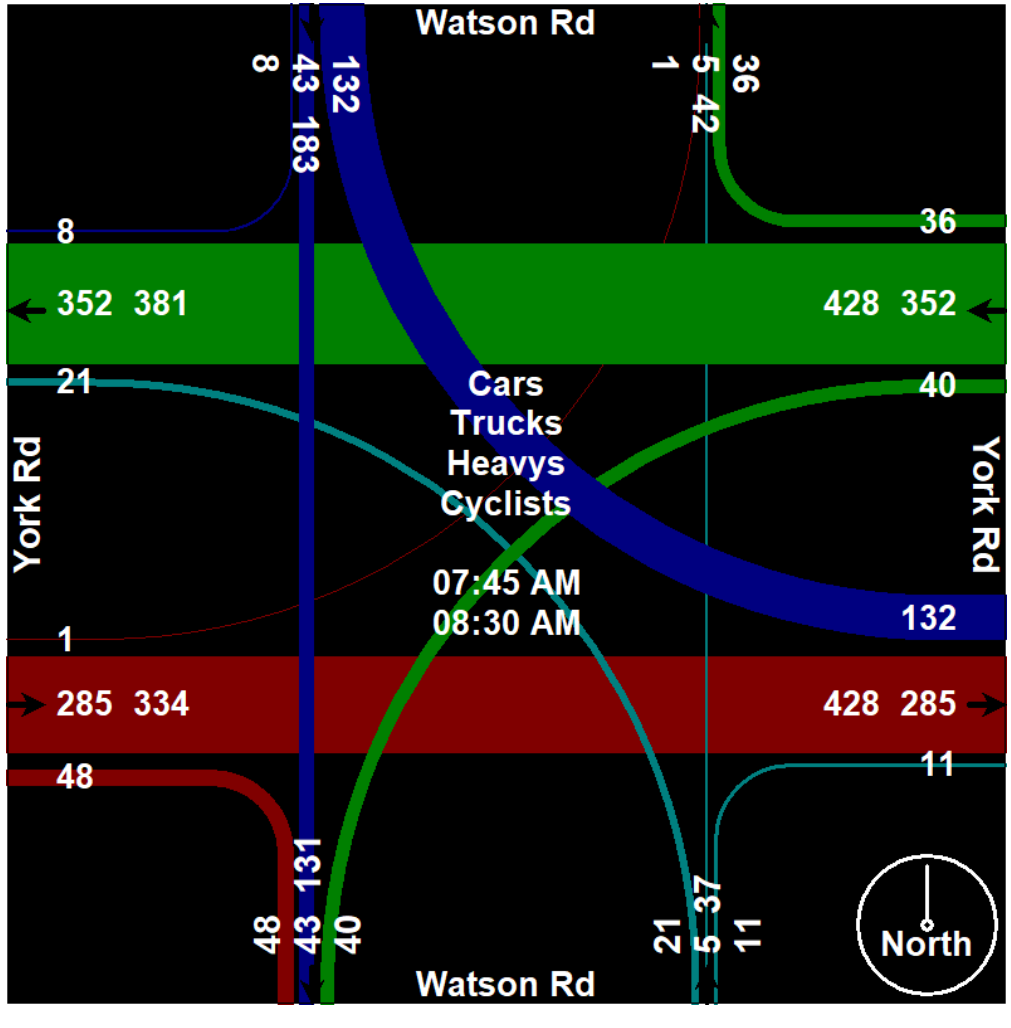
File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019
Page No : 6



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318 Simonston Blvd
Thornhill, ON L3T 4T5

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File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019

	Watson Rd From North					York Rd From East					Watson Rd From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 11:00 AM to 01:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 12:00 PM																					
12:00 PM	**1**	3	8	0	12	10	**72**	3	0	**85**	5	**13**	**19**	0	**37**	11	53	**2**	0	66	**200**
12:15 PM	0	7	8	0	15	5	59	4	**1**	69	9	2	7	0	18	**12**	38	0	0	50	152
12:30 PM	1	2	9	0	12	4	65	5	0	74	3	2	10	0	15	12	55	0	0	67	168
12:45 PM	0	**8**	**14**	0	**22**	**11**	49	**10**	0	70	**11**	3	8	0	22	9	**66**	0	0	**75**	189
Total Volume	2	20	39	0	61	30	245	22	1	298	28	20	44	0	92	44	212	2	0	258	709
% App. Total	3.3	32.8	63.9	0		10.1	82.2	7.4	0.3		30.4	21.7	47.8	0		17.1	82.2	0.8	0		
PHF	.500	.625	.696	.000	.693	.682	.851	.550	.250	.876	.636	.385	.579	.000	.622	.917	.803	.250	.000	.860	.886
Cars	2	19	39	0	60	29	217	16	1	263	24	19	40	0	83	36	192	2	0	230	636
% Cars	100	95.0	100	0	98.4	96.7	88.6	72.7	100	88.3	85.7	95.0	90.9	0	90.2	81.8	90.6	100	0	89.1	89.7
Trucks	0	1	0	0	1	1	10	0	0	11	2	0	0	0	2	1	5	0	0	6	20
% Trucks	0	5.0	0	0	1.6	3.3	4.1	0	0	3.7	7.1	0	0	0	2.2	2.3	2.4	0	0	2.3	2.8
Heavys	0	0	0	0	0	0	18	6	0	24	2	1	4	0	7	7	15	0	0	22	53
% Heavys	0	0	0	0	0	0	7.3	27.3	0	8.1	7.1	5.0	9.1	0	7.6	15.9	7.1	0	0	8.5	7.5
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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318 Simonston Blvd
Thornhill, ON L3T 4T5

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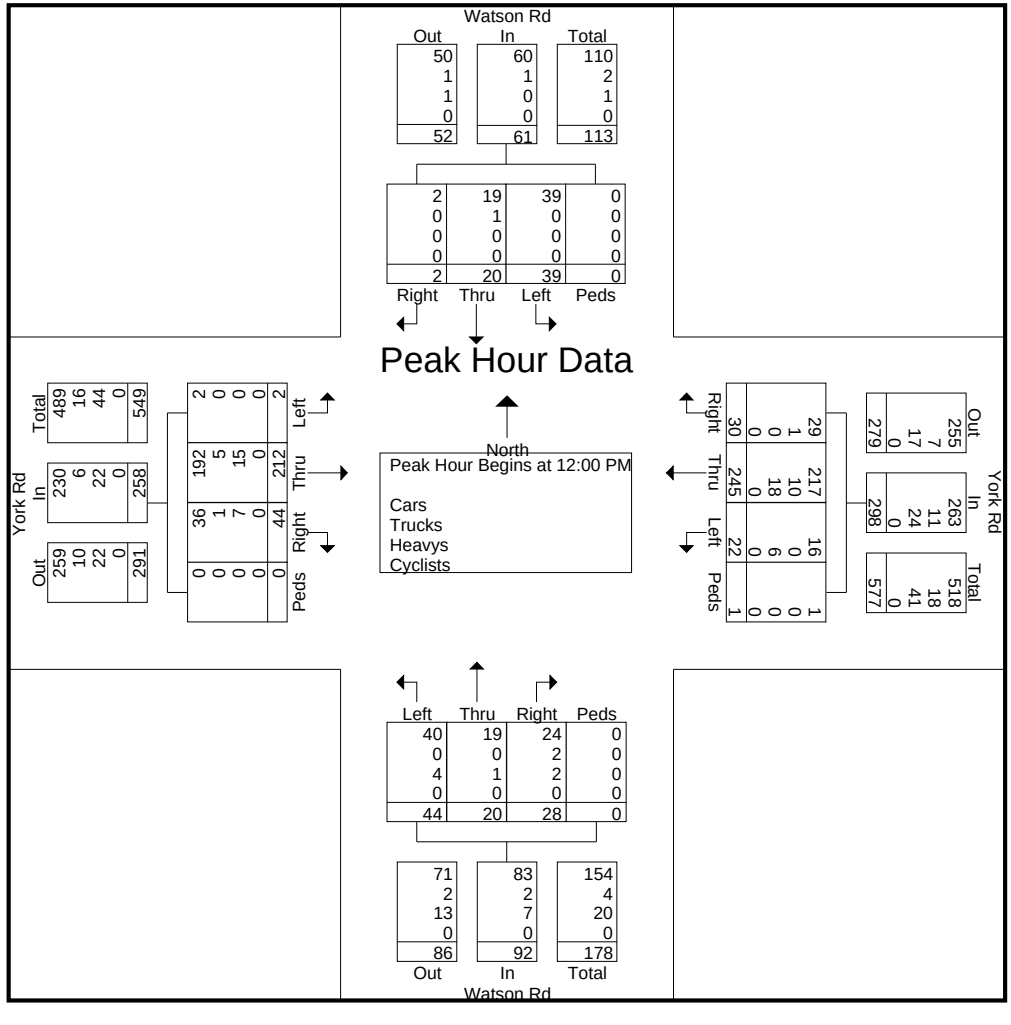
File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019
Page No : 8



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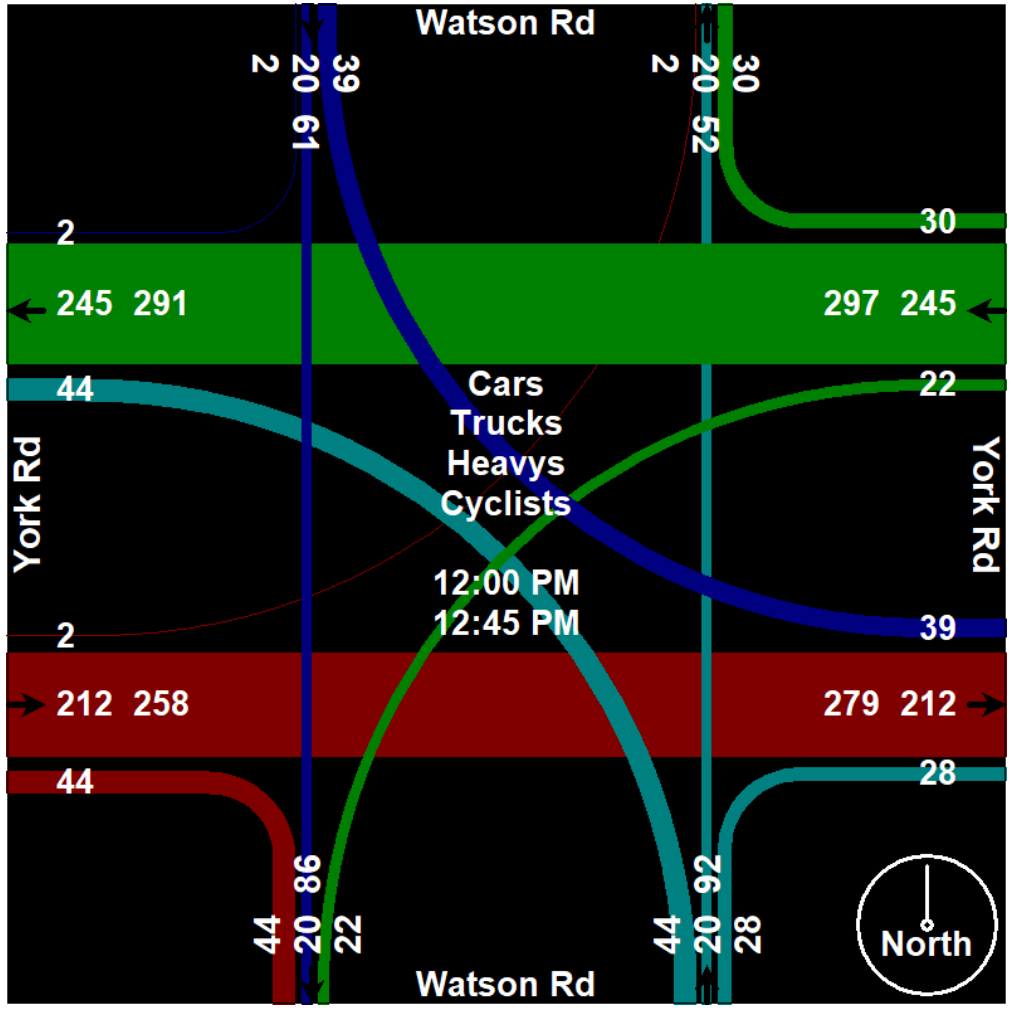
File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019
Page No : 9



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318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019

	Watson Rd From North					York Rd From East					Watson Rd From South					York Rd From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:15 PM																					
04:15 PM	0	**3**	10	0	**13**	30	91	5	0	126	**17**	11	18	0	46	3	81	1	0	85	270
04:30 PM	**1**	0	**11**	0	12	26	**98**	**8**	0	**132**	15	**27**	**32**	0	**74**	**8**	96	**2**	0	106	**324**
04:45 PM	0	2	9	0	11	30	91	2	0	123	17	12	11	0	40	2	**104**	1	0	**107**	281
05:00 PM	0	1	7	0	8	**31**	91	2	0	124	9	21	10	**1**	41	3	85	1	0	89	262
Total Volume	1	6	37	0	44	117	371	17	0	505	58	71	71	1	201	16	366	5	0	387	1137
% App. Total	2.3	13.6	84.1	0		23.2	73.5	3.4	0		28.9	35.3	35.3	0.5		4.1	94.6	1.3	0		
PHF	.250	.500	.841	.000	.846	.944	.946	.531	.000	.956	.853	.657	.555	.250	.679	.500	.880	.625	.000	.904	.877
Cars	0	6	35	0	41	116	351	12	0	479	52	69	69	1	191	10	352	5	0	367	1078
% Cars	0	100	94.6	0	93.2	99.1	94.6	70.6	0	94.9	89.7	97.2	97.2	100	95.0	62.5	96.2	100	0	94.8	94.8
Trucks	0	0	1	0	1	0	4	0	0	4	0	1	1	0	2	0	1	0	0	1	8
% Trucks	0	0	2.7	0	2.3	0	1.1	0	0	0.8	0	1.4	1.4	0	1.0	0	0.3	0	0	0.3	0.7
Heavys	1	0	1	0	2	1	16	5	0	22	6	1	1	0	8	6	13	0	0	19	51
% Heavys	100	0	2.7	0	4.5	0.9	4.3	29.4	0	4.4	10.3	1.4	1.4	0	4.0	37.5	3.6	0	0	4.9	4.5
Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% Cyclists	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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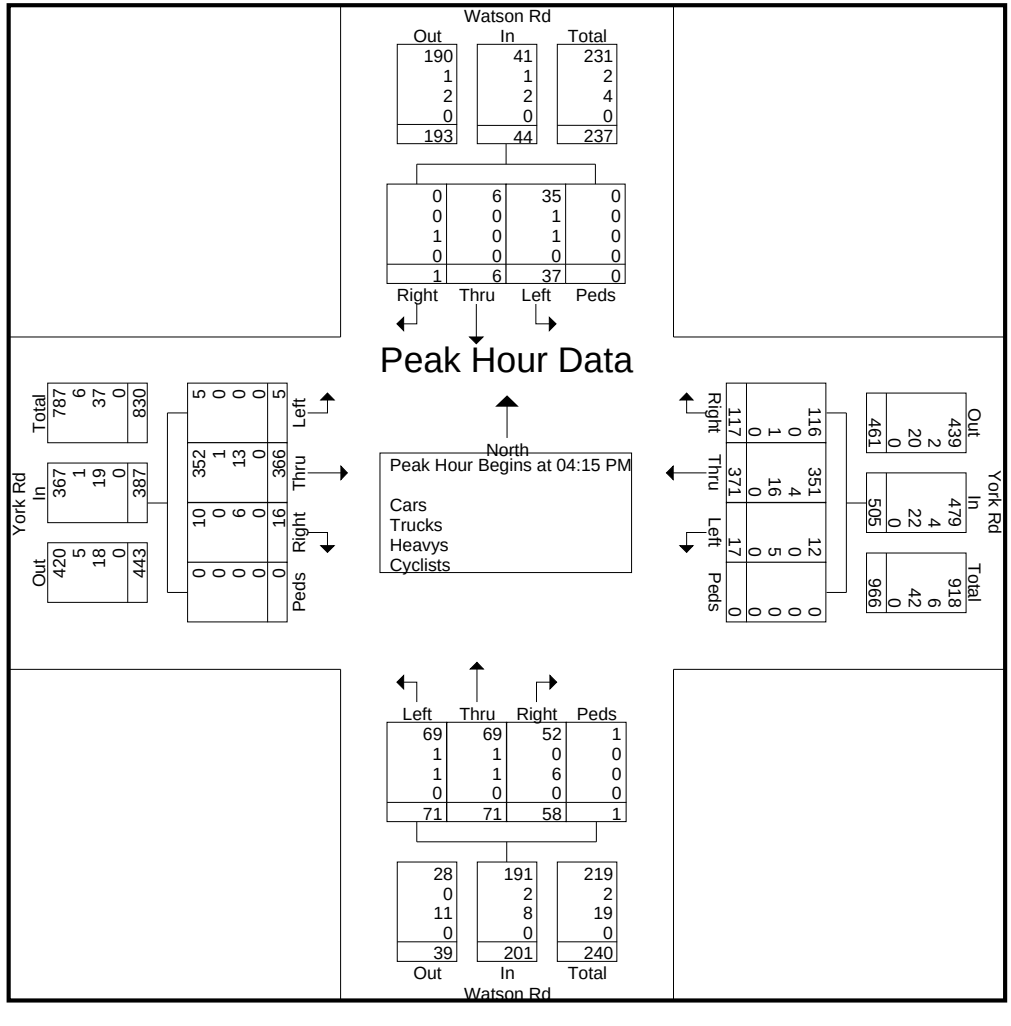
318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019



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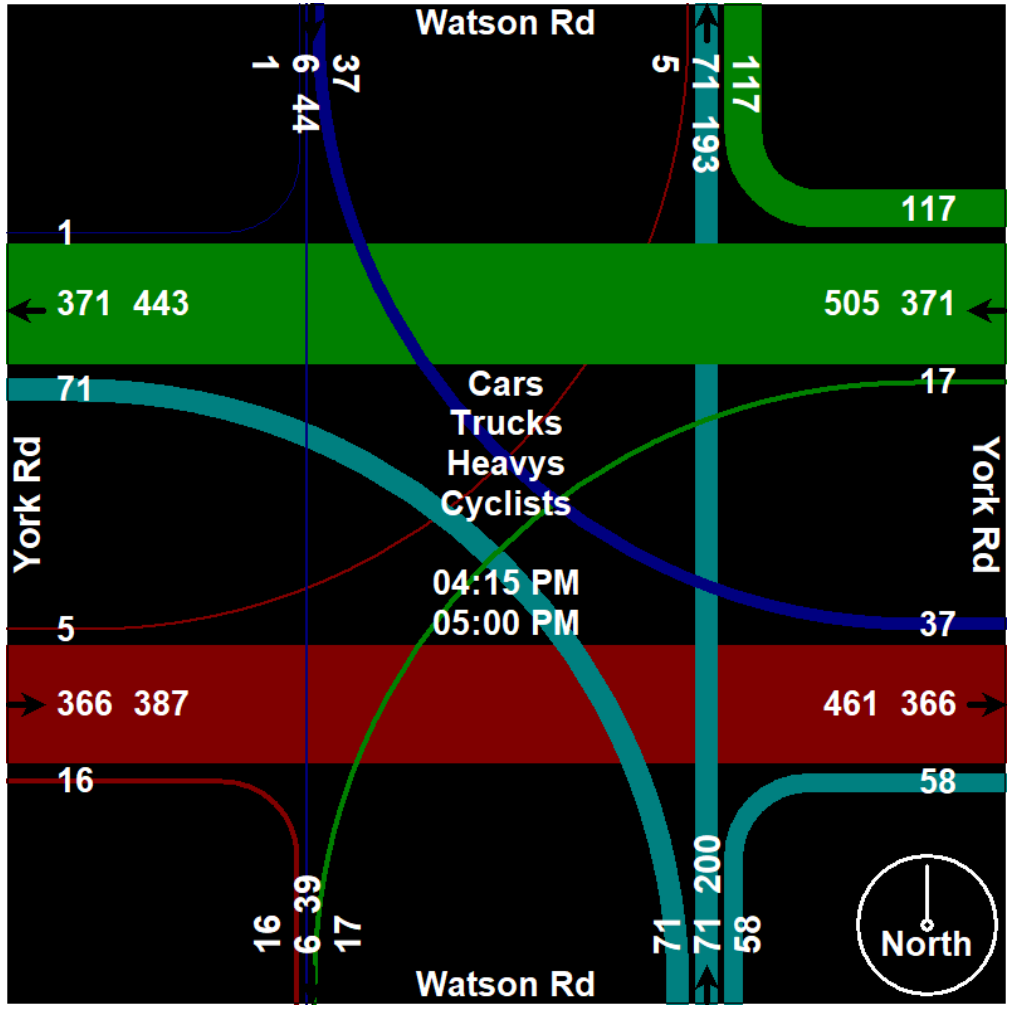
318 Simonston Blvd
Thornhill, ON L3T 4T5

"we always count...never estimated"

File Name : Watson Rd at York Rd
Site Code : 00000000
Start Date : 3/26/2019
Page No : 12



CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date			Prepared Date:	Aug. 13, 2021
Database Rev	Field		Completed By:	I.T.
Timing Card / Field rev			Checked By:	

Location:	York Rd. @ Watson Pkwy.								
							TIME PERIOD (sec.) (Green+Amber+All Red)		
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)	Day local MAX	Night local MAX	
			WALK	FDWALK					
1	WBLT - York Rd.	6.0			3.0		10.0		
2	EB - York Rd.	10.0	9.0	19.0	4.0	2.0	28.0	28.0	
3	SBLT - Watson Pkwy.	6.0			3.0		6.0		
4	NB - Watson Pkwy.	7.0	8.0	17.0	4.0	2.0	25.0	25.0	
5	EBLT - York Rd.	6.0			3.0		10.0		
6	WB - York Rd.	10.0	9.0	19.0	4.0	2.0	28.0	28.0	
7	NBLT - Watson Pkwy.	6.0			3.0		6.0		
8	SB - Watson Pkwy.	7.0	8.0	17.0	4.0	2.0	25.0	25.0	

		TIME (M-F)	PEAK	CYCLE LENGTH (sec.)	OFFSET (sec.)
System Control	No				
Local Control	Yes	7:00 - 21:00	Day local	Varies	N/A
Semi-Actuated Mode	Yes	21:00 - 7:00	Night local	Varies	N/A

Note: P+P = Protected Permissive Phase

Prot. = Fully Protected Phase

CITY OF GUELPH

Traffic Signal Timing Parameters

Database Date			Prepared Date:	Aug. 17, 2021	
Database Rev	Field		Completed By:	I.T.	
Timing Card / Field rev			Checked By:		

Location:	York Rd. @ Watson Rd.						TIME PERIOD (sec.) (Green+Amber+All Red)		
Phase #	Direction	Vehicle Minimum (sec.)	Pedestrian Minimum (sec.)		Amber (sec.)	All Red (sec.)	All day local MAX		
			WALK	FDWALK					
1									
2	EB/WB - York Rd.	17.0	17.0	12.0	4.0	2.0	29.0		
3									
4	SB - Watson Rd.	7.0	7.0	12.0	4.0	2.0	19.0		
5									
6									
7	SBLT P+P - Watson Rd.	7.0			3.0		0.0		
8	NB - Watson Rd.	7.0	7.0	12.0	4.0	2.0	19.0		

		TIME (M-F)	PEAK	CYCLE LENGTH (sec.)	OFFSET (sec.)
System Control	No	All day	Day local	Varies	N/A
Local Control	Yes				
Semi-Actuated Mode	Yes				

Note: P+P = Protected Permissive Phase

Prot. = Fully Protected Phase

APPENDIX D

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

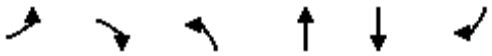
Signalized Intersections

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

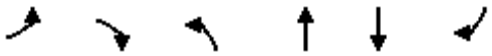
APPENDIX E

Detailed Capacity Analysis



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	53	316	85	145	436	24
Future Volume (vph)	53	316	85	145	436	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0	0.0	82.0			45.7
Storage Lanes	1	1	1			0
Taper Length (m)	50.0		66.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.993	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1772	1588	1810	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1825	1601	1772	1588	1810	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	290.7			493.1	212.4	
Travel Time (s)	26.2			29.6	12.7	
Confl. Peds. (#/hr)	5		3			3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	21%	5%	13%
Adj. Flow (vph)	58	343	92	158	474	26
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	343	92	158	500	0
Sign Control	Stop			Free	Free	

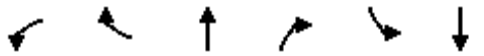
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 50.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	53	316	85	145	436	24
Future Volume (Veh/h)	53	316	85	145	436	24
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)	58	343	92	158	474	26
Pedestrians	3				5	
Lane Width (m)	3.7				3.7	
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	837	490	503			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	837	490	503			
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	41	91			
cM capacity (veh/h)	308	577	1054			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	58	343	92	158	500
Volume Left	58	0	92	0	0
Volume Right	0	343	0	0	26
cSH	308	577	1054	1700	1700
Volume to Capacity	0.19	0.59	0.09	0.09	0.29
Queue Length 95th (m)	5.4	30.7	2.3	0.0	0.0
Control Delay (s)	19.4	20.0	8.7	0.0	0.0
Lane LOS	C	C	A		
Approach Delay (s)	19.9		3.2		0.0
Approach LOS	C				

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	12	30	142	16	84	351
Future Volume (vph)	12	30	142	16	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.903		0.987			
Flt Protected	0.986				0.950	
Satd. Flow (prot)	1710	0	1670	0	1825	1830
Flt Permitted	0.986				0.950	
Satd. Flow (perm)	1710	0	1670	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	566.3		212.4			124.2
Travel Time (s)	34.0		12.7			7.5
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	13	33	154	17	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	46	0	171	0	91	382
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	30	142	16	84	351
Future Volume (Veh/h)	12	30	142	16	84	351
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)	13	33	154	17	91	382
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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	730	166			174	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	730	166			174	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	96			94	
cM capacity (veh/h)	366	880			1411	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	46	171	91	382
Volume Left	13	0	91	0
Volume Right	33	17	0	0
cSH	630	1700	1411	1700
Volume to Capacity	0.07	0.10	0.06	0.22
Queue Length 95th (m)	1.9	0.0	1.6	0.0
Control Delay (s)	11.2	0.0	7.7	0.0
Lane LOS	B		A	
Approach Delay (s)	11.2	0.0	1.5	
Approach LOS	B			

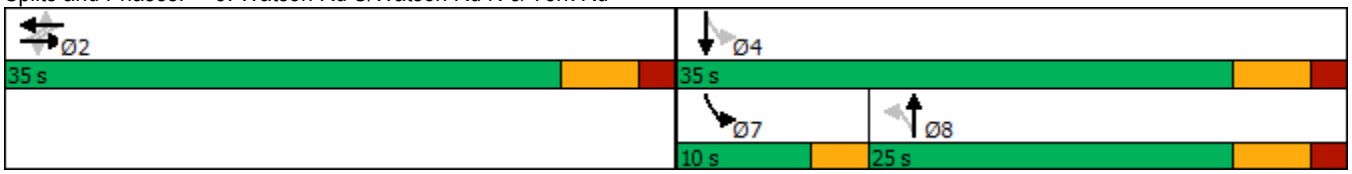
Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	303	51	43	374	39	23	6	12	141	46	9
Future Volume (vph)	2	303	51	43	374	39	23	6	12	141	46	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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		0.981			0.989			0.961			0.994	
Flt Protected					0.995			0.973			0.965	
Satd. Flow (prot)	0	1724	0	0	1796	0	0	1345	0	0	1796	0
Flt Permitted		0.998			0.936			0.802			0.759	
Satd. Flow (perm)	0	1720	0	0	1689	0	0	1109	0	0	1413	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			8			13			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			566.3	
Travel Time (s)		24.6			25.5			30.7			34.0	
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
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	2	329	55	47	407	42	25	7	13	153	50	10
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	386	0	0	496	0	0	45	0	0	213	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		30.6			30.6			13.2			13.2	
Actuated g/C Ratio		0.55			0.55			0.24			0.24	
v/c Ratio		0.41			0.53			0.17			0.63	
Control Delay		9.6			11.7			13.6			27.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.6			11.7			13.6			27.0	
LOS		A			B			B			C	
Approach Delay		9.6			11.7			13.6			27.0	
Approach LOS		A			B			B			C	
Queue Length 50th (m)		19.7			28.6			2.5			18.8	
Queue Length 95th (m)		45.9			65.4			8.8			36.6	
Internal Link Dist (m)		386.1			401.7			487.6			542.3	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		949			929			387			737	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.41			0.53			0.12			0.29	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 55.8			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.63			
Intersection Signal Delay: 13.9		Intersection LOS: B	
Intersection Capacity Utilization 73.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



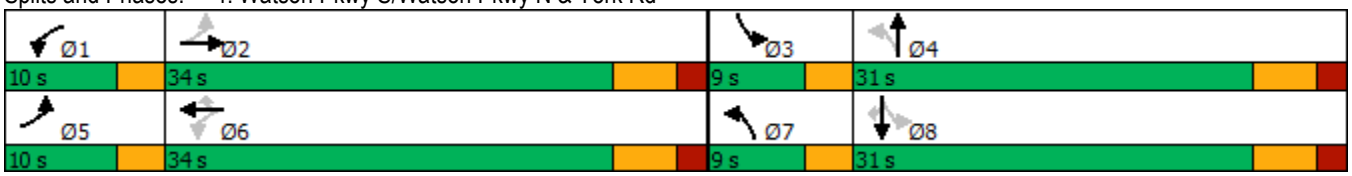
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	79	270	111	30	356	27	73	85	20	63	388	211
Future Volume (vph)	79	270	111	30	356	27	73	85	20	63	388	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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		0.956				0.850		0.971				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1757	0	1393	1847	1328	1630	1635	0	1738	1883	1570
Flt Permitted	0.372			0.400			0.241			0.684		
Satd. Flow (perm)	687	1757	0	587	1847	1328	413	1635	0	1251	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		15				229
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		223.8			410.1			303.1			493.1	
Travel Time (s)		13.4			24.6			18.2			29.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	86	293	121	33	387	29	79	92	22	68	422	229
Shared Lane Traffic (%)												
Lane Group Flow (vph)	86	414	0	33	387	29	79	114	0	68	422	229
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	35.8	29.0		34.8	26.7	26.7	28.1	20.4		28.1	20.4	20.4
Actuated g/C Ratio	0.49	0.39		0.47	0.36	0.36	0.38	0.28		0.38	0.28	0.28
v/c Ratio	0.20	0.59		0.09	0.58	0.05	0.31	0.25		0.13	0.81	0.38
Control Delay	12.6	23.9		11.9	26.2	0.2	16.9	21.1		14.2	39.4	5.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.6	23.9		11.9	26.2	0.2	16.9	21.1		14.2	39.4	5.5
LOS	B	C		B	C	A	B	C		B	D	A
Approach Delay		22.0			23.5			19.4			26.2	
Approach LOS		C			C			B			C	
Queue Length 50th (m)	7.1	53.0		2.7	52.2	0.0	7.4	12.2		6.3	62.7	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	15.0	87.8		7.5	83.5	0.0	15.8	25.2		13.8	#105.0	15.7
Internal Link Dist (m)		199.8			386.1			279.1			469.1	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	437	705		357	724	592	259	582		516	659	698
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	0.20	0.59		0.09	0.53	0.05	0.31	0.20		0.13	0.64	0.33

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 73.8			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 23.7		Intersection LOS: C	
Intersection Capacity Utilization 68.1%		ICU Level of Service C	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Watson Pkwy S/Watson Pkwy N & York Rd



Intersection: 1: Watson Pkwy N & Starwood Drive

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (m)	17.8	75.9	23.4	12.2
Average Queue (m)	8.0	27.4	8.6	0.7
95th Queue (m)	14.2	54.5	18.5	5.4
Link Distance (m)		276.4		194.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	84.0		82.0	
Storage Blk Time (%)		1		
Queuing Penalty (veh)		1		

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (m)	10.4	11.4
Average Queue (m)	6.4	3.4
95th Queue (m)	11.3	10.5
Link Distance (m)	543.7	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		38.0
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

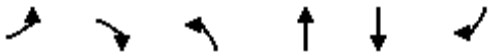
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	55.6	76.0	27.4	46.8
Average Queue (m)	24.1	29.6	8.2	21.9
95th Queue (m)	46.0	53.2	19.7	38.4
Link Distance (m)	388.9	417.0	501.1	543.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	22.2	75.3	26.0	83.0	17.2	33.5	36.1	21.8	78.1	38.7
Average Queue (m)	9.0	35.2	7.6	40.9	4.3	15.2	15.6	7.9	42.8	14.1
95th Queue (m)	18.1	60.3	20.6	68.9	13.5	29.9	30.4	17.6	65.2	28.4
Link Distance (m)		209.8		388.9			292.3		463.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)		0		2						
Queuing Penalty (veh)		0		1						

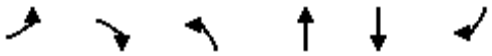
Network Summary

Network wide Queuing Penalty: 2



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	18	191	316	416	233	39
Future Volume (vph)	18	191	316	416	233	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0	0.0	82.0			45.7
Storage Lanes	1	1	1			0
Taper Length (m)	50.0		66.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.981	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1807	1883	1853	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1825	1601	1807	1883	1853	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	290.7			493.1	212.4	
Travel Time (s)	26.2			29.6	12.7	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	2%	2%	0%
Adj. Flow (vph)	20	208	343	452	253	42
Shared Lane Traffic (%)						
Lane Group Flow (vph)	20	208	343	452	295	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 45.5%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	191	316	416	233	39
Future Volume (Veh/h)	18	191	316	416	233	39
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)	20	208	343	452	253	42
Pedestrians	1					
Lane Width (m)	3.7					
Walking Speed (m/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1413	275	296			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1413	275	296			
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	73	73			
cM capacity (veh/h)	112	764	1271			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	20	208	343	452	295
Volume Left	20	0	343	0	0
Volume Right	0	208	0	0	42
cSH	112	764	1271	1700	1700
Volume to Capacity	0.18	0.27	0.27	0.27	0.17
Queue Length 95th (m)	4.9	8.7	8.7	0.0	0.0
Control Delay (s)	44.0	11.5	8.9	0.0	0.0
Lane LOS	E	B	A		
Approach Delay (s)	14.3		3.8		0.0
Approach LOS	B				

Intersection Summary			
Average Delay	4.8		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	29	128	425	12	42	244
Future Volume (vph)	29	128	425	12	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.890		0.996			
Flt Protected	0.991				0.950	
Satd. Flow (prot)	1694	0	1877	0	1772	1830
Flt Permitted	0.991				0.950	
Satd. Flow (perm)	1694	0	1877	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	566.3		212.4			124.2
Travel Time (s)	34.0		12.7			7.5
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	32	139	462	13	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	171	0	475	0	46	265
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.1%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	29	128	425	12	42	244
Future Volume (Veh/h)	29	128	425	12	42	244
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	139	462	13	46	265
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
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	832	472			478	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	472			478	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	77			96	
cM capacity (veh/h)	327	595			1078	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	171	475	46	265
Volume Left	32	0	46	0
Volume Right	139	13	0	0
cSH	516	1700	1078	1700
Volume to Capacity	0.33	0.28	0.04	0.16
Queue Length 95th (m)	11.4	0.0	1.1	0.0
Control Delay (s)	15.4	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	15.4	0.0	1.3	
Approach LOS	C			

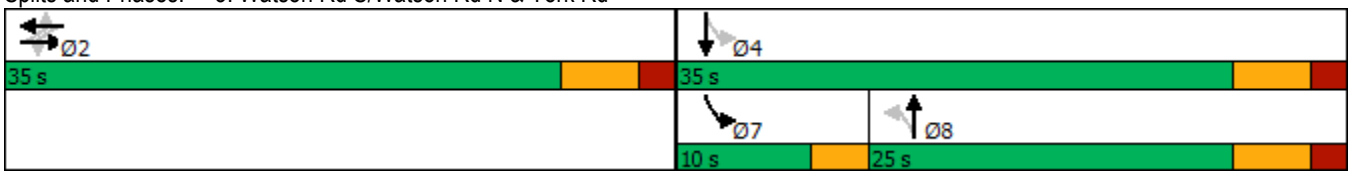
Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	328	16	14	365	88	65	63	42	29	7	1
Future Volume (vph)	6	328	16	14	365	88	65	63	42	29	7	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Ped Bike Factor								0.99			1.00	
Frt		0.994			0.974			0.966			0.997	
Flt Protected		0.999			0.999			0.981			0.962	
Satd. Flow (prot)	0	1833	0	0	1782	0	0	1775	0	0	1789	0
Flt Permitted		0.991			0.986			0.856			0.725	
Satd. Flow (perm)	0	1819	0	0	1759	0	0	1547	0	0	1346	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			20			23			1	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			566.3	
Travel Time (s)		24.6			25.5			30.7			34.0	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	7	357	17	15	397	96	71	68	46	32	8	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	381	0	0	508	0	0	185	0	0	41	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		31.8			31.8			11.0			11.0	
Actuated g/C Ratio		0.58			0.58			0.20			0.20	
v/c Ratio		0.36			0.49			0.56			0.15	
Control Delay		8.1			9.4			23.2			17.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.1			9.4			23.2			17.3	
LOS		A			A			C			B	
Approach Delay		8.1			9.4			23.2			17.3	
Approach LOS		A			A			C			B	
Queue Length 50th (m)		17.4			24.7			13.9			3.2	
Queue Length 95th (m)		39.2			56.2			29.4			9.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			542.3	
Turn Bay Length (m)												
Base Capacity (vph)		1055			1027			554			716	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.36			0.49			0.33			0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 54.9			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.56			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 52.0%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



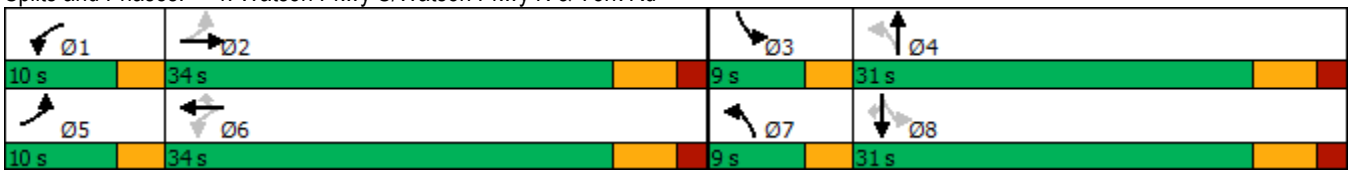
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	253	322	88	13	387	67	182	390	20	18	228	188
Future Volume (vph)	253	322	88	13	387	67	182	390	20	18	228	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.968				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1778	0	1690	1865	1633	1706	1839	0	1722	1865	1555
Flt Permitted	0.288			0.459			0.437			0.314		
Satd. Flow (perm)	542	1778	0	816	1865	1633	784	1839	0	568	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				117		3				204
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		223.8			410.1			303.1			493.1	
Travel Time (s)		13.4			24.6			18.2			29.6	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	275	350	96	14	421	73	198	424	22	20	248	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	275	446	0	14	421	73	198	446	0	20	248	204
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	34.8	30.6		31.3	21.9	21.9	27.5	22.4		25.4	16.2	16.2
Actuated g/C Ratio	0.50	0.44		0.45	0.31	0.31	0.39	0.32		0.36	0.23	0.23
v/c Ratio	0.69	0.57		0.03	0.72	0.12	0.51	0.75		0.06	0.57	0.40
Control Delay	24.3	19.9		11.0	30.3	1.9	20.1	32.6		13.4	29.4	6.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	24.3	19.9		11.0	30.3	1.9	20.1	32.6		13.4	29.4	6.2
LOS	C	B		B	C	A	C	C		B	C	A
Approach Delay		21.6			25.7			28.8			18.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			B	
Queue Length 50th (m)	18.6	36.1		0.8	46.6	0.0	16.2	46.1		1.5	28.2	0.0
Queue Length 95th (m)	#54.9	96.7		4.1	91.9	3.6	34.8	#116.5		5.7	54.7	14.9
Internal Link Dist (m)		199.8			386.1			279.1			469.1	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	397	787		465	764	739	389	675		308	683	686
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	0.69	0.57		0.03	0.55	0.10	0.51	0.66		0.06	0.36	0.30

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 69.9			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 23.8		Intersection LOS: C	
Intersection Capacity Utilization 77.8%		ICU Level of Service D	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Watson Pkwy S/Watson Pkwy N & York Rd



Intersection: 1: Watson Pkwy N & Starwood Drive

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (m)	20.3	38.3	56.0	12.6
Average Queue (m)	5.6	16.1	20.6	4.4
95th Queue (m)	15.8	27.6	39.9	11.0
Link Distance (m)		276.4		194.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	84.0		82.0	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	38.5	9.9	15.2
Average Queue (m)	17.8	2.0	4.8
95th Queue (m)	32.3	7.0	12.8
Link Distance (m)	543.7	194.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	91.8	79.3	40.9	19.4
Average Queue (m)	30.6	35.3	19.7	6.2
95th Queue (m)	67.7	62.6	34.2	15.2
Link Distance (m)	388.9	417.0	501.1	543.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	167.8	214.9	14.6	94.7	23.8	74.5	219.9	13.5	58.5	38.0
Average Queue (m)	98.5	90.5	2.6	53.3	9.4	54.4	102.3	3.5	28.3	17.8
95th Queue (m)	183.2	210.9	9.4	82.9	20.0	89.8	237.3	9.8	49.2	33.9
Link Distance (m)		209.8		388.9			292.3		463.8	
Upstream Blk Time (%)		9					7			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	54	5		7		25	9			
Queuing Penalty (veh)	222	14		5		104	16			

Network Summary

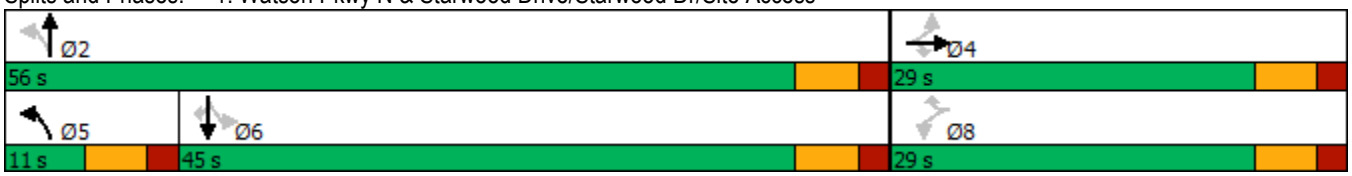
Network wide Queuing Penalty: 360

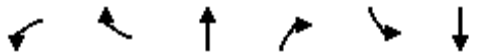
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	0	402	40	0	129	98	151	0	138	454	32
Future Volume (vph)	56	0	402	40	0	129	98	151	0	138	454	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	1		1	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor		0.99					1.00					0.98
Frt			0.850			0.850						0.850
Flt Protected		0.950		0.950			0.950			0.950		
Satd. Flow (prot)	0	1825	1601	1789	0	1601	1772	1588	0	1789	1830	1445
Flt Permitted		0.950		0.717			0.253			0.653		
Satd. Flow (perm)	0	1808	1601	1350	0	1601	471	1588	0	1230	1830	1410
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			358			140						116
Link Speed (k/h)		40			50			60			60	
Link Distance (m)		290.7			105.5			258.9			212.4	
Travel Time (s)		26.2			7.6			15.5			12.7	
Confl. Peds. (#/hr)	5						3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	3%	21%	2%	2%	5%	13%
Adj. Flow (vph)	61	0	437	43	0	140	107	164	0	150	493	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	61	437	43	0	140	107	164	0	150	493	35
Turn Type	Perm	NA	Perm	Perm		Perm	pm+pt	NA		Perm	NA	Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4	8		8	2			6		6
Detector Phase	4	4	4	8		8	5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0		7.0	5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0		29.0	11.0	45.0		45.0	45.0	45.0
Total Split (s)	29.0	29.0	29.0	29.0		29.0	11.0	56.0		45.0	45.0	45.0
Total Split (%)	34.1%	34.1%	34.1%	34.1%		34.1%	12.9%	65.9%		52.9%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0		2.0	2.0	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
Total Lost Time (s)		6.0	6.0	6.0		6.0	6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None		None	None	Min		Min	Min	Min
Act Effct Green (s)		11.2	11.2	11.2		11.2	28.4	28.4		20.1	20.1	20.1
Actuated g/C Ratio		0.21	0.21	0.21		0.21	0.53	0.53		0.38	0.38	0.38
v/c Ratio		0.16	0.70	0.15		0.31	0.28	0.19		0.32	0.71	0.06
Control Delay		21.3	12.3	21.7		6.8	7.9	7.0		15.2	21.3	0.2
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		21.3	12.3	21.7		6.8	7.9	7.0		15.2	21.3	0.2
LOS		C	B	C		A	A	A		B	C	A
Approach Delay		13.4			10.3			7.3			18.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			B			A			B	
Queue Length 50th (m)		4.9	6.5	3.5		0.0	3.7	5.9		9.7	38.3	0.0
Queue Length 95th (m)		16.5	37.1	13.1		12.8	13.9	20.6		27.8	89.3	0.0
Internal Link Dist (m)		266.7			81.5			234.9			188.4	
Turn Bay Length (m)							82.0			45.7		45.7
Base Capacity (vph)		952	1012	711		909	389	1410		960	1429	1126
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	0.43	0.06		0.15	0.28	0.12		0.16	0.34	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 53.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 14.3		Intersection LOS: B	
Intersection Capacity Utilization 65.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	21	30	142	17	84	351
Future Volume (vph)	21	30	142	17	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.920		0.986			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1732	0	1670	0	1825	1830
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1732	0	1670	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			124.2
Travel Time (s)	12.4		12.7			7.5
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	23	33	154	18	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	172	0	91	382
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	30	142	17	84	351
Future Volume (Veh/h)	21	30	142	17	84	351
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)	23	33	154	18	91	382
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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)			212			
pX, platoon unblocked						
vC, conflicting volume	731	167			175	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	731	167			175	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	96			94	
cM capacity (veh/h)	365	879			1410	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	56	172	91	382
Volume Left	23	0	91	0
Volume Right	33	18	0	0
cSH	557	1700	1410	1700
Volume to Capacity	0.10	0.10	0.06	0.22
Queue Length 95th (m)	2.6	0.0	1.6	0.0
Control Delay (s)	12.2	0.0	7.7	0.0
Lane LOS	B		A	
Approach Delay (s)	12.2	0.0	1.5	
Approach LOS	B			

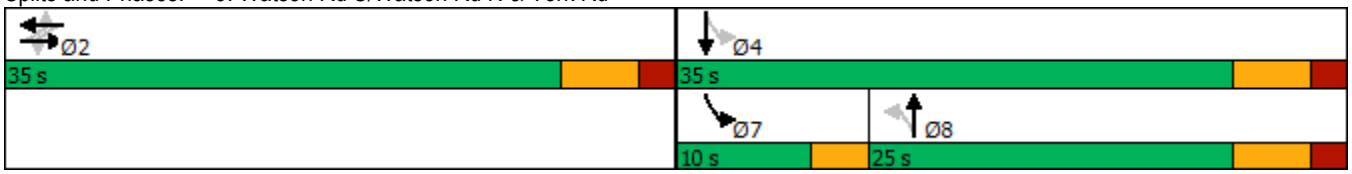
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

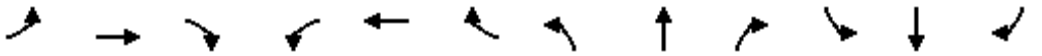
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	334	66	45	401	45	24	7	13	184	48	10
Future Volume (vph)	3	334	66	45	401	45	24	7	13	184	48	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	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		0.978			0.988			0.961			0.994	
Flt Protected					0.995			0.974			0.963	
Satd. Flow (prot)	0	1719	0	0	1792	0	0	1349	0	0	1794	0
Flt Permitted		0.997			0.930			0.796			0.746	
Satd. Flow (perm)	0	1714	0	0	1675	0	0	1102	0	0	1390	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			9			14			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	3	363	72	49	436	49	26	8	14	200	52	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	438	0	0	534	0	0	48	0	0	263	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.2			29.2			15.4			15.4	
Actuated g/C Ratio		0.51			0.51			0.27			0.27	
v/c Ratio		0.49			0.62			0.16			0.69	
Control Delay		12.1			14.8			12.6			28.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.1			14.8			12.6			28.1	
LOS		B			B			B			C	
Approach Delay		12.1			14.8			12.6			28.1	
Approach LOS		B			B			B			C	
Queue Length 50th (m)		26.2			35.9			2.7			24.5	
Queue Length 95th (m)		61.3			83.2			9.0			45.3	
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		891			867			395			717	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.49			0.62			0.12			0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 56.7			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 81.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd





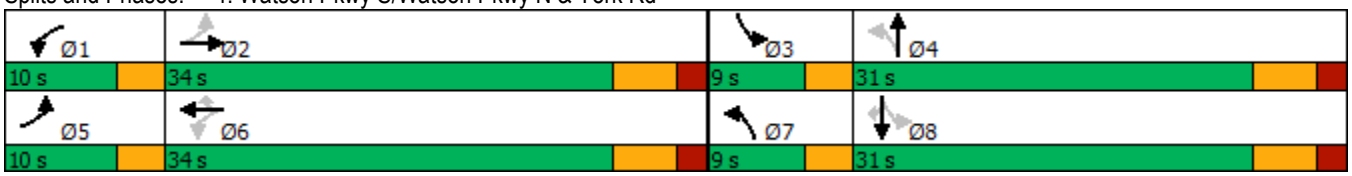
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	284	119	32	371	32	76	98	21	103	469	403
Future Volume (vph)	167	284	119	32	371	32	76	98	21	103	469	403
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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		0.956				0.850		0.973				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1757	0	1393	1847	1328	1630	1642	0	1738	1883	1570
Flt Permitted	0.297			0.374			0.170			0.674		
Satd. Flow (perm)	549	1757	0	548	1847	1328	292	1642	0	1233	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		13				410
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		223.8			410.1			303.1			240.2	
Travel Time (s)		13.4			24.6			18.2			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	182	309	129	35	403	35	83	107	23	112	510	438
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	438	0	35	403	35	83	130	0	112	510	438
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	35.6	28.7		33.7	24.0	24.0	31.1	23.5		31.1	23.5	23.5
Actuated g/C Ratio	0.46	0.37		0.44	0.31	0.31	0.41	0.31		0.41	0.31	0.31
v/c Ratio	0.50	0.65		0.11	0.70	0.07	0.37	0.25		0.21	0.88	0.57
Control Delay	17.8	26.6		12.4	31.4	0.3	18.4	21.2		14.8	46.2	6.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	17.8	26.6		12.4	31.4	0.3	18.4	21.2		14.8	46.2	6.8
LOS	B	C		B	C	A	B	C		B	D	A
Approach Delay		24.0			27.7			20.1			26.6	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	16.5	59.1		2.9	56.6	0.0	7.8	14.6		10.7	80.8	3.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	28.7	94.2		7.7	87.5	0.0	16.3	28.9		20.7	#139.8	26.4
Internal Link Dist (m)		199.8			386.1			279.1			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	367	674		323	689	568	225	555		540	627	796
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	0.50	0.65		0.11	0.58	0.06	0.37	0.23		0.21	0.81	0.55

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 76.7			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 25.5		Intersection LOS: C	
Intersection Capacity Utilization 75.1%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Watson Pkwy S/Watson Pkwy N & York Rd



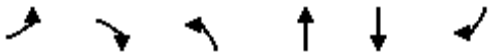
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	59	33	199	35	0	864
Future Volume (vph)	59	33	199	35	0	864
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.951		0.980			
Flt Protected	0.969					
Satd. Flow (prot)	1736	0	1846	0	1883	1883
Flt Permitted	0.969					
Satd. Flow (perm)	1736	0	1846	0	1883	1883
Link Speed (k/h)	50		50			50
Link Distance (m)	170.1		240.2			258.9
Travel Time (s)	12.2		17.3			18.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	36	216	38	0	939
Shared Lane Traffic (%)						
Lane Group Flow (vph)	100	0	254	0	0	939
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.4%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	59	33	199	35	0	864
Future Volume (Veh/h)	59	33	199	35	0	864
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)	64	36	216	38	0	939
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			259
pX, platoon unblocked	0.78					
vC, conflicting volume	1174	235			254	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1084	235			254	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	66	96			100	
cM capacity (veh/h)	188	804			1311	

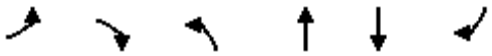
Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	100	254	0	939
Volume Left	64	0	0	0
Volume Right	36	38	0	0
cSH	260	1700	1700	1700
Volume to Capacity	0.38	0.15	0.00	0.55
Queue Length 95th (m)	13.7	0.0	0.0	0.0
Control Delay (s)	27.3	0.0	0.0	0.0
Lane LOS	D			
Approach Delay (s)	27.3	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	37	4	45	110	0
Future Volume (vph)	0	37	4	45	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.996		
Satd. Flow (prot)	1629	0	0	1876	1883	0
Flt Permitted				0.996		
Satd. Flow (perm)	1629	0	0	1876	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	125.2			356.4	206.3	
Travel Time (s)	9.0			25.7	14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	40	4	49	120	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	0	53	120	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 15.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	37	4	45	110	0
Future Volume (Veh/h)	0	37	4	45	110	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	40	4	49	120	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	177	120	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177	120	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	811	931	1468			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	53	120
Volume Left	0	4	0
Volume Right	40	0	0
cSH	931	1468	1700
Volume to Capacity	0.04	0.00	0.07
Queue Length 95th (m)	1.1	0.1	0.0
Control Delay (s)	9.0	0.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (m)	21.4	67.5	21.8	7.6
Average Queue (m)	7.8	31.9	9.5	0.3
95th Queue (m)	16.0	54.7	18.7	2.9
Link Distance (m)		276.4		194.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	84.0		82.0	
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	SB	SB
Directions Served	LR	L	T
Maximum Queue (m)	12.6	11.5	1.7
Average Queue (m)	6.5	3.3	0.1
95th Queue (m)	12.5	10.5	1.2
Link Distance (m)	543.7		116.9
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		38.0	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

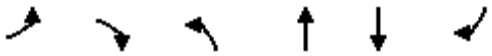
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	58.7	75.0	29.9	50.7
Average Queue (m)	28.4	36.5	9.5	24.7
95th Queue (m)	53.9	63.8	23.2	42.8
Link Distance (m)	388.9	417.0	501.1	543.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	36.0	90.9	28.1	98.0	21.1	37.0	44.7	32.0	82.3	49.2
Average Queue (m)	16.6	37.5	10.1	45.0	5.7	13.9	19.1	12.2	50.0	21.3
95th Queue (m)	29.7	68.5	25.1	75.8	15.9	27.9	35.5	24.5	76.3	39.7
Link Distance (m)		209.8		388.9			292.3		463.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)		1		3						
Queuing Penalty (veh)		2		2						

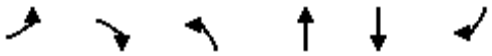
Network Summary

Network wide Queuing Penalty: 4



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	19	250	351	433	244	58
Future Volume (vph)	19	250	351	433	244	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0	0.0	82.0			45.7
Storage Lanes	1	1	1			0
Taper Length (m)	50.0		66.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.974	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1807	1883	1841	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1825	1601	1807	1883	1841	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	290.7			493.1	212.4	
Travel Time (s)	26.2			29.6	12.7	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	2%	2%	0%
Adj. Flow (vph)	21	272	382	471	265	63
Shared Lane Traffic (%)						
Lane Group Flow (vph)	21	272	382	471	328	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	250	351	433	244	58
Future Volume (Veh/h)	19	250	351	433	244	58
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)	21	272	382	471	265	63
Pedestrians	1					
Lane Width (m)	3.7					
Walking Speed (m/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1532	298	329			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1532	298	329			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	77	63	69			
cM capacity (veh/h)	90	742	1236			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	21	272	382	471	328
Volume Left	21	0	382	0	0
Volume Right	0	272	0	0	63
cSH	90	742	1236	1700	1700
Volume to Capacity	0.23	0.37	0.31	0.28	0.19
Queue Length 95th (m)	6.6	13.3	10.5	0.0	0.0
Control Delay (s)	57.1	12.6	9.2	0.0	0.0
Lane LOS	F	B	A		
Approach Delay (s)	15.8		4.1		0.0
Approach LOS	C				

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	39	128	425	13	42	244
Future Volume (vph)	39	128	425	13	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.896		0.996			
Flt Protected	0.989				0.950	
Satd. Flow (prot)	1702	0	1877	0	1772	1830
Flt Permitted	0.989				0.950	
Satd. Flow (perm)	1702	0	1877	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	566.3		212.4			124.2
Travel Time (s)	34.0		12.7			7.5
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	42	139	462	14	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	181	0	476	0	46	265
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.7%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	39	128	425	13	42	244
Future Volume (Veh/h)	39	128	425	13	42	244
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)	42	139	462	14	46	265
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
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	832	473			479	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	473			479	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	77			96	
cM capacity (veh/h)	327	595			1077	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	181	476	46	265
Volume Left	42	0	46	0
Volume Right	139	14	0	0
cSH	500	1700	1077	1700
Volume to Capacity	0.36	0.28	0.04	0.16
Queue Length 95th (m)	12.9	0.0	1.1	0.0
Control Delay (s)	16.2	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	16.2	0.0	1.3	
Approach LOS	C			

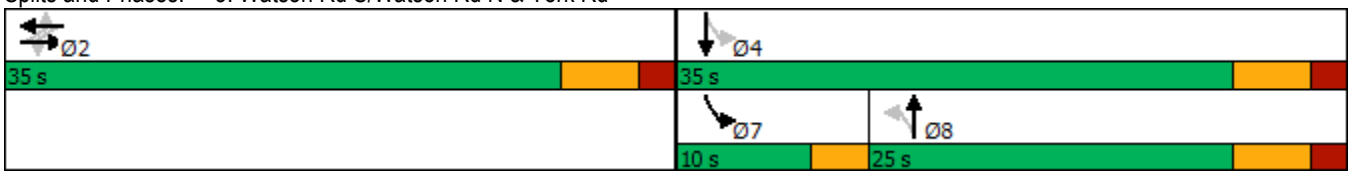
Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	359	26	15	392	92	68	66	44	31	8	2
Future Volume (vph)	7	359	26	15	392	92	68	66	44	31	8	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Ped Bike Factor								0.99			1.00	
Frt		0.991			0.975			0.967			0.994	
Flt Protected		0.999			0.999			0.981			0.964	
Satd. Flow (prot)	0	1829	0	0	1784	0	0	1777	0	0	1785	0
Flt Permitted		0.990			0.984			0.855			0.720	
Satd. Flow (perm)	0	1813	0	0	1757	0	0	1547	0	0	1331	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			20			23			2	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			566.3	
Travel Time (s)		24.6			25.5			30.7			34.0	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	8	390	28	16	426	100	74	72	48	34	9	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	426	0	0	542	0	0	194	0	0	45	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		31.6			31.6			11.3			11.3	
Actuated g/C Ratio		0.57			0.57			0.21			0.21	
v/c Ratio		0.41			0.53			0.58			0.16	
Control Delay		8.7			10.1			23.5			17.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.7			10.1			23.5			17.1	
LOS		A			B			C			B	
Approach Delay		8.7			10.1			23.5			17.1	
Approach LOS		A			B			C			B	
Queue Length 50th (m)		20.3			27.7			14.8			3.4	
Queue Length 95th (m)		45.7			62.8			30.6			9.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			542.3	
Turn Bay Length (m)												
Base Capacity (vph)		1045			1019			552			706	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.41			0.53			0.35			0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 55			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 12.0		Intersection LOS: B	
Intersection Capacity Utilization 54.6%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	399	343	99	14	403	74	190	416	21	53	278	351
Future Volume (vph)	399	343	99	14	403	74	190	416	21	53	278	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.966				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1775	0	1690	1865	1633	1706	1840	0	1722	1865	1555
Flt Permitted	0.267			0.397			0.370			0.241		
Satd. Flow (perm)	503	1775	0	706	1865	1633	664	1840	0	436	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				117		3				361
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		223.8			410.1			303.1			493.1	
Travel Time (s)		13.4			24.6			18.2			29.6	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	434	373	108	15	438	80	207	452	23	58	302	382
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	481	0	15	438	80	207	475	0	58	302	382
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	36.0	31.7		32.6	23.2	23.2	29.8	23.5		28.3	19.1	19.1
Actuated g/C Ratio	0.49	0.43		0.44	0.31	0.31	0.40	0.32		0.38	0.26	0.26
v/c Ratio	1.18	0.62		0.04	0.75	0.14	0.59	0.81		0.21	0.63	0.58
Control Delay	126.3	22.7		11.6	32.8	2.3	23.0	37.8		15.1	30.6	7.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	126.3	22.7		11.6	32.8	2.3	23.0	37.8		15.1	30.6	7.4
LOS	F	C		B	C	A	C	D		B	C	A
Approach Delay		71.9			27.6			33.4			17.4	

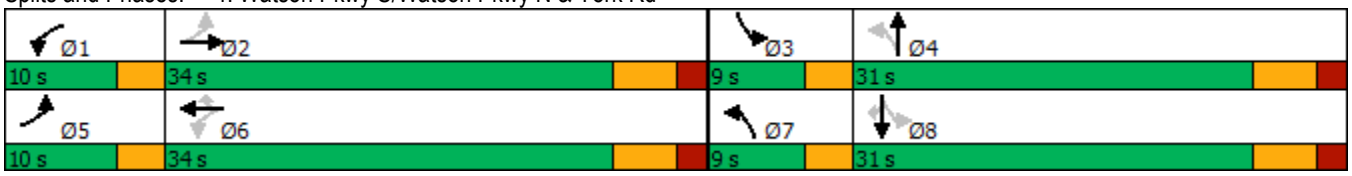
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			C			C			B	
Queue Length 50th (m)	~64.4	55.4		1.2	62.8	0.0	18.8	67.6		4.8	38.3	2.3
Queue Length 95th (m)	#132.5	#117.3		4.3	96.4	4.6	36.3	#128.3		12.2	67.1	23.5
Internal Link Dist (m)		199.8			386.1			279.1			469.1	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	368	771		413	720	702	353	636		273	643	761
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	1.18	0.62		0.04	0.61	0.11	0.59	0.75		0.21	0.47	0.50

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 74			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.18			
Intersection Signal Delay: 40.4		Intersection LOS: D	
Intersection Capacity Utilization 88.2%		ICU Level of Service E	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



Intersection: 1: Watson Pkwy N & Starwood Drive

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (m)	13.9	47.4	45.3	18.0
Average Queue (m)	4.2	19.9	17.8	5.6
95th Queue (m)	11.8	34.3	35.0	12.8
Link Distance (m)		276.4		194.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	84.0		82.0	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	32.4	6.8	13.1
Average Queue (m)	13.9	1.2	4.5
95th Queue (m)	25.2	5.1	11.9
Link Distance (m)	543.7	194.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	49.6	77.4	45.4	20.5
Average Queue (m)	19.5	33.3	20.4	6.4
95th Queue (m)	41.7	62.5	36.5	15.6
Link Distance (m)	388.9	417.0	501.1	543.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	168.0	226.9	15.3	116.1	25.6	74.6	309.5	22.0	65.9	108.7
Average Queue (m)	167.8	217.4	2.6	62.1	8.7	74.4	298.9	8.8	35.4	51.5
95th Queue (m)	168.8	224.2	9.8	100.6	18.2	74.8	315.4	18.7	58.2	95.7
Link Distance (m)		209.8		388.9			292.3		463.8	
Upstream Blk Time (%)		84					93			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	99	3		13		96	11			1
Queuing Penalty (veh)	439	14		12		421	20			2

Network Summary

Network wide Queuing Penalty: 908

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	56	8	402	79	12	146	98	151	24	138	454	32
Future Volume (vph)	56	8	402	79	12	146	98	151	24	138	454	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor		0.99					1.00					0.98
Frt			0.850		0.917			0.979				0.850
Flt Protected		0.958			0.984		0.950			0.950		
Satd. Flow (prot)	0	1836	1601	0	1699	0	1772	1588	0	1789	1830	1445
Flt Permitted		0.958			0.984		0.253			0.638		
Satd. Flow (perm)	0	1825	1601	0	1699	0	471	1588	0	1202	1830	1410
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			358		68			16				116
Link Speed (k/h)		40			50			60			60	
Link Distance (m)		334.2			160.5			258.9			212.4	
Travel Time (s)		30.1			11.6			15.5			12.7	
Confl. Peds. (#/hr)	5						3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	3%	21%	2%	2%	5%	13%
Adj. Flow (vph)	61	9	437	86	13	159	107	164	26	150	493	35
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	70	437	0	258	0	107	190	0	150	493	35
Turn Type	Perm	NA	Perm	custom	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8			5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0			5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0			11.0	45.0		45.0	45.0	45.0
Total Split (s)	29.0	29.0	29.0	29.0			11.0	56.0		45.0	45.0	45.0
Total Split (%)	34.1%	34.1%	34.1%	34.1%			12.9%	65.9%		52.9%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0			2.0	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
Total Lost Time (s)		6.0	6.0				6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None			None	Min		Min	Min	Min
Act Effct Green (s)		11.2	11.2		0.0		28.4	28.4		20.1	20.1	20.1
Actuated g/C Ratio		0.21	0.21		0.00		0.53	0.53		0.38	0.38	0.38
v/c Ratio		0.18	0.70		3.79		0.28	0.22		0.33	0.71	0.06
Control Delay		21.5	12.3		1303.8		7.9	6.5		15.3	21.3	0.2
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		21.5	12.3		1303.8		7.9	6.5		15.3	21.3	0.2
LOS		C	B		F		A	A		B	C	A
Approach Delay		13.5			1303.8			7.0			18.9	

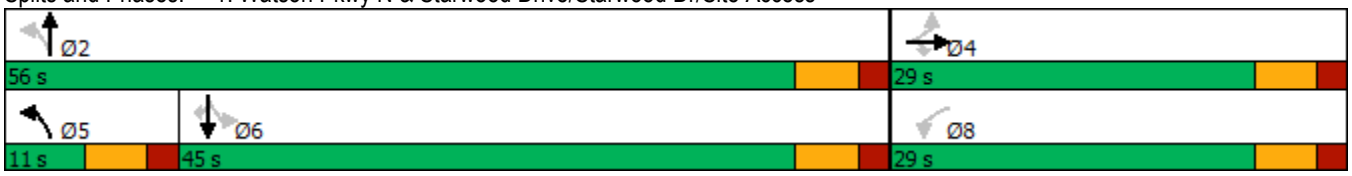
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		B			F			A			B	
Queue Length 50th (m)		5.7	6.5		~38.7		3.7	6.4		9.7	38.3	0.0
Queue Length 95th (m)		18.4	37.1		#109.4		13.9	22.1		28.0	89.3	0.0
Internal Link Dist (m)		310.2			136.5			234.9			188.4	
Turn Bay Length (m)							82.0			45.7		45.7
Base Capacity (vph)		961	1012		68		389	1412		938	1429	1126
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.07	0.43		3.79		0.28	0.13		0.16	0.34	0.03

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 53.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 3.79			
Intersection Signal Delay: 205.8		Intersection LOS: F	
Intersection Capacity Utilization 76.2%		ICU Level of Service D	
Analysis Period (min) 15			

~ 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: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	21	30	142	17	84	351
Future Volume (vph)	21	30	142	17	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.920		0.986			
Flt Protected	0.980				0.950	
Satd. Flow (prot)	1732	0	1670	0	1825	1830
Flt Permitted	0.980				0.950	
Satd. Flow (perm)	1732	0	1670	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			201.7
Travel Time (s)	12.4		12.7			12.1
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	23	33	154	18	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	56	0	172	0	91	382
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	21	30	142	17	84	351
Future Volume (Veh/h)	21	30	142	17	84	351
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)	23	33	154	18	91	382
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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)			212			
pX, platoon unblocked						
vC, conflicting volume	731	167			175	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	731	167			175	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	96			94	
cM capacity (veh/h)	365	879			1410	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	56	172	91	382
Volume Left	23	0	91	0
Volume Right	33	18	0	0
cSH	557	1700	1410	1700
Volume to Capacity	0.10	0.10	0.06	0.22
Queue Length 95th (m)	2.6	0.0	1.6	0.0
Control Delay (s)	12.2	0.0	7.7	0.0
Lane LOS	B		A	
Approach Delay (s)	12.2	0.0	1.5	
Approach LOS	B			

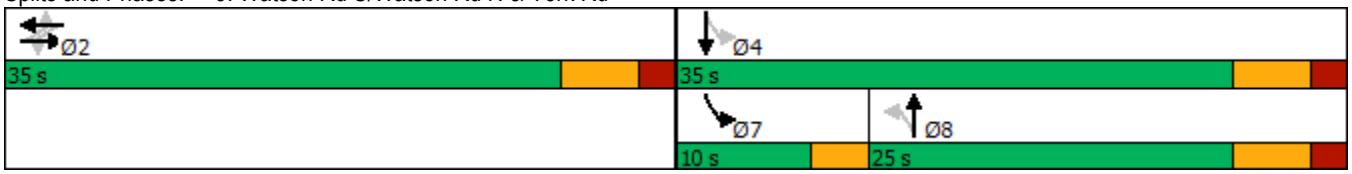
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

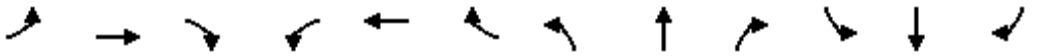
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	334	66	45	401	45	24	7	13	184	48	10
Future Volume (vph)	3	334	66	45	401	45	24	7	13	184	48	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	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		0.978			0.988			0.961			0.994	
Flt Protected					0.995			0.974			0.963	
Satd. Flow (prot)	0	1719	0	0	1792	0	0	1349	0	0	1794	0
Flt Permitted		0.997			0.930			0.796			0.746	
Satd. Flow (perm)	0	1714	0	0	1675	0	0	1102	0	0	1390	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			9			14			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	3	363	72	49	436	49	26	8	14	200	52	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	438	0	0	534	0	0	48	0	0	263	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.2			29.2			15.4			15.4	
Actuated g/C Ratio		0.51			0.51			0.27			0.27	
v/c Ratio		0.49			0.62			0.16			0.69	
Control Delay		12.1			14.8			12.6			28.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.1			14.8			12.6			28.1	
LOS		B			B			B			C	
Approach Delay		12.1			14.8			12.6			28.1	
Approach LOS		B			B			B			C	
Queue Length 50th (m)		26.2			35.9			2.7			24.5	
Queue Length 95th (m)		61.3			83.2			9.0			45.3	
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		891			867			395			717	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.49			0.62			0.12			0.37	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 56.7			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 16.5		Intersection LOS: B	
Intersection Capacity Utilization 81.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd





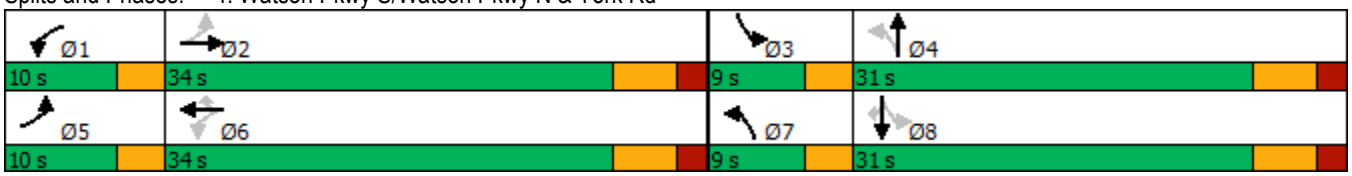
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	159	284	119	32	371	32	76	98	21	103	469	392
Future Volume (vph)	159	284	119	32	371	32	76	98	21	103	469	392
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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		0.956				0.850		0.973				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1757	0	1393	1847	1328	1630	1642	0	1738	1883	1570
Flt Permitted	0.299			0.373			0.170			0.674		
Satd. Flow (perm)	552	1757	0	547	1847	1328	292	1642	0	1233	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		13				410
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		395.6			410.1			433.1			240.2	
Travel Time (s)		23.7			24.6			26.0			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	173	309	129	35	403	35	83	107	23	112	510	426
Shared Lane Traffic (%)												
Lane Group Flow (vph)	173	438	0	35	403	35	83	130	0	112	510	426
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	35.6	28.7		33.7	24.0	24.0	31.1	23.5		31.1	23.5	23.5
Actuated g/C Ratio	0.46	0.37		0.44	0.31	0.31	0.41	0.31		0.41	0.31	0.31
v/c Ratio	0.47	0.65		0.11	0.70	0.07	0.37	0.25		0.21	0.88	0.56
Control Delay	17.1	26.6		12.4	31.3	0.3	18.4	21.2		14.8	46.2	6.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	17.1	26.6		12.4	31.3	0.3	18.4	21.2		14.8	46.2	6.2
LOS	B	C		B	C	A	B	C		B	D	A
Approach Delay		23.9			27.6			20.1			26.6	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	15.6	59.1		2.9	56.6	0.0	7.8	14.6		10.7	80.8	1.9

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	27.6	94.2		7.7	87.5	0.0	16.3	28.9		20.7	#139.8	23.5
Internal Link Dist (m)		371.6			386.1			409.1			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	368	674		322	689	568	225	555		540	627	796
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	0.47	0.65		0.11	0.58	0.06	0.37	0.23		0.21	0.81	0.54

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 76.7			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 25.5		Intersection LOS: C	
Intersection Capacity Utilization 74.7%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Watson Pkwy S/Watson Pkwy N & York Rd



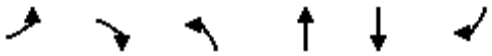
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	17	199	3	0	903
Future Volume (vph)	9	17	199	3	0	903
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.913		0.998			
Flt Protected	0.982					
Satd. Flow (prot)	1689	0	1880	0	0	1883
Flt Permitted	0.982					
Satd. Flow (perm)	1689	0	1880	0	0	1883
Link Speed (k/h)	50		50			50
Link Distance (m)	231.9		240.2			258.9
Travel Time (s)	16.7		17.3			18.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	18	216	3	0	982
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	219	0	0	982
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.5%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	17	199	3	0	903
Future Volume (Veh/h)	9	17	199	3	0	903
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)	10	18	216	3	0	982
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			259
pX, platoon unblocked	0.78					
vC, conflicting volume	1200	218			219	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1116	218			219	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	98			100	
cM capacity (veh/h)	180	822			1350	

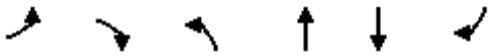
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	28	219	982
Volume Left	10	0	0
Volume Right	18	3	0
cSH	361	1700	1350
Volume to Capacity	0.08	0.13	0.00
Queue Length 95th (m)	2.0	0.0	0.0
Control Delay (s)	15.8	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.8	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	37	4	45	110	0
Future Volume (vph)	0	37	4	45	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.996		
Satd. Flow (prot)	1629	0	0	1876	1883	0
Flt Permitted				0.996		
Satd. Flow (perm)	1629	0	0	1876	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	148.0			356.4	206.3	
Travel Time (s)	10.7			25.7	14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	40	4	49	120	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	0	53	120	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 15.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	37	4	45	110	0
Future Volume (Veh/h)	0	37	4	45	110	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	40	4	49	120	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	177	120	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177	120	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	811	931	1468			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	53	120
Volume Left	0	4	0
Volume Right	40	0	0
cSH	931	1468	1700
Volume to Capacity	0.04	0.00	0.07
Queue Length 95th (m)	1.1	0.1	0.0
Control Delay (s)	9.0	0.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	20.1	85.6	148.2	27.4	32.9	50.5	108.7	31.2
Average Queue (m)	7.9	38.4	60.6	12.2	14.6	18.5	44.2	6.4
95th Queue (m)	17.1	71.9	129.4	23.4	29.3	39.8	82.2	22.8
Link Distance (m)	320.2	320.2	149.4		234.9		193.8	
Upstream Blk Time (%)			3					
Queuing Penalty (veh)			0					
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)						0	6	0
Queuing Penalty (veh)						0	10	0

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	SB	SB
Directions Served	LR	L	T
Maximum Queue (m)	14.3	12.9	2.5
Average Queue (m)	6.9	3.3	0.1
95th Queue (m)	13.1	10.6	1.7
Link Distance (m)	185.8		196.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		38.0	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	71.0	91.1	35.4	50.5
Average Queue (m)	32.4	41.6	8.7	29.6
95th Queue (m)	58.0	76.8	23.9	45.3
Link Distance (m)	390.5	417.1	501.1	339.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	48.4	79.4	46.8	101.9	18.5	36.7	42.8	38.2	108.2	65.5
Average Queue (m)	21.6	40.4	9.1	49.5	5.0	14.8	20.6	13.5	57.2	32.5
95th Queue (m)	39.2	66.7	30.5	83.4	14.6	28.4	37.1	26.9	94.4	57.3
Link Distance (m)		381.4		390.5			422.2		215.5	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	0	1		5					1	
Queuing Penalty (veh)	0	1		3					6	

Intersection: 5: Watson Pkwy N & West Site Access

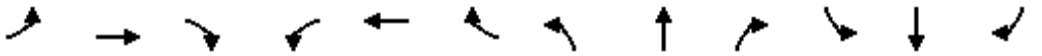
Movement	WB
Directions Served	LR
Maximum Queue (m)	13.5
Average Queue (m)	4.9
95th Queue (m)	12.5
Link Distance (m)	218.6
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Watson Rd N & East Site Access

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	15.4	5.5
Average Queue (m)	6.7	0.2
95th Queue (m)	14.2	2.3
Link Distance (m)	139.5	339.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 21



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	16	250	108	20	118	351	447	114	175	244	58
Future Volume (vph)	19	16	250	108	20	118	351	447	114	175	244	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor							1.00					0.98
Frt			0.850		0.935			0.970				0.850
Flt Protected		0.973			0.979		0.950			0.950		
Satd. Flow (prot)	0	1853	1601	0	1724	0	1807	1827	0	1789	1883	1633
Flt Permitted		0.973			0.979		0.442			0.434		
Satd. Flow (perm)	0	1853	1601	0	1724	0	840	1827	0	817	1883	1598
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			272		39			26				116
Link Speed (k/h)		40			31			60			60	
Link Distance (m)		334.2			160.5			258.9			212.4	
Travel Time (s)		30.1			18.6			15.5			12.7	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	1%	2%	2%	2%	2%	0%
Adj. Flow (vph)	21	17	272	117	22	128	382	486	124	190	265	63
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	38	272	0	267	0	382	610	0	190	265	63
Turn Type	Perm	NA	Perm	custom	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4					5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8			5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0			5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0			11.0	45.0		45.0	45.0	45.0
Total Split (s)	29.0	29.0	29.0	29.0			11.0	56.0		45.0	45.0	45.0
Total Split (%)	34.1%	34.1%	34.1%	34.1%			12.9%	65.9%		52.9%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0			4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0			2.0	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
Total Lost Time (s)		6.0	6.0				6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None			None	Min		Min	Min	Min
Act Effct Green (s)		8.2	8.2		0.0		28.4	28.4		17.0	17.0	17.0
Actuated g/C Ratio		0.17	0.17		0.00		0.58	0.58		0.35	0.35	0.35
v/c Ratio		0.12	0.55		6.85		0.65	0.57		0.67	0.40	0.10
Control Delay		20.9	8.3		2691.2		11.8	8.5		25.9	13.6	1.0
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		20.9	8.3		2691.2		11.8	8.5		25.9	13.6	1.0
LOS		C	A		F		B	A		C	B	A
Approach Delay		9.9			2691.2			9.8			16.6	

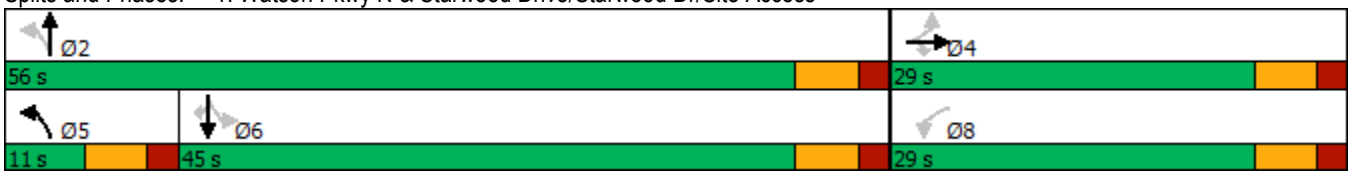
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			F			A			B	
Queue Length 50th (m)		2.8	0.0		~41.7		13.9	24.6		13.0	16.3	0.0
Queue Length 95th (m)		11.2	17.7		#103.3		33.0	58.2		34.6	34.8	1.9
Internal Link Dist (m)		310.2			136.5			234.9			188.4	
Turn Bay Length (m)							82.0			45.7		45.7
Base Capacity (vph)		898	916		39		588	1736		671	1547	1334
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.04	0.30		6.85		0.65	0.35		0.28	0.17	0.05

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 48.9			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 6.85			
Intersection Signal Delay: 354.5		Intersection LOS: F	
Intersection Capacity Utilization 74.4%		ICU Level of Service D	
Analysis Period (min) 15			

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

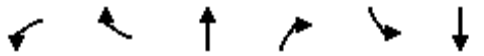
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	39	128	425	13	42	244
Future Volume (vph)	39	128	425	13	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.896		0.996			
Flt Protected	0.989				0.950	
Satd. Flow (prot)	1702	0	1877	0	1772	1830
Flt Permitted	0.989				0.950	
Satd. Flow (perm)	1702	0	1877	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			201.7
Travel Time (s)	12.4		12.7			12.1
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	42	139	462	14	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	181	0	476	0	46	265
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 46.7%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	39	128	425	13	42	244
Future Volume (Veh/h)	39	128	425	13	42	244
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)	42	139	462	14	46	265
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			212			
pX, platoon unblocked						
vC, conflicting volume	832	473			479	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	473			479	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	77			96	
cM capacity (veh/h)	327	595			1077	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	181	476	46	265
Volume Left	42	0	46	0
Volume Right	139	14	0	0
cSH	500	1700	1077	1700
Volume to Capacity	0.36	0.28	0.04	0.16
Queue Length 95th (m)	12.9	0.0	1.1	0.0
Control Delay (s)	16.2	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	16.2	0.0	1.3	
Approach LOS	C			

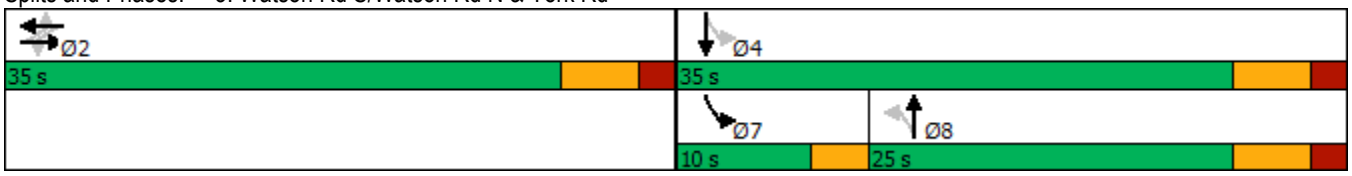
Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	46.7%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	359	26	15	392	131	68	66	44	31	8	2
Future Volume (vph)	7	359	26	15	392	131	68	66	44	31	8	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Ped Bike Factor								0.99			1.00	
Frt		0.991			0.967			0.967			0.994	
Flt Protected		0.999			0.999			0.981			0.964	
Satd. Flow (prot)	0	1829	0	0	1770	0	0	1777	0	0	1785	0
Flt Permitted		0.989			0.985			0.855			0.720	
Satd. Flow (perm)	0	1811	0	0	1745	0	0	1547	0	0	1331	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			28			23			2	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	8	390	28	16	426	142	74	72	48	34	9	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	426	0	0	584	0	0	194	0	0	45	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		31.6			31.6			11.3			11.3	
Actuated g/C Ratio		0.57			0.57			0.21			0.21	
v/c Ratio		0.41			0.58			0.58			0.16	
Control Delay		8.7			10.7			23.5			17.1	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		8.7			10.7			23.5			17.1	
LOS		A			B			C			B	
Approach Delay		8.7			10.7			23.5			17.1	
Approach LOS		A			B			C			B	
Queue Length 50th (m)		20.3			30.5			14.8			3.4	
Queue Length 95th (m)		45.7			69.8			30.6			9.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												
Base Capacity (vph)		1044			1015			552			706	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.41			0.58			0.35			0.06	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 55			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 12.3		Intersection LOS: B	
Intersection Capacity Utilization 57.0%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



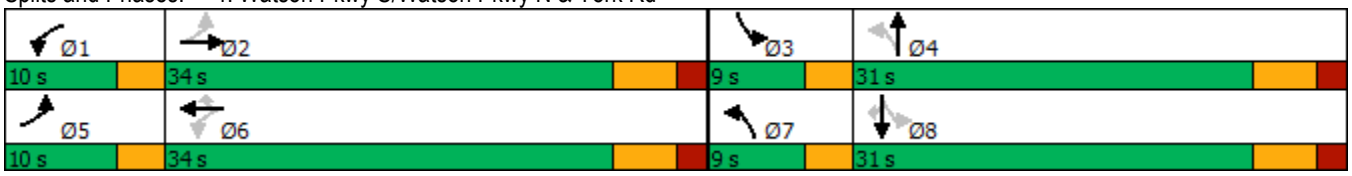
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	488	343	99	14	403	74	190	454	21	53	308	441
Future Volume (vph)	488	343	99	14	403	74	190	454	21	53	308	441
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.966				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1775	0	1690	1865	1633	1706	1841	0	1722	1865	1555
Flt Permitted	0.263			0.391			0.332			0.187		
Satd. Flow (perm)	495	1775	0	696	1865	1633	596	1841	0	339	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				117		3				357
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		395.6			410.1			433.1			240.2	
Travel Time (s)		23.7			24.6			26.0			14.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	530	373	108	15	438	80	207	493	23	58	335	479
Shared Lane Traffic (%)												
Lane Group Flow (vph)	530	481	0	15	438	80	207	516	0	58	335	479
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	36.0	31.7		32.5	23.2	23.2	30.5	24.2		29.1	19.9	19.9
Actuated g/C Ratio	0.48	0.42		0.44	0.31	0.31	0.41	0.32		0.39	0.27	0.27
v/c Ratio	1.47	0.63		0.04	0.76	0.14	0.62	0.86		0.24	0.67	0.72
Control Delay	245.4	23.1		11.6	33.5	2.3	24.8	42.4		15.6	32.1	13.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	245.4	23.1		11.6	33.5	2.3	24.8	42.4		15.6	32.1	13.6
LOS	F	C		B	C	A	C	D		B	C	B
Approach Delay		139.6			28.2			37.4			20.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			C			D			C	
Queue Length 50th (m)	~101.6	55.4		1.2	62.8	0.0	18.8	75.7		4.8	43.4	14.1
Queue Length 95th (m)	#187.3	#117.3		4.3	96.4	4.6	#37.4	#144.8		12.2	74.9	49.7
Internal Link Dist (m)		371.6			386.1			409.1			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	361	762		405	711	695	334	629		245	635	753
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	1.47	0.63		0.04	0.62	0.12	0.62	0.82		0.24	0.53	0.64

Intersection Summary

Area Type: Other
Cycle Length: 84
Actuated Cycle Length: 74.7
Natural Cycle: 105
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 1.47
Intersection Signal Delay: 64.2 Intersection LOS: E
Intersection Capacity Utilization 95.1% ICU Level of Service F
Analysis Period (min) 15
~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



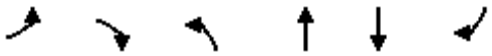
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	12	14	732	13	0	584
Future Volume (vph)	12	14	732	13	0	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.928		0.998			
Flt Protected	0.977					
Satd. Flow (prot)	1708	0	1880	0	0	1883
Flt Permitted	0.977					
Satd. Flow (perm)	1708	0	1880	0	0	1883
Link Speed (k/h)	31		60			60
Link Distance (m)	231.9		240.2			258.9
Travel Time (s)	26.9		14.4			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	15	796	14	0	635
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	810	0	0	635
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	14	732	13	0	584
Future Volume (Veh/h)	12	14	732	13	0	584
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)	13	15	796	14	0	635
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			259
pX, platoon unblocked	0.63	0.61			0.61	
vC, conflicting volume	1438	803			810	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1229	351			363	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	96			100	
cM capacity (veh/h)	124	420			726	

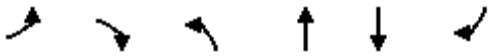
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	28	810	635
Volume Left	13	0	0
Volume Right	15	14	0
cSH	199	1700	726
Volume to Capacity	0.14	0.48	0.00
Queue Length 95th (m)	3.8	0.0	0.0
Control Delay (s)	26.0	0.0	0.0
Lane LOS	D		
Approach Delay (s)	26.0	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	39	157	64	0
Future Volume (vph)	0	0	39	157	64	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.990		
Satd. Flow (prot)	1883	0	0	1865	1883	0
Flt Permitted				0.990		
Satd. Flow (perm)	1883	0	0	1865	1883	0
Link Speed (k/h)	31			60	60	
Link Distance (m)	148.0			356.4	206.3	
Travel Time (s)	17.2			21.4	12.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	42	171	70	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	213	70	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	39	157	64	0
Future Volume (Veh/h)	0	0	39	157	64	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	42	171	70	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	325	70	70			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325	70	70			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	651	993	1531			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	213	70
Volume Left	0	42	0
Volume Right	0	0	0
cSH	1700	1531	1700
Volume to Capacity	0.04	0.03	0.04
Queue Length 95th (m)	0.0	0.7	0.0
Control Delay (s)	0.0	1.6	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	1.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	13.5	62.6	164.1	40.1	61.8	52.7	96.6	36.4
Average Queue (m)	3.5	27.8	154.0	19.9	23.8	28.3	30.7	8.0
95th Queue (m)	11.1	65.4	162.8	34.7	49.4	50.0	77.7	26.5
Link Distance (m)	320.2	320.2	149.4		234.9		193.8	
Upstream Blk Time (%)			97					
Queuing Penalty (veh)			0					
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)					0	5	5	0
Queuing Penalty (veh)					0	14	12	0

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	32.0	8.6	14.0
Average Queue (m)	14.8	1.4	2.9
95th Queue (m)	25.0	5.9	10.3
Link Distance (m)	185.8	193.8	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	45.7	79.8	36.8	21.7
Average Queue (m)	16.6	34.6	18.8	6.5
95th Queue (m)	35.5	63.9	30.7	16.6
Link Distance (m)	390.5	417.1	501.1	339.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	168.0	399.3	16.3	89.7	20.5	74.6	440.1	153.2	203.2	157.5
Average Queue (m)	167.9	389.0	3.0	55.4	9.4	74.0	411.5	61.4	158.6	142.5
95th Queue (m)	168.3	396.0	10.6	81.3	16.7	77.3	522.7	194.3	283.3	191.0
Link Distance (m)		381.4		390.5			422.2		215.5	
Upstream Blk Time (%)		98					86		23	
Queuing Penalty (veh)		0					0		144	
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	100	1		7		90	15		9	71
Queuing Penalty (veh)	441	3		6		429	28		44	257

Intersection: 5: Watson Pkwy N & West Site Access

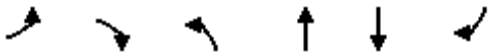
Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	43.6	8.0	166.3
Average Queue (m)	17.1	1.1	87.1
95th Queue (m)	50.0	5.1	250.4
Link Distance (m)	218.6	215.5	234.9
Upstream Blk Time (%)			6
Queuing Penalty (veh)			35
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Watson Rd N & East Site Access

Movement	NB
Directions Served	LT
Maximum Queue (m)	12.4
Average Queue (m)	0.7
95th Queue (m)	5.1
Link Distance (m)	339.3
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

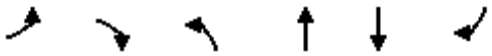
Network Summary

Network wide Queuing Penalty: 1414



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	61	436	107	167	501	35
Future Volume (vph)	61	436	107	167	501	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0	0.0	82.0			45.7
Storage Lanes	1	1	1			0
Taper Length (m)	50.0		66.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.991	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1772	1588	1804	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1825	1601	1772	1588	1804	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	290.7			493.1	212.4	
Travel Time (s)	26.2			29.6	12.7	
Confl. Peds. (#/hr)	5		3			3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	21%	5%	13%
Adj. Flow (vph)	66	474	116	182	545	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	66	474	116	182	583	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 62.2%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	61	436	107	167	501	35
Future Volume (Veh/h)	61	436	107	167	501	35
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)	66	474	116	182	545	38
Pedestrians	3				5	
Lane Width (m)	3.7				3.7	
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	986	567	586			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	986	567	586			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	73	9	88			
cM capacity (veh/h)	243	522	981			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	66	474	116	182	583
Volume Left	66	0	116	0	0
Volume Right	0	474	0	0	38
cSH	243	522	981	1700	1700
Volume to Capacity	0.27	0.91	0.12	0.11	0.34
Queue Length 95th (m)	8.4	84.4	3.2	0.0	0.0
Control Delay (s)	25.3	48.3	9.2	0.0	0.0
Lane LOS	D	E	A		
Approach Delay (s)	45.5		3.6		0.0
Approach LOS	E				

Intersection Summary			
Average Delay	18.0		
Intersection Capacity Utilization	62.2%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	30	142	19	84	351
Future Volume (vph)	23	30	142	19	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.923		0.984			
Flt Protected	0.979				0.950	
Satd. Flow (prot)	1736	0	1670	0	1825	1830
Flt Permitted	0.979				0.950	
Satd. Flow (perm)	1736	0	1670	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	566.3		212.4			124.2
Travel Time (s)	34.0		12.7			7.5
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	25	33	154	21	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	175	0	91	382
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	30	142	19	84	351
Future Volume (Veh/h)	23	30	142	19	84	351
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)	25	33	154	21	91	382
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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	732	168			178	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	732	168			178	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	96			94	
cM capacity (veh/h)	364	878			1406	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	58	175	91	382
Volume Left	25	0	91	0
Volume Right	33	21	0	0
cSH	546	1700	1406	1700
Volume to Capacity	0.11	0.10	0.06	0.22
Queue Length 95th (m)	2.8	0.0	1.6	0.0
Control Delay (s)	12.4	0.0	7.7	0.0
Lane LOS	B		A	
Approach Delay (s)	12.4	0.0	1.5	
Approach LOS	B			

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

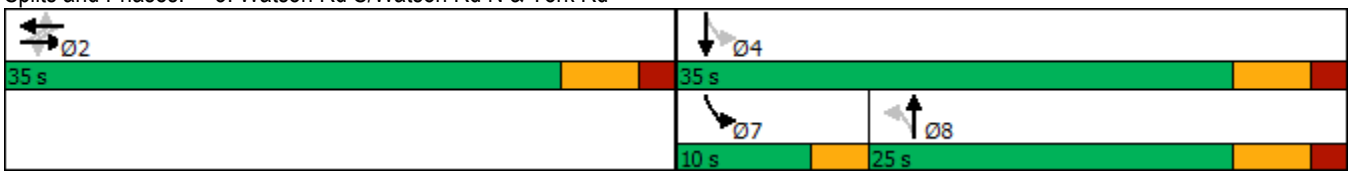
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	367	71	50	443	45	27	7	14	162	53	11
Future Volume (vph)	3	367	71	50	443	45	27	7	14	162	53	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	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		0.978			0.989			0.961			0.993	
Flt Protected					0.995			0.973			0.965	
Satd. Flow (prot)	0	1719	0	0	1795	0	0	1345	0	0	1794	0
Flt Permitted		0.997			0.923			0.791			0.755	
Satd. Flow (perm)	0	1714	0	0	1666	0	0	1094	0	0	1404	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			8			15			5	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			566.3	
Travel Time (s)		24.6			25.5			30.7			34.0	
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
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	3	399	77	54	482	49	29	8	15	176	58	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	479	0	0	585	0	0	52	0	0	246	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.3			29.3			14.4			14.4	
Actuated g/C Ratio		0.53			0.53			0.26			0.26	
v/c Ratio		0.53			0.67			0.18			0.67	
Control Delay		12.2			15.9			13.2			27.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		12.2			15.9			13.2			27.5	
LOS		B			B			B			C	
Approach Delay		12.2			15.9			13.3			27.5	
Approach LOS		B			B			B			C	
Queue Length 50th (m)		28.3			39.5			3.0			22.4	
Queue Length 95th (m)		65.7			#97.6			9.7			42.1	
Internal Link Dist (m)		386.1			401.7			487.6			542.3	
Turn Bay Length (m)												

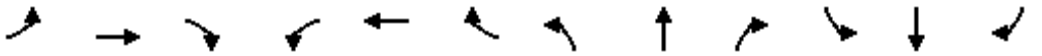
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		908			878			393			735	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.53			0.67			0.13			0.33	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 55.8			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.67			
Intersection Signal Delay: 16.6		Intersection LOS: B	
Intersection Capacity Utilization 84.3%		ICU Level of Service E	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd





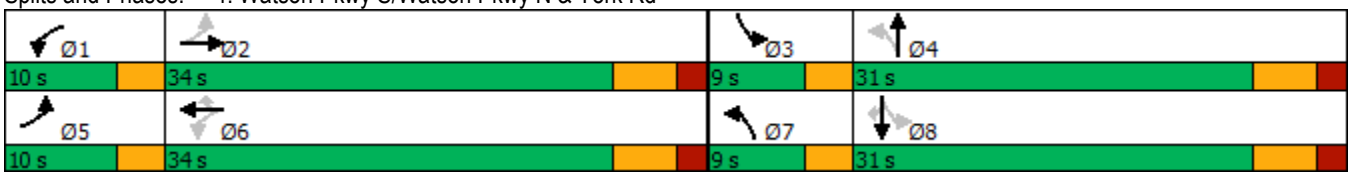
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	140	314	131	35	409	35	84	108	23	111	491	353
Future Volume (vph)	140	314	131	35	409	35	84	108	23	111	491	353
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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		0.956				0.850		0.974				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1757	0	1393	1847	1328	1630	1644	0	1738	1883	1570
Flt Permitted	0.247			0.310			0.165			0.666		
Satd. Flow (perm)	456	1757	0	455	1847	1328	283	1644	0	1219	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		13				380
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		223.8			410.1			303.1			493.1	
Travel Time (s)		13.4			24.6			18.2			29.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	152	341	142	38	445	38	91	117	25	121	534	384
Shared Lane Traffic (%)												
Lane Group Flow (vph)	152	483	0	38	445	38	91	142	0	121	534	384
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	35.9	28.9		34.1	24.4	24.4	31.7	24.1		31.7	24.1	24.1
Actuated g/C Ratio	0.46	0.37		0.44	0.31	0.31	0.41	0.31		0.41	0.31	0.31
v/c Ratio	0.46	0.72		0.14	0.77	0.08	0.41	0.27		0.22	0.91	0.51
Control Delay	17.2	29.6		12.7	34.6	0.3	19.5	21.6		15.0	50.0	5.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	17.2	29.6		12.7	34.6	0.3	19.5	21.6		15.0	50.0	5.5
LOS	B	C		B	C	A	B	C		B	D	A
Approach Delay		26.6			30.5			20.8			29.5	
Approach LOS		C			C			C			C	
Queue Length 50th (m)	13.5	68.2		3.2	64.3	0.0	8.6	16.2		11.6	86.2	0.5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	24.5	#118.7		8.2	98.7	0.0	17.7	31.2		22.1	#149.3	20.2
Internal Link Dist (m)		199.8			386.1			279.1			469.1	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	329	671		288	677	561	221	547		539	616	769
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	0.46	0.72		0.13	0.66	0.07	0.41	0.26		0.22	0.87	0.50

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 77.6			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 28.1		Intersection LOS: C	
Intersection Capacity Utilization 77.0%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Watson Pkwy S/Watson Pkwy N & York Rd



Intersection: 1: Watson Pkwy N & Starwood Drive

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (m)	41.7	106.8	23.9	1.8	10.8
Average Queue (m)	10.3	49.7	10.0	0.1	0.7
95th Queue (m)	35.3	95.1	20.6	1.3	5.2
Link Distance (m)		276.4		463.8	194.0
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	84.0		82.0		
Storage Blk Time (%)		6			
Queuing Penalty (veh)		3			

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	15.0	1.6	14.6
Average Queue (m)	6.5	0.1	3.7
95th Queue (m)	12.6	1.1	11.7
Link Distance (m)	543.7	194.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

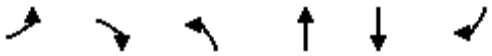
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	66.9	123.7	31.2	48.7
Average Queue (m)	30.5	45.9	9.8	27.3
95th Queue (m)	56.5	85.1	23.5	44.1
Link Distance (m)	388.9	417.0	501.1	543.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	35.7	105.9	25.7	100.3	22.4	40.4	50.7	38.6	104.6	51.2
Average Queue (m)	16.9	48.0	8.8	54.6	6.2	16.8	21.8	14.7	61.8	25.3
95th Queue (m)	29.8	84.3	20.9	89.9	16.9	32.2	41.2	29.2	97.0	43.7
Link Distance (m)		209.8		388.9			292.3		463.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)		3		8					1	
Queuing Penalty (veh)		5		5					5	

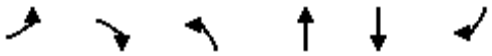
Network Summary

Network wide Queuing Penalty: 18



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	21	271	385	478	269	62
Future Volume (vph)	21	271	385	478	269	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0	0.0	82.0			45.7
Storage Lanes	1	1	1			0
Taper Length (m)	50.0		66.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.975	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1807	1883	1843	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1825	1601	1807	1883	1843	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	290.7			493.1	212.4	
Travel Time (s)	26.2			29.6	12.7	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	2%	2%	0%
Adj. Flow (vph)	23	295	418	520	292	67
Shared Lane Traffic (%)						
Lane Group Flow (vph)	23	295	418	520	359	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 52.6%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	271	385	478	269	62
Future Volume (Veh/h)	21	271	385	478	269	62
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)	23	295	418	520	292	67
Pedestrians	1					
Lane Width (m)	3.7					
Walking Speed (m/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1682	326	360			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1682	326	360			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	66	59	65			
cM capacity (veh/h)	69	715	1204			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	23	295	418	520	359
Volume Left	23	0	418	0	0
Volume Right	0	295	0	0	67
cSH	69	715	1204	1700	1700
Volume to Capacity	0.34	0.41	0.35	0.31	0.21
Queue Length 95th (m)	9.8	16.0	12.4	0.0	0.0
Control Delay (s)	82.1	13.5	9.6	0.0	0.0
Lane LOS	F	B	A		
Approach Delay (s)	18.5		4.3		0.0
Approach LOS	C				

Intersection Summary			
Average Delay	6.1		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	128	425	14	42	244
Future Volume (vph)	43	128	425	14	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899		0.996			
Flt Protected	0.988				0.950	
Satd. Flow (prot)	1706	0	1877	0	1772	1830
Flt Permitted	0.988				0.950	
Satd. Flow (perm)	1706	0	1877	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	566.3		212.4			124.2
Travel Time (s)	34.0		12.7			7.5
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	47	139	462	15	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	186	0	477	0	46	265
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	128	425	14	42	244
Future Volume (Veh/h)	43	128	425	14	42	244
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)	47	139	462	15	46	265
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
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	832	474			480	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	474			480	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	86	77			96	
cM capacity (veh/h)	326	594			1076	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	186	477	46	265
Volume Left	47	0	46	0
Volume Right	139	15	0	0
cSH	492	1700	1076	1700
Volume to Capacity	0.38	0.28	0.04	0.16
Queue Length 95th (m)	13.8	0.0	1.1	0.0
Control Delay (s)	16.7	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	16.7	0.0	1.3	
Approach LOS	C			

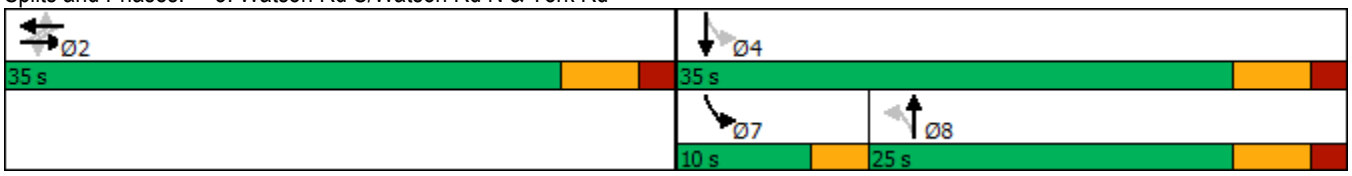
Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	394	28	17	432	102	75	73	49	34	9	2
Future Volume (vph)	7	394	28	17	432	102	75	73	49	34	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Ped Bike Factor								0.99			1.00	
Frt		0.991			0.975			0.967			0.994	
Flt Protected		0.999			0.998			0.981			0.964	
Satd. Flow (prot)	0	1829	0	0	1782	0	0	1777	0	0	1785	0
Flt Permitted		0.990			0.982			0.853			0.706	
Satd. Flow (perm)	0	1813	0	0	1753	0	0	1544	0	0	1305	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			20			23			2	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			566.3	
Travel Time (s)		24.6			25.5			30.7			34.0	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	8	428	30	18	470	111	82	79	53	37	10	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	466	0	0	599	0	0	214	0	0	49	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		30.5			30.5			11.9			11.9	
Actuated g/C Ratio		0.56			0.56			0.22			0.22	
v/c Ratio		0.46			0.60			0.60			0.17	
Control Delay		9.7			11.9			23.8			17.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		9.7			11.9			23.8			17.0	
LOS		A			B			C			B	
Approach Delay		9.7			11.9			23.8			17.0	
Approach LOS		A			B			C			B	
Queue Length 50th (m)		23.9			33.7			16.7			3.8	
Queue Length 95th (m)		53.9			77.3			33.8			10.4	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			542.3	
Turn Bay Length (m)												
Base Capacity (vph)		1018			991			554			697	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.46			0.60			0.39			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 54.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.60			
Intersection Signal Delay: 13.2		Intersection LOS: B	
Intersection Capacity Utilization 59.6%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	426	377	109	15	445	82	210	459	23	55	307	374
Future Volume (vph)	426	377	109	15	445	82	210	459	23	55	307	374
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.966				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1775	0	1690	1865	1633	1706	1840	0	1722	1865	1555
Flt Permitted	0.222			0.338			0.327			0.187		
Satd. Flow (perm)	418	1775	0	601	1865	1633	587	1840	0	339	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				117		3				329
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		223.8			410.1			303.1			493.1	
Travel Time (s)		13.4			24.6			18.2			29.6	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	463	410	118	16	484	89	228	499	25	60	334	407
Shared Lane Traffic (%)												
Lane Group Flow (vph)	463	528	0	16	484	89	228	524	0	60	334	407
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	37.3	32.9		33.9	24.5	24.5	30.6	24.2		29.2	20.0	20.0
Actuated g/C Ratio	0.49	0.43		0.45	0.32	0.32	0.40	0.32		0.38	0.26	0.26
v/c Ratio	1.39	0.68		0.04	0.81	0.15	0.70	0.89		0.25	0.68	0.63
Control Delay	214.4	24.7		11.5	36.3	3.0	30.4	46.6		16.2	33.1	10.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	214.4	24.7		11.5	36.3	3.0	30.4	46.6		16.2	33.1	10.6
LOS	F	C		B	D	A	C	D		B	C	B
Approach Delay		113.3			30.6			41.7			20.4	

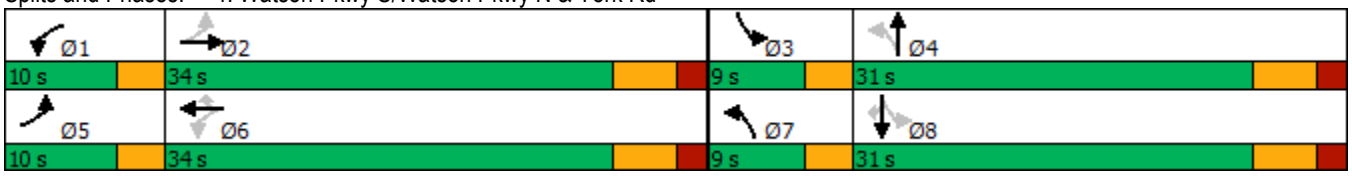
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			C			D			C	
Queue Length 50th (m)	~81.7	63.3		1.3	71.8	0.0	22.9	82.6		5.4	46.1	9.3
Queue Length 95th (m)	#166.5	#136.8		4.4	#118.8	6.3	#46.9	#148.1		12.6	74.8	36.1
Internal Link Dist (m)		199.8			386.1			279.1			469.1	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	333	779		376	698	685	325	617		241	623	728
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	1.39	0.68		0.04	0.69	0.13	0.70	0.85		0.25	0.54	0.56

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 76.1			
Natural Cycle: 95			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.39			
Intersection Signal Delay: 56.8		Intersection LOS: E	
Intersection Capacity Utilization 94.3%		ICU Level of Service F	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



Intersection: 1: Watson Pkwy N & Starwood Drive

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (m)	15.0	43.8	42.8	19.3
Average Queue (m)	3.6	20.9	18.2	6.1
95th Queue (m)	10.7	36.4	33.6	13.3
Link Distance (m)		276.4		194.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	84.0		82.0	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	33.6	7.7	13.0
Average Queue (m)	14.3	1.4	3.2
95th Queue (m)	24.9	5.7	10.7
Link Distance (m)	543.7	194.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

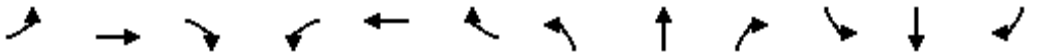
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	71.2	92.3	46.8	21.6
Average Queue (m)	23.1	37.9	23.4	7.3
95th Queue (m)	51.4	70.6	38.8	17.6
Link Distance (m)	388.9	417.0	501.1	543.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	168.0	224.8	38.3	157.8	86.8	74.6	310.0	24.6	109.3	143.3
Average Queue (m)	167.9	216.5	3.6	77.3	18.1	74.3	298.3	9.4	42.2	73.7
95th Queue (m)	168.0	221.8	22.7	136.1	69.6	74.8	322.1	20.1	78.5	127.9
Link Distance (m)		209.8		388.9			292.3		463.8	
Upstream Blk Time (%)		87					93			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	100	3		26		94	9		0	5
Queuing Penalty (veh)	485	15		25		454	19		1	18

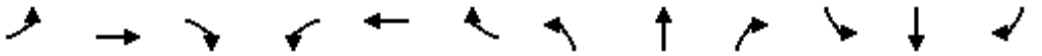
Network Summary

Network wide Queuing Penalty: 1017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	61	8	436	79	12	146	107	167	24	138	501	35
Future Volume (vph)	61	8	436	79	12	146	107	167	24	138	501	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor												
Frt			0.850		0.917			0.981				0.850
Flt Protected		0.958			0.984		0.950			0.950		
Satd. Flow (prot)	0	1836	1601	0	1699	0	1807	1848	0	1789	1883	1633
Flt Permitted		0.958			0.984		0.950			0.950		
Satd. Flow (perm)	0	1836	1601	0	1699	0	1807	1848	0	1789	1883	1633
Link Speed (k/h)		40			31			60			60	
Link Distance (m)		375.9			190.4			258.9			212.4	
Travel Time (s)		33.8			22.1			15.5			12.7	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	1%	2%	2%	2%	2%	0%
Adj. Flow (vph)	66	9	474	86	13	159	116	182	26	150	545	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	474	0	258	0	116	208	0	150	545	38
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 77.3%		ICU Level of Service D	
Analysis Period (min) 15			



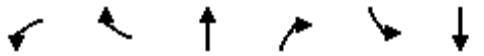
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	61	8	436	79	12	146	107	167	24	138	501	35
Future Volume (Veh/h)	61	8	436	79	12	146	107	167	24	138	501	35
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	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)	66	9	474	86	13	159	116	182	26	150	545	38
Pedestrians		1										
Lane Width (m)		3.7										
Walking Speed (m/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1426	1286	546	1750	1311	195	584			208		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1426	1286	546	1750	1311	195	584			208		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	8	93	12	0	90	81	88			89		
cM capacity (veh/h)	72	129	537	6	125	846	995			1363		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	75	474	258	116	208	150	545	38
Volume Left	66	0	86	116	0	150	0	0
Volume Right	0	474	159	0	26	0	0	38
cSH	76	537	18	995	1700	1363	1700	1700
Volume to Capacity	0.99	0.88	14.01	0.12	0.12	0.11	0.32	0.02
Queue Length 95th (m)	41.6	78.6	Err	3.1	0.0	2.9	0.0	0.0
Control Delay (s)	196.7	43.1	Err	9.1	0.0	8.0	0.0	0.0
Lane LOS	F	E	F	A		A		
Approach Delay (s)	64.1		Err	3.3		1.6		
Approach LOS	F		F					

Intersection Summary				
Average Delay	1404.1			
Intersection Capacity Utilization	77.3%	ICU Level of Service	D	
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	23	30	142	19	84	351
Future Volume (vph)	23	30	142	19	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.923		0.984			
Flt Protected	0.979				0.950	
Satd. Flow (prot)	1736	0	1858	0	1772	1830
Flt Permitted	0.979				0.950	
Satd. Flow (perm)	1736	0	1858	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			210.8
Travel Time (s)	12.4		12.7			12.6
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	25	33	154	21	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	58	0	175	0	91	382
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	30	142	19	84	351
Future Volume (Veh/h)	23	30	142	19	84	351
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)	25	33	154	21	91	382
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
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	734	168			178	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	734	168			178	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	96			93	
cM capacity (veh/h)	364	880			1391	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	58	175	91	382
Volume Left	25	0	91	0
Volume Right	33	21	0	0
cSH	546	1700	1391	1700
Volume to Capacity	0.11	0.10	0.07	0.22
Queue Length 95th (m)	2.8	0.0	1.7	0.0
Control Delay (s)	12.4	0.0	7.8	0.0
Lane LOS	B		A	
Approach Delay (s)	12.4	0.0	1.5	
Approach LOS	B			

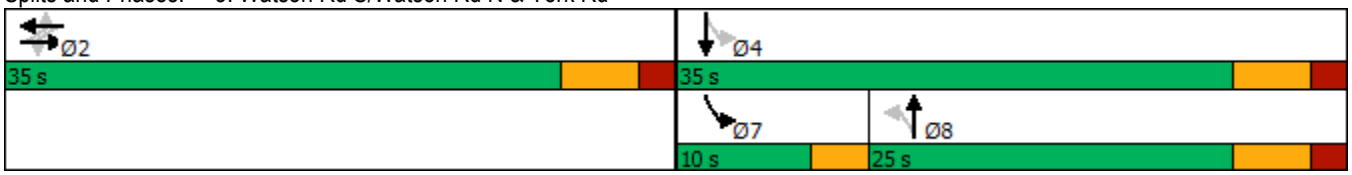
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	367	71	50	443	49	27	7	14	199	53	11
Future Volume (vph)	3	367	71	50	443	49	27	7	14	199	53	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Ped Bike Factor								0.99			1.00	
Frt		0.978			0.988			0.961			0.994	
Flt Protected					0.995			0.973			0.964	
Satd. Flow (prot)	0	1816	0	0	1795	0	0	1744	0	0	1785	0
Flt Permitted		0.997			0.923			0.785			0.745	
Satd. Flow (perm)	0	1811	0	0	1666	0	0	1406	0	0	1376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			9			15			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	3	399	77	54	482	53	29	8	15	216	58	12
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	479	0	0	589	0	0	52	0	0	286	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.3			29.3			16.6			16.6	
Actuated g/C Ratio		0.51			0.51			0.29			0.29	
v/c Ratio		0.52			0.70			0.13			0.72	
Control Delay		13.2			18.6			11.7			29.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.2			18.6			11.7			29.0	
LOS		B			B			B			C	
Approach Delay		13.2			18.6			11.7			29.0	
Approach LOS		B			B			B			C	
Queue Length 50th (m)		30.7			44.2			2.9			27.3	
Queue Length 95th (m)		70.9			#116.9			9.2			49.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												
Base Capacity (vph)		921			844			504			696	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.52			0.70			0.10			0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 58			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 18.6		Intersection LOS: B	
Intersection Capacity Utilization 87.8%		ICU Level of Service E	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	167	314	131	35	409	35	84	108	23	111	515	417
Future Volume (vph)	167	314	131	35	409	35	84	108	23	111	515	417
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.956				0.850		0.974				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1759	0	1690	1865	1633	1706	1773	0	1722	1865	1555
Flt Permitted	0.239			0.302			0.159			0.666		
Satd. Flow (perm)	450	1759	0	537	1865	1633	285	1773	0	1204	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		13				379
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		409.2			410.1			450.6			240.2	
Travel Time (s)		24.6			24.6			27.0			14.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	182	341	142	38	445	38	91	117	25	121	560	453
Shared Lane Traffic (%)												
Lane Group Flow (vph)	182	483	0	38	445	38	91	142	0	121	560	453
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	35.7	28.7		33.7	24.2	24.2	32.9	25.3		32.9	25.3	25.3
Actuated g/C Ratio	0.45	0.37		0.43	0.31	0.31	0.42	0.32		0.42	0.32	0.32
v/c Ratio	0.56	0.73		0.12	0.78	0.07	0.40	0.25		0.22	0.93	0.61
Control Delay	20.0	30.2		12.3	35.4	0.2	19.0	21.1		15.0	53.3	8.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	20.0	30.2		12.3	35.4	0.2	19.0	21.1		15.0	53.3	8.9
LOS	C	C		B	D	A	B	C		B	D	A
Approach Delay		27.4			31.2			20.3			31.5	

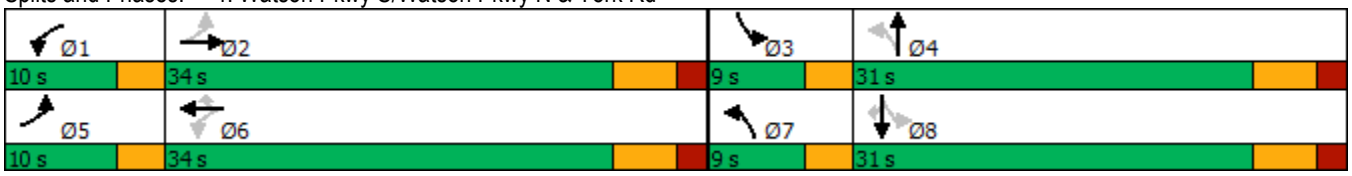
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			C	
Queue Length 50th (m)	16.4	67.7		3.2	64.2	0.0	8.6	16.0		11.6	~92.4	9.0
Queue Length 95th (m)	28.6	#118.6		8.1	98.3	0.0	17.5	30.8		22.2	#160.4	37.5
Internal Link Dist (m)		385.2			386.1			426.6			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	325	660		338	672	663	228	578		544	600	746
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	0.56	0.73		0.11	0.66	0.06	0.40	0.25		0.22	0.93	0.61

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 78.5			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 29.3		Intersection LOS: C	
Intersection Capacity Utilization 79.6%		ICU Level of Service D	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



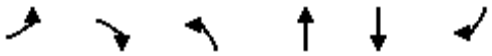
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	17	199	3	0	903
Future Volume (vph)	9	17	199	3	0	903
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.913		0.998			
Flt Protected	0.982					
Satd. Flow (prot)	1689	0	1880	0	0	1883
Flt Permitted	0.982					
Satd. Flow (perm)	1689	0	1880	0	0	1883
Link Speed (k/h)	31		60			60
Link Distance (m)	232.6		240.2			258.9
Travel Time (s)	27.0		14.4			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	18	216	3	0	982
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	219	0	0	982
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.5%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	17	199	3	0	903
Future Volume (Veh/h)	9	17	199	3	0	903
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)	10	18	216	3	0	982
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			
pX, platoon unblocked						
vC, conflicting volume	1200	218			219	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1200	218			219	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			100	
cM capacity (veh/h)	205	822			1350	

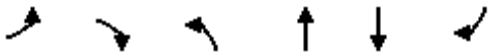
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	28	219	982
Volume Left	10	0	0
Volume Right	18	3	0
cSH	396	1700	1350
Volume to Capacity	0.07	0.13	0.00
Queue Length 95th (m)	1.8	0.0	0.0
Control Delay (s)	14.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	37	4	45	110	0
Future Volume (vph)	0	37	4	45	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.996		
Satd. Flow (prot)	1629	0	0	1876	1883	0
Flt Permitted				0.996		
Satd. Flow (perm)	1629	0	0	1876	1883	0
Link Speed (k/h)	31			60	60	
Link Distance (m)	143.5			356.4	206.3	
Travel Time (s)	16.7			21.4	12.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	40	4	49	120	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	0	53	120	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 15.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	37	4	45	110	0
Future Volume (Veh/h)	0	37	4	45	110	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	40	4	49	120	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	177	120	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177	120	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	811	931	1468			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	53	120
Volume Left	0	4	0
Volume Right	40	0	0
cSH	931	1468	1700
Volume to Capacity	0.04	0.00	0.07
Queue Length 95th (m)	1.1	0.1	0.0
Control Delay (s)	9.0	0.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	374.2	373.9	193.8	23.3	4.3	24.4	27.7	6.2
Average Queue (m)	340.7	361.2	183.0	9.2	0.7	7.5	4.6	3.1
95th Queue (m)	471.3	400.5	204.3	19.1	2.8	18.4	16.9	7.5
Link Distance (m)	361.7	361.7	179.9		235.7		194.5	
Upstream Blk Time (%)	81	91	94					
Queuing Penalty (veh)	0	0	0					
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	16.8	6.3	16.7
Average Queue (m)	7.8	1.8	3.7
95th Queue (m)	14.6	6.3	11.9
Link Distance (m)	185.8	194.5	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	90.4	238.4	17.5	55.4
Average Queue (m)	35.1	104.1	7.1	30.5
95th Queue (m)	66.9	252.4	16.1	48.9
Link Distance (m)	390.4	417.1	501.1	339.2
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	39.2	116.1	33.2	129.7	13.0	45.9	44.0	46.7	121.9	90.8
Average Queue (m)	22.3	53.5	7.9	65.7	5.5	20.3	19.6	13.5	60.9	40.5
95th Queue (m)	36.9	95.7	20.6	115.1	12.2	37.9	36.1	32.4	98.9	77.6
Link Distance (m)		395.1		390.4			439.6		215.2	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)		7	0	16					1	1
Queuing Penalty (veh)		11	0	11					5	5

Intersection: 5: Watson Pkwy N & West Site Access

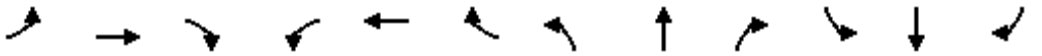
Movement	WB	NB
Directions Served	LR	TR
Maximum Queue (m)	15.2	4.9
Average Queue (m)	5.7	0.2
95th Queue (m)	13.1	2.2
Link Distance (m)	219.9	215.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Watson Rd N & East Site Access

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	13.5	1.4
Average Queue (m)	7.1	0.0
95th Queue (m)	14.1	1.0
Link Distance (m)	135.0	339.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 32



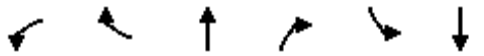
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	16	271	108	20	118	385	492	114	175	269	62
Future Volume (vph)	21	16	271	108	20	118	385	492	114	175	269	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor												
Frt			0.850		0.935			0.972				0.850
Flt Protected		0.972			0.979		0.950			0.950		
Satd. Flow (prot)	0	1852	1601	0	1724	0	1772	1590	0	1789	1830	1445
Flt Permitted		0.972			0.979		0.950			0.950		
Satd. Flow (perm)	0	1852	1601	0	1724	0	1772	1590	0	1789	1830	1445
Link Speed (k/h)		40			50			60			60	
Link Distance (m)		375.9			190.4			258.9			212.4	
Travel Time (s)		33.8			13.7			15.5			12.7	
Confl. Peds. (#/hr)	5						3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	3%	21%	2%	2%	5%	13%
Adj. Flow (vph)	23	17	295	117	22	128	418	535	124	190	292	67
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	40	295	0	267	0	418	659	0	190	292	67
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 73.4%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	16	271	108	20	118	385	492	114	175	269	62
Future Volume (Veh/h)	21	16	271	108	20	118	385	492	114	175	269	62
Sign Control		Stop			Stop			Free			Free	
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)	23	17	295	117	22	128	418	535	124	190	292	67
Pedestrians		3									5	
Lane Width (m)		3.7									3.7	
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	2190	2170	295	2408	2175	602	362			659		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2190	2170	295	2408	2175	602	362			659		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	29	60	0	8	74	65			80		
cM capacity (veh/h)	3	24	742	4	24	497	1188			929		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	40	295	267	418	659	190	292	67
Volume Left	23	0	117	418	0	190	0	0
Volume Right	0	295	128	0	124	0	0	67
cSH	5	742	9	1188	1700	929	1700	1700
Volume to Capacity	7.76	0.40	31.36	0.35	0.39	0.20	0.17	0.04
Queue Length 95th (m)	Err	15.1	Err	12.7	0.0	6.0	0.0	0.0
Control Delay (s)	Err	13.0	Err	9.7	0.0	9.9	0.0	0.0
Lane LOS	F	B	F	A		A		
Approach Delay (s)	1205.4		Err	3.8		3.4		
Approach LOS	F		F					

Intersection Summary				
Average Delay	1382.2			
Intersection Capacity Utilization	73.4%	ICU Level of Service	D	
Analysis Period (min)	15			



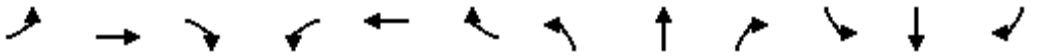
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	43	128	425	14	42	244
Future Volume (vph)	43	128	425	14	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.899		0.996			
Flt Protected	0.988				0.950	
Satd. Flow (prot)	1706	0	1671	0	1825	1830
Flt Permitted	0.988				0.950	
Satd. Flow (perm)	1706	0	1671	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			210.8
Travel Time (s)	12.4		12.7			12.6
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	47	139	462	15	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	186	0	477	0	46	265
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.0%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	43	128	425	14	42	244
Future Volume (Veh/h)	43	128	425	14	42	244
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)	47	139	462	15	46	265
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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	830	474			480	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	830	474			480	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	86	77			96	
cM capacity (veh/h)	327	593			1090	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	186	477	46	265
Volume Left	47	0	46	0
Volume Right	139	15	0	0
cSH	492	1700	1090	1700
Volume to Capacity	0.38	0.28	0.04	0.16
Queue Length 95th (m)	13.8	0.0	1.0	0.0
Control Delay (s)	16.7	0.0	8.4	0.0
Lane LOS	C		A	
Approach Delay (s)	16.7	0.0	1.2	
Approach LOS	C			

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		



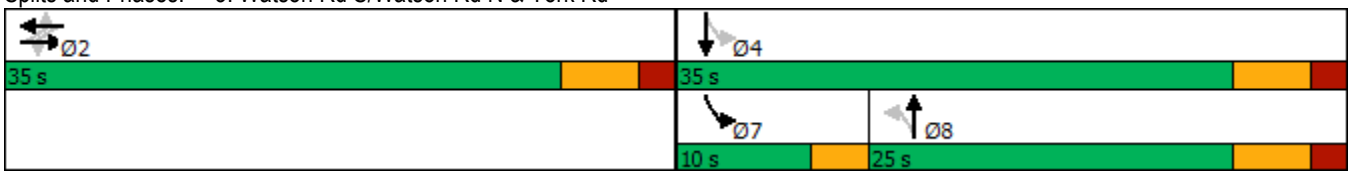
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	394	28	17	432	141	75	73	49	34	9	2
Future Volume (vph)	7	394	28	17	432	141	75	73	49	34	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	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		0.991			0.968			0.967			0.994	
Flt Protected		0.999			0.999			0.981			0.964	
Satd. Flow (prot)	0	1713	0	0	1736	0	0	1365	0	0	1795	0
Flt Permitted		0.989			0.983			0.853			0.742	
Satd. Flow (perm)	0	1696	0	0	1708	0	0	1187	0	0	1382	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			28			23			2	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	8	428	30	18	470	153	82	79	53	37	10	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	466	0	0	641	0	0	214	0	0	49	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		30.5			30.5			13.9			13.9	
Actuated g/C Ratio		0.54			0.54			0.25			0.25	
v/c Ratio		0.51			0.68			0.69			0.14	
Control Delay		11.6			15.4			28.8			15.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.6			15.4			28.8			15.8	
LOS		B			B			C			B	
Approach Delay		11.6			15.4			28.8			15.8	
Approach LOS		B			B			C			B	
Queue Length 50th (m)		28.0			42.9			17.5			3.7	
Queue Length 95th (m)		59.7			#100.8			36.8			10.3	
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		919			936			415			712	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.51			0.68			0.52			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 56.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 16.2		Intersection LOS: B	
Intersection Capacity Utilization 61.7%		ICU Level of Service B	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	515	377	109	15	445	82	210	497	23	55	337	464
Future Volume (vph)	515	377	109	15	445	82	210	497	23	55	337	464
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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		0.966				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1769	0	1393	1847	1328	1630	1708	0	1738	1883	1570
Flt Permitted	0.215			0.327			0.294			0.176		
Satd. Flow (perm)	397	1769	0	480	1847	1328	504	1708	0	322	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				117		3				325
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		409.2			410.1			450.6			240.2	
Travel Time (s)		24.6			24.6			27.0			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	560	410	118	16	484	89	228	540	25	60	366	504
Shared Lane Traffic (%)												
Lane Group Flow (vph)	560	528	0	16	484	89	228	565	0	60	366	504
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	37.2	32.9		34.0	24.6	24.6	31.9	25.5		30.5	21.4	21.4
Actuated g/C Ratio	0.48	0.43		0.44	0.32	0.32	0.41	0.33		0.39	0.28	0.28
v/c Ratio	1.78	0.69		0.06	0.82	0.18	0.77	1.00		0.25	0.70	0.75
Control Delay	383.1	25.5		11.7	38.2	3.2	37.4	68.7		16.3	33.7	17.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	383.1	25.5		11.7	38.2	3.2	37.4	68.7		16.3	33.7	17.2
LOS	F	C		B	D	A	D	E		B	C	B
Approach Delay		209.5			32.2			59.7			23.7	
Approach LOS		F			C			E			C	
Queue Length 50th (m)	~125.5	63.4		1.3	72.0	0.0	23.3	~106.7		5.5	52.0	23.9

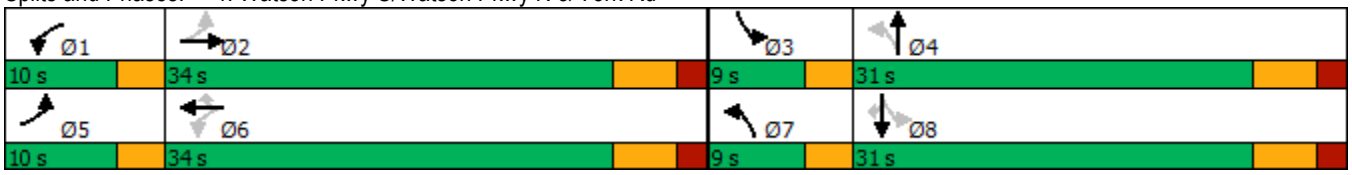
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	#206.5	#137.9		4.5	#119.9	6.3	#54.3	#171.6		12.5	82.6	62.8
Internal Link Dist (m)		385.2			386.1			426.6			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	314	762		299	675	560	296	565		237	615	731
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	1.78	0.69		0.05	0.72	0.16	0.77	1.00		0.25	0.60	0.69

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 77.4			
Natural Cycle: 125			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.78			
Intersection Signal Delay: 93.0		Intersection LOS: F	
Intersection Capacity Utilization 101.2%		ICU Level of Service G	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



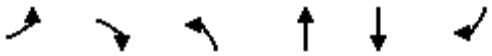
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	12	14	732	13	0	584
Future Volume (vph)	12	14	732	13	0	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.928		0.998			
Flt Protected	0.977					
Satd. Flow (prot)	1708	0	1880	0	0	1883
Flt Permitted	0.977					
Satd. Flow (perm)	1708	0	1880	0	0	1883
Link Speed (k/h)	50		50			50
Link Distance (m)	232.6		240.2			258.9
Travel Time (s)	16.7		17.3			18.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	15	796	14	0	635
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	810	0	0	635
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	14	732	13	0	584
Future Volume (Veh/h)	12	14	732	13	0	584
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)	13	15	796	14	0	635
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			
pX, platoon unblocked	0.63	0.63			0.63	
vC, conflicting volume	1438	803			810	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1402	396			407	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	96			100	
cM capacity (veh/h)	97	412			727	

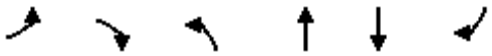
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	28	810	635
Volume Left	13	0	0
Volume Right	15	14	0
cSH	165	1700	727
Volume to Capacity	0.17	0.48	0.00
Queue Length 95th (m)	4.7	0.0	0.0
Control Delay (s)	31.3	0.0	0.0
Lane LOS	D		
Approach Delay (s)	31.3	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	39	157	64	0
Future Volume (vph)	0	0	39	157	64	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.990		
Satd. Flow (prot)	1883	0	0	1865	1883	0
Flt Permitted				0.990		
Satd. Flow (perm)	1883	0	0	1865	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	143.5			356.4	206.3	
Travel Time (s)	10.3			25.7	14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	42	171	70	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	213	70	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	39	157	64	0
Future Volume (Veh/h)	0	0	39	157	64	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	42	171	70	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	325	70	70			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325	70	70			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	651	993	1531			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	213	70
Volume Left	0	42	0
Volume Right	0	0	0
cSH	1700	1531	1700
Volume to Capacity	0.04	0.03	0.04
Queue Length 95th (m)	0.0	0.7	0.0
Control Delay (s)	0.0	1.6	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	1.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	34.3	42.8	192.8	35.5	3.4	26.6	11.3	7.5
Average Queue (m)	9.6	20.7	165.5	13.9	0.1	11.5	0.5	1.0
95th Queue (m)	23.5	36.2	227.3	26.8	2.0	21.3	4.2	4.8
Link Distance (m)	361.7	361.7	179.9		235.7		194.5	
Upstream Blk Time (%)			68					
Queuing Penalty (veh)			0					
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (m)	30.9	4.4	11.6	1.8
Average Queue (m)	13.2	0.1	3.3	0.1
95th Queue (m)	22.5	3.1	10.4	1.3
Link Distance (m)	185.8	194.5		205.2
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)			38.0	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	73.4	79.7	66.9	21.2
Average Queue (m)	19.9	39.0	32.1	7.1
95th Queue (m)	48.3	68.0	56.2	16.8
Link Distance (m)	390.4	417.1	501.1	339.2
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	168.0	413.0	41.9	146.4	70.7	74.6	422.0	20.2	91.1	110.9
Average Queue (m)	167.9	403.3	4.3	70.5	18.9	69.4	305.9	9.0	43.3	51.4
95th Queue (m)	167.9	410.2	24.2	122.0	55.8	91.7	537.9	17.8	76.6	96.5
Link Distance (m)		395.1		390.4			439.6		215.2	
Upstream Blk Time (%)		98					23			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	100	1		16		42	35		0	2
Queuing Penalty (veh)	484	6		16		220	74		1	8

Intersection: 5: Watson Pkwy N & West Site Access

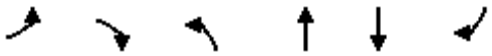
Movement	WB
Directions Served	LR
Maximum Queue (m)	16.3
Average Queue (m)	5.8
95th Queue (m)	14.3
Link Distance (m)	219.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Watson Rd N & East Site Access

Movement	NB
Directions Served	LT
Maximum Queue (m)	7.4
Average Queue (m)	0.9
95th Queue (m)	5.2
Link Distance (m)	339.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

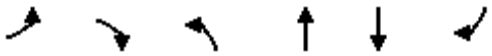
Network Summary

Network wide Queuing Penalty: 809



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	68	474	117	184	553	38
Future Volume (vph)	68	474	117	184	553	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0	0.0	82.0			45.7
Storage Lanes	1	1	1			0
Taper Length (m)	50.0		66.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.991	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1772	1588	1804	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1825	1601	1772	1588	1804	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	290.7			493.1	212.4	
Travel Time (s)	26.2			29.6	12.7	
Confl. Peds. (#/hr)	5		3			3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	3%	21%	5%	13%
Adj. Flow (vph)	74	515	127	200	601	41
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	515	127	200	642	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 67.4%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	68	474	117	184	553	38
Future Volume (Veh/h)	68	474	117	184	553	38
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)	74	515	127	200	601	41
Pedestrians	3				5	
Lane Width (m)	3.7				3.7	
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	1084	624	645			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1084	624	645			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	64	0	86			
cM capacity (veh/h)	208	484	933			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	74	515	127	200	642
Volume Left	74	0	127	0	0
Volume Right	0	515	0	0	41
cSH	208	484	933	1700	1700
Volume to Capacity	0.36	1.06	0.14	0.12	0.38
Queue Length 95th (m)	12.0	126.2	3.7	0.0	0.0
Control Delay (s)	31.6	88.4	9.5	0.0	0.0
Lane LOS	D	F	A		
Approach Delay (s)	81.2		3.7		0.0
Approach LOS	F				

Intersection Summary			
Average Delay	31.5		
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

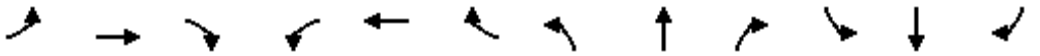
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	30	142	21	84	351
Future Volume (vph)	26	30	142	21	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.927		0.982			
Flt Protected	0.978				0.950	
Satd. Flow (prot)	1742	0	1669	0	1825	1830
Flt Permitted	0.978				0.950	
Satd. Flow (perm)	1742	0	1669	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	566.3		212.4			124.2
Travel Time (s)	34.0		12.7			7.5
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	28	33	154	23	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	177	0	91	382
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	30	142	21	84	351
Future Volume (Veh/h)	26	30	142	21	84	351
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)	28	33	154	23	91	382
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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	734	170			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	734	170			180	
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	96			94	
cM capacity (veh/h)	364	877			1404	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	61	177	91	382
Volume Left	28	0	91	0
Volume Right	33	23	0	0
cSH	532	1700	1404	1700
Volume to Capacity	0.11	0.10	0.06	0.22
Queue Length 95th (m)	3.0	0.0	1.6	0.0
Control Delay (s)	12.6	0.0	7.7	0.0
Lane LOS	B		A	
Approach Delay (s)	12.6	0.0	1.5	
Approach LOS	B			

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		



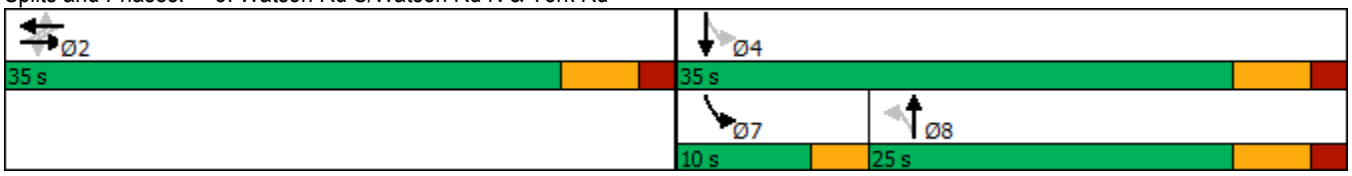
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	403	77	55	489	50	30	8	16	179	59	12
Future Volume (vph)	3	403	77	55	489	50	30	8	16	179	59	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	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		0.978			0.989			0.961			0.994	
Flt Protected					0.995			0.973			0.965	
Satd. Flow (prot)	0	1720	0	0	1796	0	0	1345	0	0	1796	0
Flt Permitted		0.997			0.914			0.781			0.750	
Satd. Flow (perm)	0	1715	0	0	1649	0	0	1080	0	0	1396	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			8			17			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			566.3	
Travel Time (s)		24.6			25.5			30.7			34.0	
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
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	3	438	84	60	532	54	33	9	17	195	64	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	525	0	0	646	0	0	59	0	0	272	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.2			29.2			15.8			15.8	
Actuated g/C Ratio		0.51			0.51			0.28			0.28	
v/c Ratio		0.59			0.76			0.19			0.70	
Control Delay		14.2			20.9			13.0			28.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		14.2			20.9			13.0			28.3	
LOS		B			C			B			C	
Approach Delay		14.2			20.9			13.0			28.3	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		34.4			49.6			3.4			25.5	
Queue Length 95th (m)		80.0			#131.5			10.5			46.7	
Internal Link Dist (m)		386.1			401.7			487.6			542.3	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		886			848			389			716	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.59			0.76			0.15			0.38	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 57.1			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 19.6		Intersection LOS: B	
Intersection Capacity Utilization 91.5%		ICU Level of Service F	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	346	144	39	452	39	93	120	26	119	542	381
Future Volume (vph)	150	346	144	39	452	39	93	120	26	119	542	381
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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		0.956				0.850		0.973				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1757	0	1393	1847	1328	1630	1642	0	1738	1883	1570
Flt Permitted	0.193			0.241			0.159			0.657		
Satd. Flow (perm)	357	1757	0	353	1847	1328	273	1642	0	1202	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		13				351
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		223.8			410.1			303.1			493.1	
Travel Time (s)		13.4			24.6			18.2			29.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	163	376	157	42	491	42	101	130	28	129	589	414
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	533	0	42	491	42	101	158	0	129	589	414
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	36.3	29.3		34.6	25.0	25.0	32.9	25.2		32.9	25.2	25.2
Actuated g/C Ratio	0.46	0.37		0.44	0.32	0.32	0.42	0.32		0.42	0.32	0.32
v/c Ratio	0.57	0.80		0.17	0.85	0.08	0.47	0.30		0.24	0.98	0.56
Control Delay	20.9	34.2		13.3	40.7	0.3	21.2	22.2		15.4	63.6	8.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	20.9	34.2		13.3	40.7	0.3	21.2	22.2		15.4	63.6	8.2
LOS	C	C		B	D	A	C	C		B	E	A
Approach Delay		31.1			35.7			21.8			37.8	
Approach LOS		C			D			C			D	
Queue Length 50th (m)	14.6	78.9		3.5	73.3	0.0	9.6	18.4		12.5	~108.0	7.6

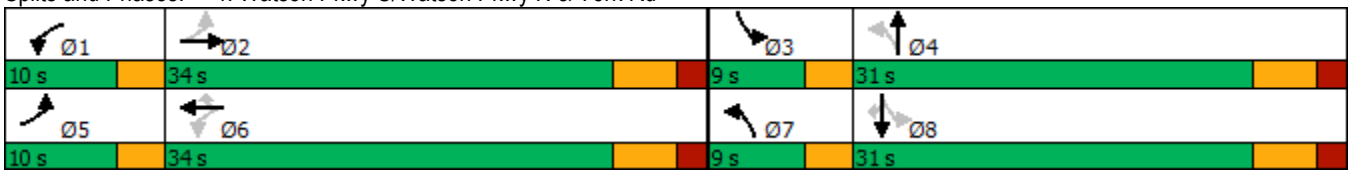
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	25.9	#138.8		8.8	#122.7	0.0	19.2	34.6		23.4	#170.3	32.8
Internal Link Dist (m)		199.8			386.1			279.1			469.1	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	288	667		249	659	549	216	531		539	600	739
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	0.57	0.80		0.17	0.75	0.08	0.47	0.30		0.24	0.98	0.56

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 79.2			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 34.0		Intersection LOS: C	
Intersection Capacity Utilization 82.4%		ICU Level of Service E	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



Intersection: 1: Watson Pkwy N & Starwood Drive

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (m)	133.8	204.0	28.8	1.8	19.6
Average Queue (m)	44.7	117.2	12.4	0.1	1.6
95th Queue (m)	136.9	256.8	24.3	1.3	10.5
Link Distance (m)		276.4		463.8	194.0
Upstream Blk Time (%)		13			
Queuing Penalty (veh)		0			
Storage Bay Dist (m)	84.0		82.0		
Storage Blk Time (%)		41			
Queuing Penalty (veh)		28			

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	15.4	1.8	11.8
Average Queue (m)	7.1	0.1	3.5
95th Queue (m)	13.0	1.3	10.7
Link Distance (m)	543.7	194.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

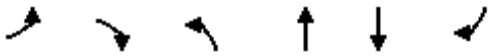
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	84.6	247.8	35.3	53.6
Average Queue (m)	38.6	78.2	10.8	28.1
95th Queue (m)	71.2	177.0	25.8	46.7
Link Distance (m)	388.9	417.0	501.1	543.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	39.1	126.5	71.3	140.4	62.8	46.5	52.5	63.7	188.1	83.3
Average Queue (m)	20.1	59.9	11.4	70.0	7.5	19.1	22.5	27.4	106.5	49.3
95th Queue (m)	34.2	103.3	38.8	116.7	33.0	35.9	41.7	101.8	250.0	123.4
Link Distance (m)		209.8		388.9			292.3		463.8	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)		7		17		0	0		14	
Queuing Penalty (veh)		11		13		0	0		70	

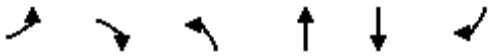
Network Summary

Network wide Queuing Penalty: 121



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	23	294	423	528	297	67
Future Volume (vph)	23	294	423	528	297	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0	0.0	82.0			45.7
Storage Lanes	1	1	1			0
Taper Length (m)	50.0		66.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.850			0.975	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1825	1601	1807	1883	1843	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1825	1601	1807	1883	1843	0
Link Speed (k/h)	40			60	60	
Link Distance (m)	290.7			493.1	212.4	
Travel Time (s)	26.2			29.6	12.7	
Confl. Peds. (#/hr)			1			1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	1%	2%	2%	0%
Adj. Flow (vph)	25	320	460	574	323	73
Shared Lane Traffic (%)						
Lane Group Flow (vph)	25	320	460	574	396	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 56.5%		ICU Level of Service B	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	294	423	528	297	67
Future Volume (Veh/h)	23	294	423	528	297	67
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)	25	320	460	574	323	73
Pedestrians	1					
Lane Width (m)	3.7					
Walking Speed (m/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1854	360	397			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1854	360	397			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	50	53	61			
cM capacity (veh/h)	50	684	1167			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1
Volume Total	25	320	460	574	396
Volume Left	25	0	460	0	0
Volume Right	0	320	0	0	73
cSH	50	684	1167	1700	1700
Volume to Capacity	0.50	0.47	0.39	0.34	0.23
Queue Length 95th (m)	14.9	19.8	15.1	0.0	0.0
Control Delay (s)	135.4	14.8	10.1	0.0	0.0
Lane LOS	F	B	B		
Approach Delay (s)	23.5		4.5		0.0
Approach LOS	C				

Intersection Summary			
Average Delay	7.2		
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

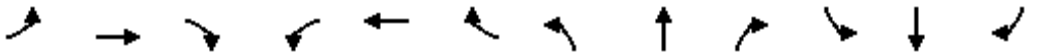
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	128	425	16	42	244
Future Volume (vph)	47	128	425	16	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.901		0.995			
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1708	0	1875	0	1772	1830
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1708	0	1875	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	566.3		212.4			124.2
Travel Time (s)	34.0		12.7			7.5
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	51	139	462	17	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	0	479	0	46	265
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	47	128	425	16	42	244
Future Volume (Veh/h)	47	128	425	16	42	244
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)	51	139	462	17	46	265
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
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	834	474			482	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	834	474			482	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	77			96	
cM capacity (veh/h)	326	594			1075	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	190	479	46	265
Volume Left	51	0	46	0
Volume Right	139	17	0	0
cSH	486	1700	1075	1700
Volume to Capacity	0.39	0.28	0.04	0.16
Queue Length 95th (m)	14.5	0.0	1.1	0.0
Control Delay (s)	17.1	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	17.1	0.0	1.3	
Approach LOS	C			

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

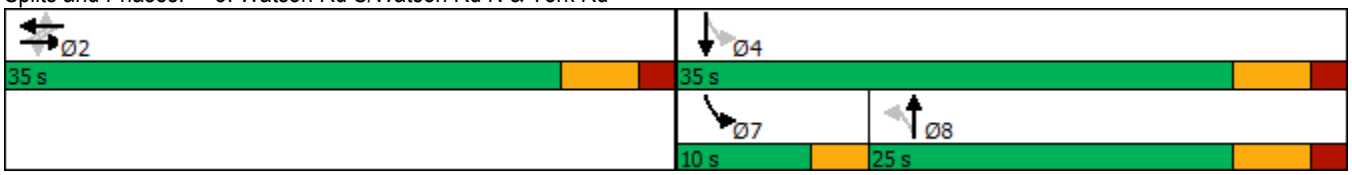


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	433	30	18	477	112	83	80	54	37	9	2
Future Volume (vph)	8	433	30	18	477	112	83	80	54	37	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								0.99			1.00	
Frt		0.991			0.975			0.966			0.995	
Flt Protected		0.999			0.998			0.981			0.963	
Satd. Flow (prot)	0	1829	0	0	1782	0	0	1774	0	0	1788	0
Flt Permitted		0.988			0.979			0.852			0.691	
Satd. Flow (perm)	0	1809	0	0	1748	0	0	1540	0	0	1281	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			20			24			2	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			566.3	
Travel Time (s)		24.6			25.5			30.7			34.0	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	9	471	33	20	518	122	90	87	59	40	10	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	513	0	0	660	0	0	236	0	0	52	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.6			29.6			12.7			12.7	
Actuated g/C Ratio		0.55			0.55			0.23			0.23	
v/c Ratio		0.52			0.69			0.63			0.17	
Control Delay		11.1			15.0			24.1			16.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		11.1			15.0			24.1			16.7	
LOS		B			B			C			B	
Approach Delay		11.1			15.0			24.1			16.7	
Approach LOS		B			B			C			B	
Queue Length 50th (m)		28.7			41.4			18.9			4.0	
Queue Length 95th (m)		64.6			#103.5			37.2			10.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			542.3	
Turn Bay Length (m)												
Base Capacity (vph)		989			962			555			686	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.52			0.69			0.43			0.08	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 54.3			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 15.1		Intersection LOS: B	
Intersection Capacity Utilization 64.0%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	456	416	119	17	491	90	231	507	26	58	339	399
Future Volume (vph)	456	416	119	17	491	90	231	507	26	58	339	399
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.967				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1777	0	1690	1865	1633	1706	1840	0	1722	1865	1555
Flt Permitted	0.157			0.228			0.315			0.169		
Satd. Flow (perm)	296	1777	0	406	1865	1633	565	1840	0	306	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				117		3				302
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		223.8			410.1			303.1			493.1	
Travel Time (s)		13.4			24.6			18.2			29.6	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	496	452	129	18	534	98	251	551	28	63	368	434
Shared Lane Traffic (%)												
Lane Group Flow (vph)	496	581	0	18	534	98	251	579	0	63	368	434
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	37.7	32.0		34.9	25.6	25.6	32.9	25.2		32.1	23.0	23.0
Actuated g/C Ratio	0.47	0.40		0.44	0.32	0.32	0.41	0.32		0.40	0.29	0.29
v/c Ratio	1.83	0.80		0.06	0.90	0.16	0.79	0.99		0.27	0.69	0.66
Control Delay	406.5	33.5		11.8	46.1	3.8	37.8	66.9		16.8	33.1	13.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	406.5	33.5		11.8	46.1	3.8	37.8	66.9		16.8	33.1	13.6
LOS	F	C		B	D	A	D	E		B	C	B
Approach Delay		205.3			38.8			58.1			22.1	

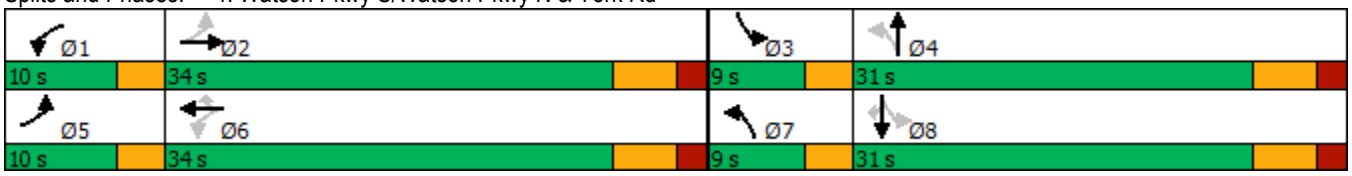
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			D			E			C	
Queue Length 50th (m)	~106.9	73.1		1.5	82.1	0.0	26.5	~106.7		5.9	53.3	16.8
Queue Length 95th (m)	#170.4	#158.5		4.9	#138.5	7.8	#58.5	#169.7		13.0	83.4	48.7
Internal Link Dist (m)		199.8			386.1			279.1			469.1	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	271	722		294	659	653	319	583		230	589	687
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	1.83	0.80		0.06	0.81	0.15	0.79	0.99		0.27	0.62	0.63

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 79.9			
Natural Cycle: 115			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.83			
Intersection Signal Delay: 91.7		Intersection LOS: F	
Intersection Capacity Utilization 101.0%		ICU Level of Service G	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



Intersection: 1: Watson Pkwy N & Starwood Drive

Movement	EB	EB	NB	SB
Directions Served	L	R	L	TR
Maximum Queue (m)	18.7	53.9	56.5	22.1
Average Queue (m)	4.9	23.0	19.7	7.3
95th Queue (m)	15.0	40.8	39.9	15.4
Link Distance (m)		276.4		194.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)	84.0		82.0	
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	32.8	6.3	10.0
Average Queue (m)	13.7	1.1	3.3
95th Queue (m)	24.8	4.8	10.0
Link Distance (m)	543.7	194.0	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

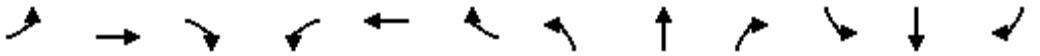
Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	78.9	101.2	48.4	17.8
Average Queue (m)	22.7	41.5	23.6	6.8
95th Queue (m)	55.6	80.3	39.9	15.8
Link Distance (m)	388.9	417.0	501.1	543.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	168.0	224.3	88.4	228.0	106.8	74.6	308.0	184.9	304.2	162.0
Average Queue (m)	167.9	217.1	10.0	114.1	41.0	74.2	300.1	79.8	212.2	148.9
95th Queue (m)	168.1	222.9	56.2	220.3	125.8	76.6	306.5	223.3	368.7	196.9
Link Distance (m)		209.8		388.9			292.3		463.8	
Upstream Blk Time (%)		87					96			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	100	2		41		94	11		1	84
Queuing Penalty (veh)	535	9		44		502	26		3	334

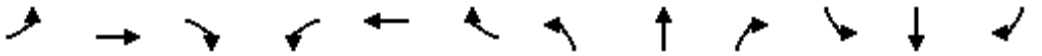
Network Summary

Network wide Queuing Penalty: 1452



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	8	474	79	12	146	117	184	24	138	553	38
Future Volume (vph)	68	8	474	79	12	146	117	184	24	138	553	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor												
Frt			0.850		0.917			0.983				0.850
Flt Protected		0.957			0.984		0.950			0.950		
Satd. Flow (prot)	0	1835	1601	0	1699	0	1807	1851	0	1789	1883	1633
Flt Permitted		0.957			0.984		0.950			0.950		
Satd. Flow (perm)	0	1835	1601	0	1699	0	1807	1851	0	1789	1883	1633
Link Speed (k/h)		40			31			60			60	
Link Distance (m)		417.2			169.5			258.9			212.4	
Travel Time (s)		37.5			19.7			15.5			12.7	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	1%	2%	2%	2%	2%	0%
Adj. Flow (vph)	74	9	515	86	13	159	127	200	26	150	601	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	515	0	258	0	127	226	0	150	601	41
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 82.4%		ICU Level of Service E	
Analysis Period (min) 15			



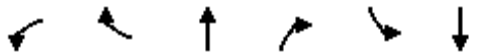
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	8	474	79	12	146	117	184	24	138	553	38
Future Volume (Veh/h)	68	8	474	79	12	146	117	184	24	138	553	38
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	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)	74	9	515	86	13	159	127	200	26	150	601	41
Pedestrians		1										
Lane Width (m)		3.7										
Walking Speed (m/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1522	1382	602	1888	1410	213	643			226		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1522	1382	602	1888	1410	213	643			226		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	92	0	0	88	81	87			89		
cM capacity (veh/h)	59	111	499	0	106	827	946			1342		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	83	515	258	127	226	150	601	41
Volume Left	74	0	86	127	0	150	0	0
Volume Right	0	515	159	0	26	0	0	41
cSH	62	499	0	946	1700	1342	1700	1700
Volume to Capacity	1.33	1.03	Err	0.13	0.13	0.11	0.35	0.02
Queue Length 95th (m)	55.4	117.7	Err	3.7	0.0	3.0	0.0	0.0
Control Delay (s)	337.6	77.4	Err	9.4	0.0	8.0	0.0	0.0
Lane LOS	F	F	F	A		A		
Approach Delay (s)	113.6		Err	3.4		1.5		
Approach LOS	F		F					

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	82.4%	ICU Level of Service	E	
Analysis Period (min)	15			

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	30	142	21	84	351
Future Volume (vph)	26	30	142	21	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.927		0.982			
Flt Protected	0.978				0.950	
Satd. Flow (prot)	1742	0	1854	0	1772	1830
Flt Permitted	0.978				0.950	
Satd. Flow (perm)	1742	0	1854	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			309.3
Travel Time (s)	12.4		12.7			18.6
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	28	33	154	23	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	177	0	91	382
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	30	142	21	84	351
Future Volume (Veh/h)	26	30	142	21	84	351
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)	28	33	154	23	91	382
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
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	736	170			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736	170			180	
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	96			93	
cM capacity (veh/h)	363	879			1388	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	61	177	91	382
Volume Left	28	0	91	0
Volume Right	33	23	0	0
cSH	532	1700	1388	1700
Volume to Capacity	0.11	0.10	0.07	0.22
Queue Length 95th (m)	3.0	0.0	1.7	0.0
Control Delay (s)	12.6	0.0	7.8	0.0
Lane LOS	B		A	
Approach Delay (s)	12.6	0.0	1.5	
Approach LOS	B			

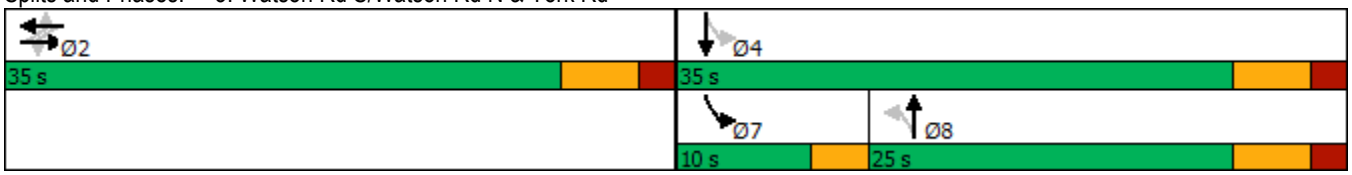
Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	403	77	55	489	54	30	8	16	216	59	12
Future Volume (vph)	3	403	77	55	489	54	30	8	16	216	59	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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
Ped Bike Factor								0.99			1.00	
Frt		0.978			0.988			0.961			0.994	
Flt Protected					0.995			0.973			0.964	
Satd. Flow (prot)	0	1816	0	0	1795	0	0	1744	0	0	1784	0
Flt Permitted		0.997			0.913			0.775			0.741	
Satd. Flow (perm)	0	1811	0	0	1647	0	0	1388	0	0	1368	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			9			17			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	3	438	84	60	532	59	33	9	17	235	64	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	525	0	0	651	0	0	59	0	0	312	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.3			29.3			18.1			18.1	
Actuated g/C Ratio		0.49			0.49			0.30			0.30	
v/c Ratio		0.58			0.80			0.14			0.74	
Control Delay		15.2			24.5			11.5			29.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.2			24.5			11.5			29.7	
LOS		B			C			B			C	
Approach Delay		15.2			24.5			11.5			29.7	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		37.3			55.5			3.3			30.6	
Queue Length 95th (m)		85.9			#145.9			9.9			54.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												
Base Capacity (vph)		900			815			505			675	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.58			0.80			0.12			0.46	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 59.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 95.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	346	144	39	452	39	93	120	26	119	566	445
Future Volume (vph)	177	346	144	39	452	39	93	120	26	119	566	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.956				0.850		0.973				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1759	0	1690	1865	1633	1706	1771	0	1722	1865	1555
Flt Permitted	0.191			0.242			0.159			0.657		
Satd. Flow (perm)	360	1759	0	430	1865	1633	285	1771	0	1188	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		13				350
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		365.4			410.1			438.0			240.2	
Travel Time (s)		21.9			24.6			26.3			14.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	192	376	157	42	491	42	101	130	28	129	615	484
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	533	0	42	491	42	101	158	0	129	615	484
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	36.3	29.3		34.3	24.7	24.7	32.9	25.2		32.9	25.2	25.2
Actuated g/C Ratio	0.46	0.37		0.43	0.31	0.31	0.42	0.32		0.42	0.32	0.32
v/c Ratio	0.66	0.80		0.14	0.84	0.07	0.44	0.28		0.24	1.03	0.67
Control Delay	25.5	34.1		12.7	40.4	0.2	20.3	21.7		15.4	76.5	12.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	25.5	34.1		12.7	40.4	0.2	20.3	21.7		15.4	76.5	12.6
LOS	C	C		B	D	A	C	C		B	E	B
Approach Delay		31.8			35.4			21.2			44.9	

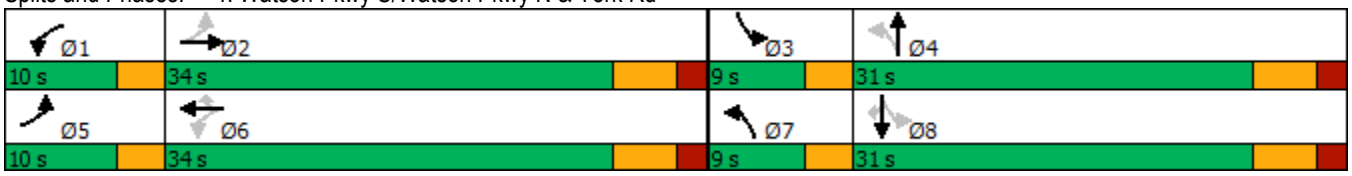
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			D			C			D	
Queue Length 50th (m)	17.5	78.4		3.5	73.2	0.0	9.5	18.2		12.4	~117.2	16.9
Queue Length 95th (m)	#33.8	#138.7		8.7	#121.6	0.0	19.0	34.2		23.4	#181.5	52.8
Internal Link Dist (m)		341.4			386.1			414.0			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	292	668		301	666	659	227	574		534	595	723
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	0.66	0.80		0.14	0.74	0.06	0.44	0.28		0.24	1.03	0.67

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 79.1			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 37.4		Intersection LOS: D	
Intersection Capacity Utilization 85.2%		ICU Level of Service E	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



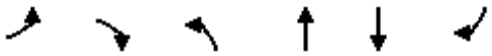
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	17	199	3	0	903
Future Volume (vph)	9	17	199	3	0	903
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.913		0.998			
Flt Protected	0.982					
Satd. Flow (prot)	1689	0	1880	0	0	1883
Flt Permitted	0.982					
Satd. Flow (perm)	1689	0	1880	0	0	1883
Link Speed (k/h)	31		60			60
Link Distance (m)	247.1		240.2			258.9
Travel Time (s)	28.7		14.4			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	18	216	3	0	982
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	219	0	0	982
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.5%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	17	199	3	0	903
Future Volume (Veh/h)	9	17	199	3	0	903
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)	10	18	216	3	0	982
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			
pX, platoon unblocked						
vC, conflicting volume	1200	218			219	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1200	218			219	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	98			100	
cM capacity (veh/h)	205	822			1350	

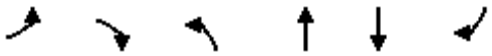
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	28	219	982
Volume Left	10	0	0
Volume Right	18	3	0
cSH	396	1700	1350
Volume to Capacity	0.07	0.13	0.00
Queue Length 95th (m)	1.8	0.0	0.0
Control Delay (s)	14.8	0.0	0.0
Lane LOS	B		
Approach Delay (s)	14.8	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	37	4	45	110	0
Future Volume (vph)	0	37	4	45	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.996		
Satd. Flow (prot)	1629	0	0	1876	1883	0
Flt Permitted				0.996		
Satd. Flow (perm)	1629	0	0	1876	1883	0
Link Speed (k/h)	31			60	60	
Link Distance (m)	157.8			356.4	206.3	
Travel Time (s)	18.3			21.4	12.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	40	4	49	120	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	0	53	120	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	37	4	45	110	0
Future Volume (Veh/h)	0	37	4	45	110	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	40	4	49	120	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	177	120	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177	120	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	811	931	1468			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	53	120
Volume Left	0	4	0
Volume Right	40	0	0
cSH	931	1468	1700
Volume to Capacity	0.04	0.00	0.07
Queue Length 95th (m)	1.1	0.1	0.0
Control Delay (s)	9.0	0.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	413.6	415.4	171.1	31.0	4.4	18.3	64.0	7.4
Average Queue (m)	397.8	406.3	160.1	9.4	0.8	6.4	34.1	2.7
95th Queue (m)	458.6	417.6	183.3	21.6	2.7	16.0	145.2	7.2
Link Distance (m)	403.0	403.0	158.7		235.1		194.2	
Upstream Blk Time (%)	85	95	93				14	
Queuing Penalty (veh)	0	0	0				53	
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)							15	
Queuing Penalty (veh)							26	

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (m)	52.4	6.4	16.6	61.6
Average Queue (m)	23.8	1.6	3.8	40.0
95th Queue (m)	101.4	5.9	12.3	207.0
Link Distance (m)	185.6	194.2		303.6
Upstream Blk Time (%)	3			12
Queuing Penalty (veh)	1			0
Storage Bay Dist (m)			38.0	
Storage Blk Time (%)				14
Queuing Penalty (veh)				11

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	74.6	344.4	22.0	60.4
Average Queue (m)	35.9	207.6	8.6	32.4
95th Queue (m)	64.5	439.9	18.4	52.9
Link Distance (m)	390.4	417.1	501.1	339.4
Upstream Blk Time (%)		19		
Queuing Penalty (veh)		0		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	70.1	165.5	69.4	192.6	39.3	50.9	53.7	118.0	160.2	136.5
Average Queue (m)	28.4	78.1	10.8	83.9	10.6	22.2	21.2	21.9	113.7	72.1
95th Queue (m)	75.7	155.5	42.0	173.0	47.4	42.1	39.9	79.8	205.1	140.2
Link Distance (m)		351.2		390.4			427.0		215.5	
Upstream Blk Time (%)									16	
Queuing Penalty (veh)									146	
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)		23		26		0			14	19
Queuing Penalty (veh)		41		20		0			77	127

Intersection: 5: Watson Pkwy N & West Site Access

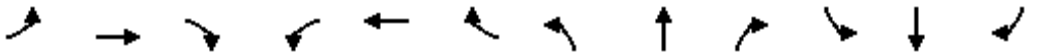
Movement	WB	NB	SB
Directions Served	LR	TR	LT
Maximum Queue (m)	37.7	6.0	47.0
Average Queue (m)	13.4	0.3	37.4
95th Queue (m)	53.2	2.3	178.4
Link Distance (m)	233.8	215.5	235.1
Upstream Blk Time (%)			15
Queuing Penalty (veh)			169
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Watson Rd N & East Site Access

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	14.5	8.3
Average Queue (m)	7.0	0.7
95th Queue (m)	14.4	6.9
Link Distance (m)	149.1	339.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 673



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	16	294	108	20	118	423	542	114	175	297	67
Future Volume (vph)	23	16	294	108	20	118	423	542	114	175	297	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor												
Frt			0.850		0.935			0.974				0.850
Flt Protected		0.971			0.979		0.950			0.950		
Satd. Flow (prot)	0	1850	1601	0	1724	0	1772	1590	0	1789	1830	1445
Flt Permitted		0.971			0.979		0.950			0.950		
Satd. Flow (perm)	0	1850	1601	0	1724	0	1772	1590	0	1789	1830	1445
Link Speed (k/h)		40			50			60			60	
Link Distance (m)		417.2			169.5			258.9			212.4	
Travel Time (s)		37.5			12.2			15.5			12.7	
Confl. Peds. (#/hr)	5						3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	3%	21%	2%	2%	5%	13%
Adj. Flow (vph)	25	17	320	117	22	128	460	589	124	190	323	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	320	0	267	0	460	713	0	190	323	73
Sign Control		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 76.1%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	16	294	108	20	118	423	542	114	175	297	67
Future Volume (Veh/h)	23	16	294	108	20	118	423	542	114	175	297	67
Sign Control		Stop			Stop			Free			Free	
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)	25	17	320	117	22	128	460	589	124	190	323	73
Pedestrians		3									5	
Lane Width (m)		3.7									3.7	
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	2359	2339	326	2602	2350	656	399			713		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2359	2339	326	2602	2350	656	399			713		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	1	55	0	0	72	60			79		
cM capacity (veh/h)	0	17	713	0	17	463	1151			887		

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	42	320	267	460	713	190	323	73
Volume Left	25	0	117	460	0	190	0	0
Volume Right	0	320	128	0	124	0	0	73
cSH	0	713	1	1151	1700	887	1700	1700
Volume to Capacity	Err	0.45	295.76	0.40	0.42	0.21	0.19	0.04
Queue Length 95th (m)	Err	18.4	Err	15.4	0.0	6.4	0.0	0.0
Control Delay (s)	Err	14.1	Err	10.2	0.0	10.2	0.0	0.0
Lane LOS	F	B	F	B		B		
Approach Delay (s)	Err		Err	4.0		3.3		
Approach LOS	F		F					

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	76.1%	ICU Level of Service	D	
Analysis Period (min)	15			

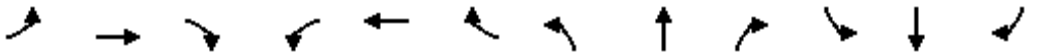
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	128	425	16	42	244
Future Volume (vph)	47	128	425	16	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.901		0.995			
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1708	0	1670	0	1825	1830
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1708	0	1670	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			309.3
Travel Time (s)	12.4		12.7			18.6
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	51	139	462	17	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	0	479	0	46	265
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 47.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	47	128	425	16	42	244
Future Volume (Veh/h)	47	128	425	16	42	244
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)	51	139	462	17	46	265
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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	832	474			482	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	474			482	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	77			96	
cM capacity (veh/h)	326	592			1088	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	190	479	46	265
Volume Left	51	0	46	0
Volume Right	139	17	0	0
cSH	486	1700	1088	1700
Volume to Capacity	0.39	0.28	0.04	0.16
Queue Length 95th (m)	14.5	0.0	1.0	0.0
Control Delay (s)	17.1	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	17.1	0.0	1.3	
Approach LOS	C			

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A	
Analysis Period (min)	15			



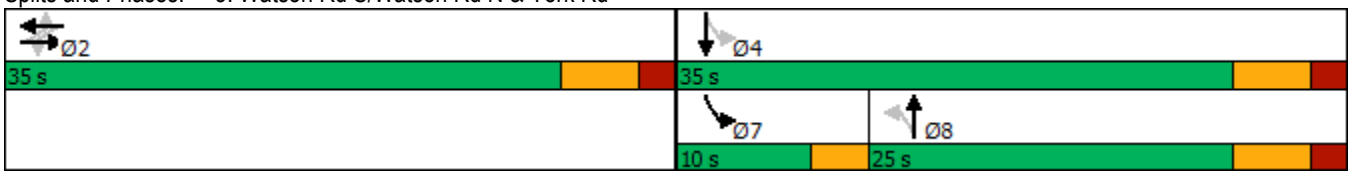
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	433	30	18	477	151	83	80	54	37	9	2
Future Volume (vph)	8	433	30	18	477	151	83	80	54	37	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	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		0.991			0.968			0.966			0.995	
Flt Protected		0.999			0.999			0.981			0.963	
Satd. Flow (prot)	0	1712	0	0	1737	0	0	1365	0	0	1796	0
Flt Permitted		0.987			0.980			0.852			0.729	
Satd. Flow (perm)	0	1692	0	0	1704	0	0	1185	0	0	1360	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			27			24			2	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	9	471	33	20	518	164	90	87	59	40	10	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	513	0	0	702	0	0	236	0	0	52	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.6			29.6			15.0			15.0	
Actuated g/C Ratio		0.52			0.52			0.26			0.26	
v/c Ratio		0.58			0.78			0.71			0.14	
Control Delay		13.4			19.9			29.4			15.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.4			19.9			29.4			15.6	
LOS		B			B			C			B	
Approach Delay		13.4			19.9			29.4			15.6	
Approach LOS		B			B			C			B	
Queue Length 50th (m)		34.8			54.5			19.9			4.0	
Queue Length 95th (m)		68.4			#126.3			41.3			10.9	
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		887			903			414			699	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.58			0.78			0.57			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 56.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 66.1%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	545	416	119	17	491	90	231	545	26	58	369	489
Future Volume (vph)	545	416	119	17	491	90	231	545	26	58	369	489
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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		0.967				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1771	0	1393	1847	1328	1630	1708	0	1738	1883	1570
Flt Permitted	0.159			0.227			0.268			0.169		
Satd. Flow (perm)	294	1771	0	333	1847	1328	460	1708	0	309	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				117		3				298
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		365.4			410.1			438.0			240.2	
Travel Time (s)		21.9			24.6			26.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	592	452	129	18	534	98	251	592	28	63	401	532
Shared Lane Traffic (%)												
Lane Group Flow (vph)	592	581	0	18	534	98	251	620	0	63	401	532
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	37.8	32.1		35.1	25.8	25.8	32.9	25.2		32.1	23.0	23.0
Actuated g/C Ratio	0.47	0.40		0.44	0.32	0.32	0.41	0.31		0.40	0.29	0.29
v/c Ratio	2.22	0.81		0.08	0.90	0.19	0.91	1.15		0.27	0.74	0.80
Control Delay	576.5	33.7		12.1	46.7	4.1	57.5	116.5		16.8	35.6	22.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	576.5	33.7		12.1	46.7	4.1	57.5	116.5		16.8	35.6	22.2
LOS	F	C		B	D	A	E	F		B	D	C
Approach Delay		307.6			39.3			99.5			27.3	
Approach LOS		F			D			F			C	
Queue Length 50th (m)	~142.3	73.2		1.5	82.5	0.0	26.7	~128.7		5.9	59.3	35.3

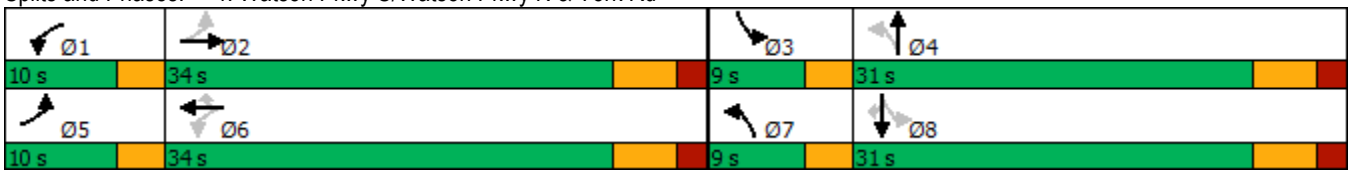
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	#209.9	#159.3		4.9	#139.6	7.9	#67.8	#193.2		13.0	91.5	#89.4
Internal Link Dist (m)		341.4			386.1			414.0			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	267	721		242	651	544	276	540		232	593	698
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	2.22	0.81		0.07	0.82	0.18	0.91	1.15		0.27	0.68	0.76

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 80.1			
Natural Cycle: 145			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 2.22			
Intersection Signal Delay: 135.6		Intersection LOS: F	
Intersection Capacity Utilization 108.0%		ICU Level of Service G	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



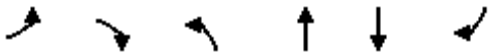
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	12	14	732	13	0	584
Future Volume (vph)	12	14	732	13	0	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.928		0.998			
Flt Protected	0.977					
Satd. Flow (prot)	1708	0	1880	0	0	1883
Flt Permitted	0.977					
Satd. Flow (perm)	1708	0	1880	0	0	1883
Link Speed (k/h)	50		50			50
Link Distance (m)	247.1		240.2			258.9
Travel Time (s)	17.8		17.3			18.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	15	796	14	0	635
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	810	0	0	635
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	14	732	13	0	584
Future Volume (Veh/h)	12	14	732	13	0	584
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)	13	15	796	14	0	635
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			
pX, platoon unblocked	0.63	0.63			0.63	
vC, conflicting volume	1438	803			810	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1401	386			397	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	96			100	
cM capacity (veh/h)	97	414			727	

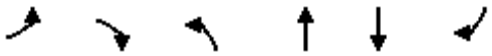
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	28	810	635
Volume Left	13	0	0
Volume Right	15	14	0
cSH	164	1700	727
Volume to Capacity	0.17	0.48	0.00
Queue Length 95th (m)	4.7	0.0	0.0
Control Delay (s)	31.4	0.0	0.0
Lane LOS	D		
Approach Delay (s)	31.4	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	39	157	64	0
Future Volume (vph)	0	0	39	157	64	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.990		
Satd. Flow (prot)	1883	0	0	1865	1883	0
Flt Permitted				0.990		
Satd. Flow (perm)	1883	0	0	1865	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	157.8			356.4	206.3	
Travel Time (s)	11.4			25.7	14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	42	171	70	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	213	70	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	39	157	64	0
Future Volume (Veh/h)	0	0	39	157	64	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	42	171	70	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	325	70	70			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325	70	70			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	651	993	1531			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	213	70
Volume Left	0	42	0
Volume Right	0	0	0
cSH	1700	1531	1700
Volume to Capacity	0.04	0.03	0.04
Queue Length 95th (m)	0.0	0.7	0.0
Control Delay (s)	0.0	1.6	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	1.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	30.8	65.1	171.3	41.4	5.3	25.1	3.0	7.7
Average Queue (m)	10.3	25.7	161.8	14.7	0.2	11.5	0.1	1.4
95th Queue (m)	24.5	48.5	182.6	28.7	2.8	20.7	1.5	5.7
Link Distance (m)	403.0	403.0	158.7		235.1		194.2	
Upstream Blk Time (%)			94					
Queuing Penalty (veh)			0					
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB	SB
Directions Served	LR	TR	L	T
Maximum Queue (m)	26.4	6.1	9.0	1.7
Average Queue (m)	12.9	0.2	2.8	0.1
95th Queue (m)	22.3	3.3	9.3	1.2
Link Distance (m)	185.6	194.2		303.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)			38.0	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	59.4	93.3	67.3	21.3
Average Queue (m)	20.6	47.9	32.7	7.7
95th Queue (m)	45.8	83.8	57.6	17.1
Link Distance (m)	390.4	417.1	501.1	339.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	168.0	368.5	64.7	172.4	89.6	74.6	446.2	26.1	124.1	137.4
Average Queue (m)	167.9	359.9	6.7	90.0	23.5	71.9	414.5	10.8	56.0	68.7
95th Queue (m)	168.3	366.7	38.4	157.7	76.5	87.0	530.5	22.1	104.7	124.9
Link Distance (m)		351.2		390.4			427.0		215.5	
Upstream Blk Time (%)		98					74			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	100	1		30		53	37		0	6
Queuing Penalty (veh)	534	5		32		305	86		2	24

Intersection: 5: Watson Pkwy N & West Site Access

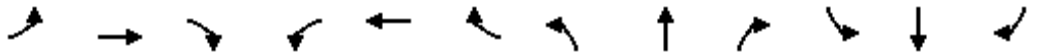
Movement	WB
Directions Served	LR
Maximum Queue (m)	13.5
Average Queue (m)	5.0
95th Queue (m)	12.5
Link Distance (m)	233.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Watson Rd N & East Site Access

Movement	NB
Directions Served	LT
Maximum Queue (m)	8.5
Average Queue (m)	0.4
95th Queue (m)	3.8
Link Distance (m)	339.4
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 990



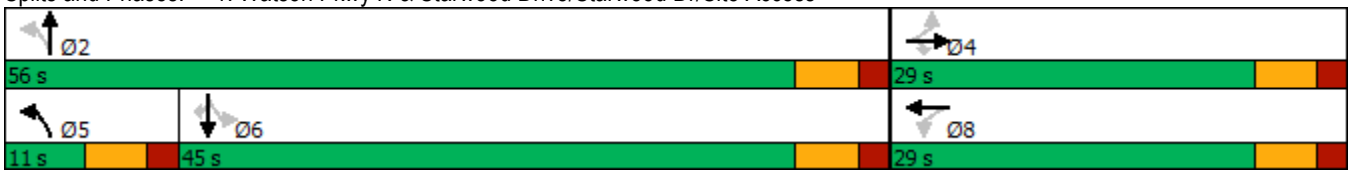
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	8	474	79	12	146	117	184	24	138	553	38
Future Volume (vph)	68	8	474	79	12	146	117	184	24	138	553	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor							1.00					0.98
Frt			0.850		0.917			0.983				0.850
Flt Protected		0.957			0.984		0.950			0.950		
Satd. Flow (prot)	0	1835	1601	0	1699	0	1807	1851	0	1789	1883	1633
Flt Permitted		0.558			0.857		0.185			0.617		
Satd. Flow (perm)	0	1070	1601	0	1480	0	352	1851	0	1162	1883	1598
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			297		93			13				116
Link Speed (k/h)		40			31			60			60	
Link Distance (m)		417.2			169.5			258.9			212.4	
Travel Time (s)		37.5			19.7			15.5			12.7	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	1%	2%	2%	2%	2%	0%
Adj. Flow (vph)	74	9	515	86	13	159	127	200	26	150	601	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	515	0	258	0	127	226	0	150	601	41
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		11.0	45.0		45.0	45.0	45.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0		11.0	56.0		45.0	45.0	45.0
Total Split (%)	34.1%	34.1%	34.1%	34.1%	34.1%		12.9%	65.9%		52.9%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	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
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Act Effct Green (s)		16.2	16.2		16.2		35.0	35.0		26.9	26.9	26.9
Actuated g/C Ratio		0.25	0.25		0.25		0.54	0.54		0.42	0.42	0.42
v/c Ratio		0.31	0.83		0.59		0.40	0.22		0.31	0.77	0.06
Control Delay		26.2	23.7		21.4		11.4	8.0		16.6	25.1	0.2
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		26.2	23.7		21.4		11.4	8.0		16.6	25.1	0.2
LOS		C	C		C		B	A		B	C	A
Approach Delay		24.0			21.4			9.2			22.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			A			C	
Queue Length 50th (m)		8.8	25.7		18.2		7.1	12.4		13.1	66.8	0.0
Queue Length 95th (m)		23.6	#86.9		47.3		16.2	26.1		28.4	116.2	0.0
Internal Link Dist (m)		393.2			145.5			234.9			188.4	
Turn Bay Length (m)							82.0			45.7		45.7
Base Capacity (vph)		425	815		644		316	1425		747	1211	1069
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.20	0.63		0.40		0.40	0.16		0.20	0.50	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 64.6			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 20.3		Intersection LOS: C	
Intersection Capacity Utilization 87.4%		ICU Level of Service E	
Analysis Period (min) 15			

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	30	142	21	84	351
Future Volume (vph)	26	30	142	21	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.927		0.982			
Flt Protected	0.978				0.950	
Satd. Flow (prot)	1742	0	1854	0	1772	1830
Flt Permitted	0.978				0.950	
Satd. Flow (perm)	1742	0	1854	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			309.3
Travel Time (s)	12.4		12.7			18.6
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	28	33	154	23	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	177	0	91	382
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	30	142	21	84	351
Future Volume (Veh/h)	26	30	142	21	84	351
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)	28	33	154	23	91	382
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			212			
pX, platoon unblocked						
vC, conflicting volume	736	170			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736	170			180	
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	96			93	
cM capacity (veh/h)	363	879			1388	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	61	177	91	382
Volume Left	28	0	91	0
Volume Right	33	23	0	0
cSH	532	1700	1388	1700
Volume to Capacity	0.11	0.10	0.07	0.22
Queue Length 95th (m)	3.0	0.0	1.7	0.0
Control Delay (s)	12.6	0.0	7.8	0.0
Lane LOS	B		A	
Approach Delay (s)	12.6	0.0	1.5	
Approach LOS	B			

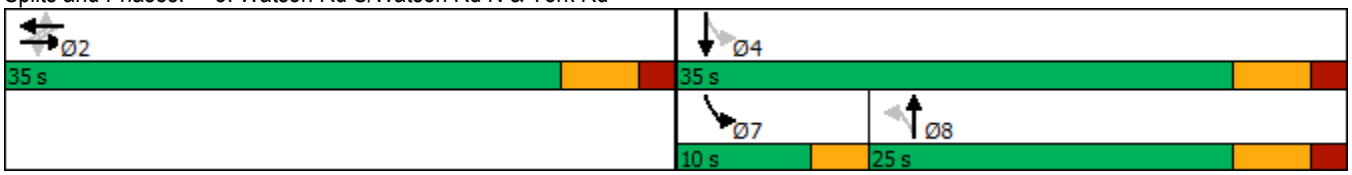
Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		

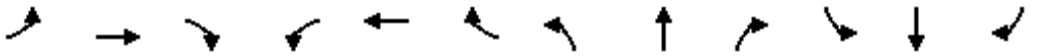
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	403	77	55	489	54	30	8	16	216	59	12
Future Volume (vph)	3	403	77	55	489	54	30	8	16	216	59	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								0.99			1.00	
Frt		0.978			0.988			0.961			0.994	
Flt Protected					0.995			0.973			0.964	
Satd. Flow (prot)	0	1816	0	0	1795	0	0	1744	0	0	1784	0
Flt Permitted		0.997			0.913			0.775			0.741	
Satd. Flow (perm)	0	1811	0	0	1647	0	0	1388	0	0	1368	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			9			17			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	3	438	84	60	532	59	33	9	17	235	64	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	525	0	0	651	0	0	59	0	0	312	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.3			29.3			18.1			18.1	
Actuated g/C Ratio		0.49			0.49			0.30			0.30	
v/c Ratio		0.58			0.80			0.14			0.74	
Control Delay		15.2			24.5			11.5			29.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.2			24.5			11.5			29.7	
LOS		B			C			B			C	
Approach Delay		15.2			24.5			11.5			29.7	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		37.3			55.5			3.3			30.6	
Queue Length 95th (m)		85.9			#145.9			9.9			54.5	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												
Base Capacity (vph)		900			815			505			675	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.58			0.80			0.12			0.46	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 59.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 95.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	346	144	39	452	39	93	120	26	119	566	445
Future Volume (vph)	177	346	144	39	452	39	93	120	26	119	566	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.956				0.850		0.973				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1789	1759	0	1690	1865	1633	1706	1771	0	1722	1865	1555
Flt Permitted	0.191			0.242			0.159			0.657		
Satd. Flow (perm)	360	1759	0	430	1865	1633	285	1771	0	1188	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		13				350
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		365.4			410.1			438.0			240.2	
Travel Time (s)		21.9			24.6			26.3			14.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	192	376	157	42	491	42	101	130	28	129	615	484
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	533	0	42	491	42	101	158	0	129	615	484
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	36.3	29.3		34.3	24.7	24.7	32.9	25.2		32.9	25.2	25.2
Actuated g/C Ratio	0.46	0.37		0.43	0.31	0.31	0.42	0.32		0.42	0.32	0.32
v/c Ratio	0.66	0.80		0.14	0.84	0.07	0.44	0.28		0.24	1.03	0.67
Control Delay	25.5	34.1		12.7	40.4	0.2	20.3	21.7		15.4	76.5	12.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	25.5	34.1		12.7	40.4	0.2	20.3	21.7		15.4	76.5	12.6
LOS	C	C		B	D	A	C	C		B	E	B
Approach Delay		31.8			35.4			21.2			44.9	

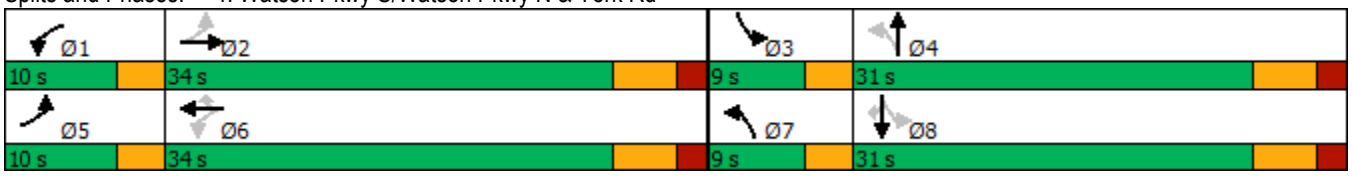
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			D			C			D	
Queue Length 50th (m)	17.5	78.4		3.5	73.2	0.0	9.5	18.2		12.4	~117.2	16.9
Queue Length 95th (m)	#33.8	#138.7		8.7	#121.6	0.0	19.0	34.2		23.4	#181.5	52.8
Internal Link Dist (m)		341.4			386.1			414.0			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	292	668		301	666	659	227	574		534	595	723
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	0.66	0.80		0.14	0.74	0.06	0.44	0.28		0.24	1.03	0.67

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 79.1			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 37.4		Intersection LOS: D	
Intersection Capacity Utilization 85.2%		ICU Level of Service E	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



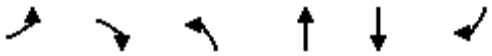
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	17	199	3	0	903
Future Volume (vph)	9	17	199	3	0	903
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.913		0.998			
Flt Protected	0.982					
Satd. Flow (prot)	1689	0	1880	0	0	1883
Flt Permitted	0.982					
Satd. Flow (perm)	1689	0	1880	0	0	1883
Link Speed (k/h)	31		60			60
Link Distance (m)	247.1		240.2			258.9
Travel Time (s)	28.7		14.4			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	18	216	3	0	982
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	219	0	0	982
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.5%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	17	199	3	0	903
Future Volume (Veh/h)	9	17	199	3	0	903
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)	10	18	216	3	0	982
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			259
pX, platoon unblocked	0.75					
vC, conflicting volume	1200	218			219	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1101	218			219	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	98			100	
cM capacity (veh/h)	177	822			1350	

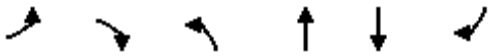
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	28	219	982
Volume Left	10	0	0
Volume Right	18	3	0
cSH	357	1700	1350
Volume to Capacity	0.08	0.13	0.00
Queue Length 95th (m)	2.0	0.0	0.0
Control Delay (s)	15.9	0.0	0.0
Lane LOS	C		
Approach Delay (s)	15.9	0.0	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	37	4	45	110	0
Future Volume (vph)	0	37	4	45	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.996		
Satd. Flow (prot)	1629	0	0	1876	1883	0
Flt Permitted				0.996		
Satd. Flow (perm)	1629	0	0	1876	1883	0
Link Speed (k/h)	31			60	60	
Link Distance (m)	157.8			356.4	206.3	
Travel Time (s)	18.3			21.4	12.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	40	4	49	120	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	0	53	120	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	37	4	45	110	0
Future Volume (Veh/h)	0	37	4	45	110	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	40	4	49	120	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	177	120	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177	120	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	811	931	1468			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	53	120
Volume Left	0	4	0
Volume Right	40	0	0
cSH	931	1468	1700
Volume to Capacity	0.04	0.00	0.07
Queue Length 95th (m)	1.1	0.1	0.0
Control Delay (s)	9.0	0.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	16.7	53.8	80.9	67.0	89.1	50.5	80.4	47.0
Average Queue (m)	6.0	22.4	35.5	28.5	39.3	27.5	33.5	9.5
95th Queue (m)	14.6	40.3	66.2	52.0	74.1	47.2	64.5	26.6
Link Distance (m)	403.0	403.0	158.7		235.1		194.2	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)				0	0	2	2	0
Queuing Penalty (veh)				0	2	5	5	0

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	29.2	3.0	10.6
Average Queue (m)	12.9	0.1	3.0
95th Queue (m)	22.2	2.1	10.0
Link Distance (m)	185.6	194.2	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	69.3	108.4	65.4	22.9
Average Queue (m)	22.8	45.2	33.1	8.3
95th Queue (m)	51.8	81.0	55.8	18.1
Link Distance (m)	390.4	417.1	501.1	339.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	168.0	368.5	43.8	190.4	128.0	74.6	446.2	29.6	130.7	132.0
Average Queue (m)	167.9	360.0	8.3	86.8	23.5	72.6	423.4	10.9	57.0	72.2
95th Queue (m)	167.9	367.1	44.2	155.8	80.2	82.5	508.1	24.1	113.0	130.0
Link Distance (m)		351.2		390.4			427.0		215.5	
Upstream Blk Time (%)		98					79			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	100	1		28		46	40		1	7
Queuing Penalty (veh)	534	5		30		260	92		5	29

Intersection: 5: Watson Pkwy N & West Site Access

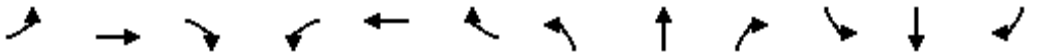
Movement	WB
Directions Served	LR
Maximum Queue (m)	12.4
Average Queue (m)	5.0
95th Queue (m)	12.1
Link Distance (m)	233.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Watson Rd N & East Site Access

Movement	NB
Directions Served	LT
Maximum Queue (m)	7.4
Average Queue (m)	0.5
95th Queue (m)	4.0
Link Distance (m)	339.4
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 967



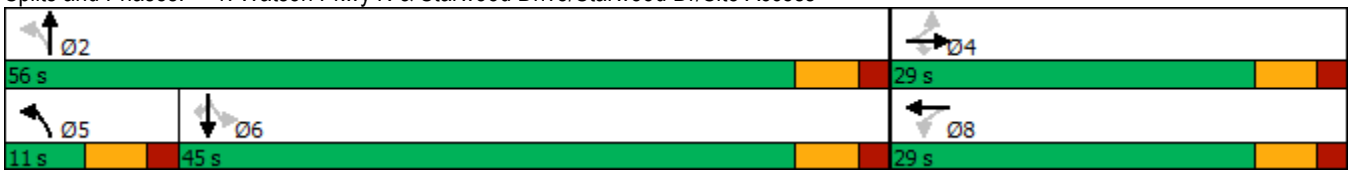
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	16	294	108	20	118	423	542	114	175	297	67
Future Volume (vph)	23	16	294	108	20	118	423	542	114	175	297	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor		1.00					1.00					0.98
Frt			0.850		0.935			0.974				0.850
Flt Protected		0.971			0.979		0.950			0.950		
Satd. Flow (prot)	0	1850	1601	0	1724	0	1772	1590	0	1789	1830	1445
Flt Permitted		0.769			0.839		0.411			0.390		
Satd. Flow (perm)	0	1461	1601	0	1477	0	765	1590	0	735	1830	1410
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			320		53			22				116
Link Speed (k/h)		40			50			60			60	
Link Distance (m)		417.2			169.5			258.9			212.4	
Travel Time (s)		37.5			12.2			15.5			12.7	
Confl. Peds. (#/hr)	5						3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	3%	21%	2%	2%	5%	13%
Adj. Flow (vph)	25	17	320	117	22	128	460	589	124	190	323	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	320	0	267	0	460	713	0	190	323	73
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		11.0	45.0		45.0	45.0	45.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0		11.0	56.0		45.0	45.0	45.0
Total Split (%)	34.1%	34.1%	34.1%	34.1%	34.1%		12.9%	65.9%		52.9%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	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
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Act Effct Green (s)		14.9	14.9		14.9		36.1	36.1		24.3	24.3	24.3
Actuated g/C Ratio		0.23	0.23		0.23		0.57	0.57		0.38	0.38	0.38
v/c Ratio		0.12	0.52		0.70		0.89	0.79		0.68	0.46	0.12
Control Delay		22.9	6.6		29.8		34.2	18.4		30.2	17.0	1.4
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		22.9	6.6		29.8		34.2	18.4		30.2	17.0	1.4
LOS		C	A		C		C	B		C	B	A
Approach Delay		8.4			29.8			24.6			19.3	

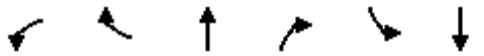
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			C			C			B	
Queue Length 50th (m)		4.0	0.0		23.0		28.3	56.8		17.9	27.4	0.0
Queue Length 95th (m)		13.2	19.0		57.1		#87.6	128.0		45.5	54.6	2.9
Internal Link Dist (m)		393.2			145.5			234.9			188.4	
Turn Bay Length (m)							82.0			45.7		45.7
Base Capacity (vph)		564	814		602		517	1274		481	1198	963
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.07	0.39		0.44		0.89	0.56		0.40	0.27	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 63.8			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 21.4		Intersection LOS: C	
Intersection Capacity Utilization 81.1%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

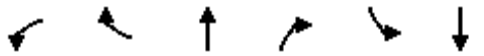
Splits and Phases: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	128	425	16	42	244
Future Volume (vph)	47	128	425	16	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.901		0.995			
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1708	0	1670	0	1825	1830
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1708	0	1670	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			309.3
Travel Time (s)	12.4		12.7			18.6
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	51	139	462	17	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	0	479	0	46	265
Sign Control	Stop		Free			Free

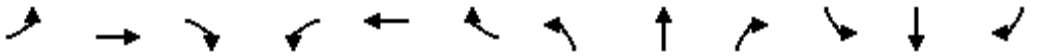
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	47	128	425	16	42	244
Future Volume (Veh/h)	47	128	425	16	42	244
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)	51	139	462	17	46	265
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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)			212			
pX, platoon unblocked						
vC, conflicting volume	832	474			482	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	474			482	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	77			96	
cM capacity (veh/h)	326	592			1088	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	190	479	46	265
Volume Left	51	0	46	0
Volume Right	139	17	0	0
cSH	486	1700	1088	1700
Volume to Capacity	0.39	0.28	0.04	0.16
Queue Length 95th (m)	14.5	0.0	1.0	0.0
Control Delay (s)	17.1	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	17.1	0.0	1.3	
Approach LOS	C			

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		



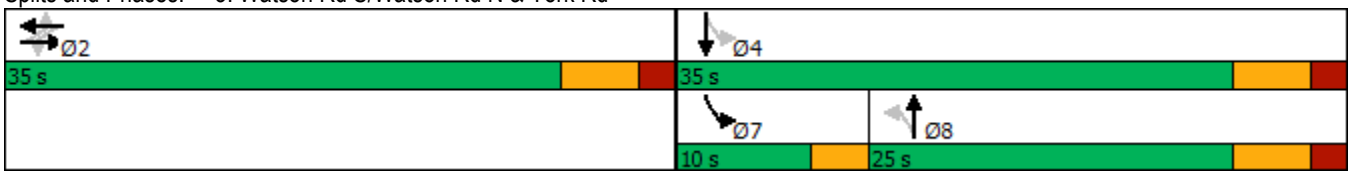
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	433	30	18	477	151	83	80	54	37	9	2
Future Volume (vph)	8	433	30	18	477	151	83	80	54	37	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	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		0.991			0.968			0.966			0.995	
Flt Protected		0.999			0.999			0.981			0.963	
Satd. Flow (prot)	0	1712	0	0	1737	0	0	1365	0	0	1796	0
Flt Permitted		0.987			0.980			0.852			0.729	
Satd. Flow (perm)	0	1692	0	0	1704	0	0	1185	0	0	1360	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			27			24			2	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	9	471	33	20	518	164	90	87	59	40	10	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	513	0	0	702	0	0	236	0	0	52	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.6			29.6			15.0			15.0	
Actuated g/C Ratio		0.52			0.52			0.26			0.26	
v/c Ratio		0.58			0.78			0.71			0.14	
Control Delay		13.4			19.9			29.4			15.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.4			19.9			29.4			15.6	
LOS		B			B			C			B	
Approach Delay		13.4			19.9			29.4			15.6	
Approach LOS		B			B			C			B	
Queue Length 50th (m)		34.8			54.5			19.9			4.0	
Queue Length 95th (m)		68.4			#126.3			41.3			10.9	
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		887			903			414			699	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.58			0.78			0.57			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 56.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 66.1%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	545	416	119	17	491	90	231	545	26	58	369	489
Future Volume (vph)	545	416	119	17	491	90	231	545	26	58	369	489
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	1		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
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		0.967				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1755	1771	0	1393	1847	1328	1630	1708	0	1738	1883	1570
Flt Permitted	0.159			0.227			0.268			0.169		
Satd. Flow (perm)	294	1771	0	333	1847	1328	460	1708	0	309	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				117		3				298
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		365.4			410.1			438.0			240.2	
Travel Time (s)		21.9			24.6			26.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	592	452	129	18	534	98	251	592	28	63	401	532
Shared Lane Traffic (%)												
Lane Group Flow (vph)	592	581	0	18	534	98	251	620	0	63	401	532
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	37.8	32.1		35.1	25.8	25.8	32.9	25.2		32.1	23.0	23.0
Actuated g/C Ratio	0.47	0.40		0.44	0.32	0.32	0.41	0.31		0.40	0.29	0.29
v/c Ratio	2.22	0.81		0.08	0.90	0.19	0.91	1.15		0.27	0.74	0.80
Control Delay	576.5	33.7		12.1	46.7	4.1	57.5	116.5		16.8	35.6	22.2
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	576.5	33.7		12.1	46.7	4.1	57.5	116.5		16.8	35.6	22.2
LOS	F	C		B	D	A	E	F		B	D	C
Approach Delay		307.6			39.3			99.5			27.3	
Approach LOS		F			D			F			C	
Queue Length 50th (m)	~142.3	73.2		1.5	82.5	0.0	26.7	~128.7		5.9	59.3	35.3

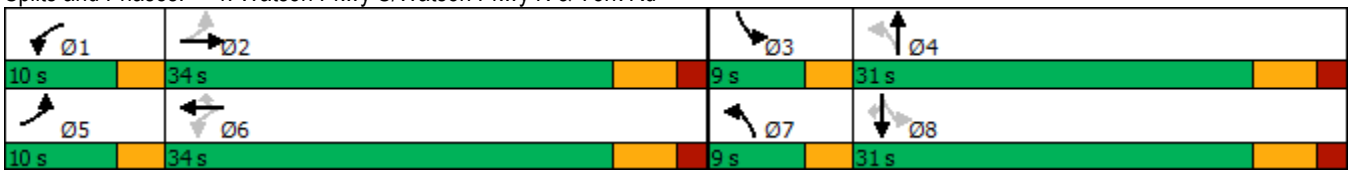
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	#209.9	#159.3		4.9	#139.6	7.9	#67.8	#193.2		13.0	91.5	#89.4
Internal Link Dist (m)		341.4			386.1			414.0			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	267	721		242	651	544	276	540		232	593	698
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	2.22	0.81		0.07	0.82	0.18	0.91	1.15		0.27	0.68	0.76

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 80.1			
Natural Cycle: 145			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 2.22			
Intersection Signal Delay: 135.6		Intersection LOS: F	
Intersection Capacity Utilization 108.0%		ICU Level of Service G	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



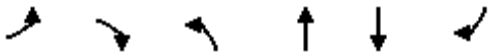
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	12	14	732	13	0	584
Future Volume (vph)	12	14	732	13	0	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.928		0.998			
Flt Protected	0.977					
Satd. Flow (prot)	1708	0	1880	0	0	1883
Flt Permitted	0.977					
Satd. Flow (perm)	1708	0	1880	0	0	1883
Link Speed (k/h)	50		50			50
Link Distance (m)	247.1		240.2			258.9
Travel Time (s)	17.8		17.3			18.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	15	796	14	0	635
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	810	0	0	635
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 49.3%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	14	732	13	0	584
Future Volume (Veh/h)	12	14	732	13	0	584
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)	13	15	796	14	0	635
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			259
pX, platoon unblocked	0.65	0.63			0.63	
vC, conflicting volume	1438	803			810	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1230	386			397	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	96			100	
cM capacity (veh/h)	128	414			727	

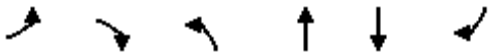
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	28	810	635
Volume Left	13	0	0
Volume Right	15	14	0
cSH	203	1700	727
Volume to Capacity	0.14	0.48	0.00
Queue Length 95th (m)	3.7	0.0	0.0
Control Delay (s)	25.6	0.0	0.0
Lane LOS	D		
Approach Delay (s)	25.6	0.0	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	39	157	64	0
Future Volume (vph)	0	0	39	157	64	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.990		
Satd. Flow (prot)	1883	0	0	1865	1883	0
Flt Permitted				0.990		
Satd. Flow (perm)	1883	0	0	1865	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	157.8			356.4	206.3	
Travel Time (s)	11.4			25.7	14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	42	171	70	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	213	70	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	39	157	64	0
Future Volume (Veh/h)	0	0	39	157	64	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	42	171	70	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	325	70	70			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325	70	70			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	651	993	1531			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	213	70
Volume Left	0	42	0
Volume Right	0	0	0
cSH	1700	1531	1700
Volume to Capacity	0.04	0.03	0.04
Queue Length 95th (m)	0.0	0.7	0.0
Control Delay (s)	0.0	1.6	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	1.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	16.7	53.8	80.9	67.0	89.1	50.5	80.4	47.0
Average Queue (m)	6.0	22.4	35.5	28.5	39.3	27.5	33.5	9.5
95th Queue (m)	14.6	40.3	66.2	52.0	74.1	47.2	64.5	26.6
Link Distance (m)	403.0	403.0	158.7		235.1		194.2	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)				0	0	2	2	0
Queuing Penalty (veh)				0	2	5	5	0

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	29.2	3.0	10.6
Average Queue (m)	12.9	0.1	3.0
95th Queue (m)	22.2	2.1	10.0
Link Distance (m)	185.6	194.2	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	69.3	108.4	65.4	22.9
Average Queue (m)	22.8	45.2	33.1	8.3
95th Queue (m)	51.8	81.0	55.8	18.1
Link Distance (m)	390.4	417.1	501.1	339.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	168.0	368.5	43.8	190.4	128.0	74.6	446.2	29.6	130.7	132.0
Average Queue (m)	167.9	360.0	8.3	86.8	23.5	72.6	423.4	10.9	57.0	72.2
95th Queue (m)	167.9	367.1	44.2	155.8	80.2	82.5	508.1	24.1	113.0	130.0
Link Distance (m)		351.2		390.4			427.0		215.5	
Upstream Blk Time (%)		98					79			
Queuing Penalty (veh)		0					0			
Storage Bay Dist (m)	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	100	1		28		46	40		1	7
Queuing Penalty (veh)	534	5		30		260	92		5	29

Intersection: 5: Watson Pkwy N & West Site Access

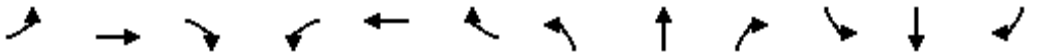
Movement	WB
Directions Served	LR
Maximum Queue (m)	12.4
Average Queue (m)	5.0
95th Queue (m)	12.1
Link Distance (m)	233.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Watson Rd N & East Site Access

Movement	NB
Directions Served	LT
Maximum Queue (m)	7.4
Average Queue (m)	0.5
95th Queue (m)	4.0
Link Distance (m)	339.4
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 967



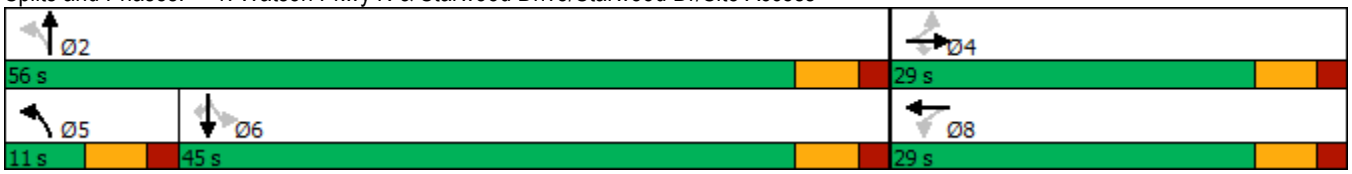
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	8	474	79	12	146	117	184	24	138	553	38
Future Volume (vph)	68	8	474	79	12	146	117	184	24	138	553	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor							1.00					0.98
Frt			0.850		0.917			0.983				0.850
Flt Protected		0.957			0.984		0.950			0.950		
Satd. Flow (prot)	0	1835	1601	0	1699	0	1807	1851	0	1789	1883	1633
Flt Permitted		0.558			0.857		0.185			0.617		
Satd. Flow (perm)	0	1070	1601	0	1480	0	352	1851	0	1162	1883	1598
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			297		93			13				116
Link Speed (k/h)		40			31			60			60	
Link Distance (m)		417.2			169.5			258.9			212.4	
Travel Time (s)		37.5			19.7			15.5			12.7	
Confl. Peds. (#/hr)							1					1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	1%	2%	2%	2%	2%	0%
Adj. Flow (vph)	74	9	515	86	13	159	127	200	26	150	601	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	83	515	0	258	0	127	226	0	150	601	41
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		11.0	45.0		45.0	45.0	45.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0		11.0	56.0		45.0	45.0	45.0
Total Split (%)	34.1%	34.1%	34.1%	34.1%	34.1%		12.9%	65.9%		52.9%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	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
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Act Effct Green (s)		16.2	16.2		16.2		35.0	35.0		26.9	26.9	26.9
Actuated g/C Ratio		0.25	0.25		0.25		0.54	0.54		0.42	0.42	0.42
v/c Ratio		0.31	0.83		0.59		0.40	0.22		0.31	0.77	0.06
Control Delay		26.2	23.7		21.4		11.4	8.0		16.6	25.1	0.2
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		26.2	23.7		21.4		11.4	8.0		16.6	25.1	0.2
LOS		C	C		C		B	A		B	C	A
Approach Delay		24.0			21.4			9.2			22.2	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			A			C	
Queue Length 50th (m)		8.8	25.7		18.2		7.1	12.4		13.1	66.8	0.0
Queue Length 95th (m)		23.6	#86.9		47.3		16.2	26.1		28.4	116.2	0.0
Internal Link Dist (m)		393.2			145.5			234.9			188.4	
Turn Bay Length (m)							82.0			45.7		45.7
Base Capacity (vph)		425	815		644		316	1425		747	1211	1069
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.20	0.63		0.40		0.40	0.16		0.20	0.50	0.04

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 64.6			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 20.3		Intersection LOS: C	
Intersection Capacity Utilization 87.4%		ICU Level of Service E	
Analysis Period (min) 15			

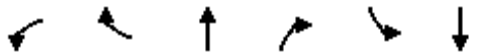
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	26	30	142	21	84	351
Future Volume (vph)	26	30	142	21	84	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.927		0.982			
Flt Protected	0.978				0.950	
Satd. Flow (prot)	1742	0	1854	0	1772	1830
Flt Permitted	0.978				0.950	
Satd. Flow (perm)	1742	0	1854	0	1772	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			309.3
Travel Time (s)	12.4		12.7			18.6
Confl. Peds. (#/hr)	3	1		1	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	2%	0%	3%	5%
Adj. Flow (vph)	28	33	154	23	91	382
Shared Lane Traffic (%)						
Lane Group Flow (vph)	61	0	177	0	91	382
Sign Control	Stop		Free			Free

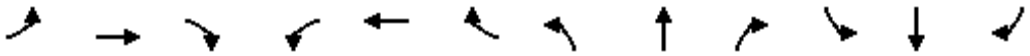
Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 28.8%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	30	142	21	84	351
Future Volume (Veh/h)	26	30	142	21	84	351
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)	28	33	154	23	91	382
Pedestrians	3		3			1
Lane Width (m)	3.7		3.7			3.7
Walking Speed (m/s)	4.0		4.0			4.0
Percent Blockage	0		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			212			
pX, platoon unblocked						
vC, conflicting volume	736	170			180	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736	170			180	
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	96			93	
cM capacity (veh/h)	363	879			1388	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	61	177	91	382
Volume Left	28	0	91	0
Volume Right	33	23	0	0
cSH	532	1700	1388	1700
Volume to Capacity	0.11	0.10	0.07	0.22
Queue Length 95th (m)	3.0	0.0	1.7	0.0
Control Delay (s)	12.6	0.0	7.8	0.0
Lane LOS	B		A	
Approach Delay (s)	12.6	0.0	1.5	
Approach LOS	B			

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		



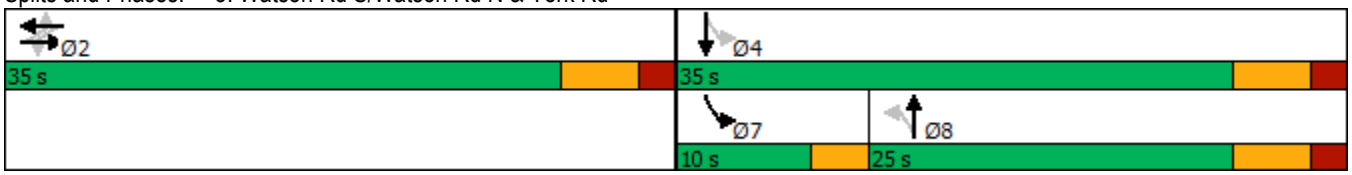
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	403	77	55	489	54	30	8	16	216	59	12
Future Volume (vph)	3	403	77	55	489	54	30	8	16	216	59	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								0.99			1.00	
Frt		0.978			0.988			0.961			0.994	
Flt Protected					0.995			0.973			0.964	
Satd. Flow (prot)	0	1816	0	0	1795	0	0	1744	0	0	1784	0
Flt Permitted		0.997			0.913			0.775			0.741	
Satd. Flow (perm)	0	1811	0	0	1647	0	0	1388	0	0	1368	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			9			17			4	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	17%	4%	0%	8%	5%	4%	0%	0%	8%	0%	15%	0%
Adj. Flow (vph)	3	438	84	60	532	59	33	9	17	235	64	13
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	525	0	0	651	0	0	59	0	0	312	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.3			29.3			18.1			18.1	
Actuated g/C Ratio		0.49			0.49			0.30			0.30	
v/c Ratio		0.58			0.80			0.14			0.74	
Control Delay		15.2			24.5			11.5			29.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		15.2			24.5			11.5			29.7	
LOS		B			C			B			C	
Approach Delay		15.2			24.5			11.5			29.7	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		37.3			55.5			3.3			30.6	
Queue Length 95th (m)		85.9			#145.9			9.9			54.5	

Double Left Turn-Lane

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												
Base Capacity (vph)		900			815			505			675	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.58			0.80			0.12			0.46	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 59.5			
Natural Cycle: 70			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 21.9		Intersection LOS: C	
Intersection Capacity Utilization 95.1%		ICU Level of Service F	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	177	346	144	39	452	39	93	120	26	119	566	445
Future Volume (vph)	177	346	144	39	452	39	93	120	26	119	566	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00	1.00		1.00		0.98
Frt		0.956				0.850		0.973				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3471	1759	0	1690	1865	1633	1706	1771	0	1722	1865	1555
Flt Permitted	0.195			0.240			0.159			0.657		
Satd. Flow (perm)	713	1759	0	427	1865	1633	285	1771	0	1188	1865	1522
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27				117		13				350
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		365.4			410.1			438.0			240.2	
Travel Time (s)		21.9			24.6			26.3			14.4	
Confl. Peds. (#/hr)							1		2	2		1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	5%	3%	8%	3%	0%	7%	3%	15%	6%	3%	5%
Adj. Flow (vph)	192	376	157	42	491	42	101	130	28	129	615	484
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	533	0	42	491	42	101	158	0	129	615	484
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	8
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	7.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	31.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	36.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	4.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	36.3	29.3		34.5	24.9	24.9	32.9	25.2		32.9	25.2	25.2
Actuated g/C Ratio	0.46	0.37		0.44	0.31	0.31	0.42	0.32		0.42	0.32	0.32
v/c Ratio	0.34	0.80		0.14	0.84	0.07	0.44	0.28		0.24	1.03	0.67
Control Delay	13.4	34.1		12.7	39.7	0.2	20.3	21.7		15.4	76.5	12.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	13.4	34.1		12.7	39.7	0.2	20.3	21.7		15.4	76.5	12.6
LOS	B	C		B	D	A	C	C		B	E	B
Approach Delay		28.6			34.9			21.2			44.9	

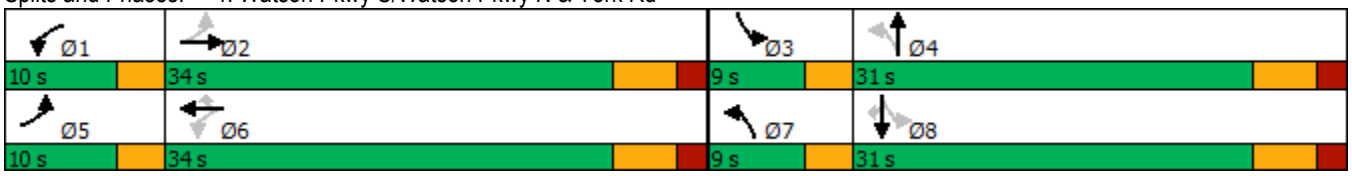
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		C			C			C			D	
Queue Length 50th (m)	8.5	78.4		3.5	73.2	0.0	9.5	18.2		12.4	~117.2	16.9
Queue Length 95th (m)	14.0	#138.7		8.7	#121.6	0.0	19.0	34.2		23.4	#181.5	52.8
Internal Link Dist (m)		341.4			386.1			414.0			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	573	668		302	666	659	227	574		534	595	723
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	0.34	0.80		0.14	0.74	0.06	0.44	0.28		0.24	1.03	0.67

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 79.1			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay: 36.4		Intersection LOS: D	
Intersection Capacity Utilization 83.6%		ICU Level of Service E	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



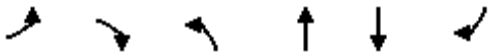
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	9	17	199	3	0	903
Future Volume (vph)	9	17	199	3	0	903
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.913			0.850		
Flt Protected	0.982					
Satd. Flow (prot)	1689	0	1883	1601	0	1883
Flt Permitted	0.982					
Satd. Flow (perm)	1689	0	1883	1601	0	1883
Link Speed (k/h)	31		60			60
Link Distance (m)	247.1		240.2			258.9
Travel Time (s)	28.7		14.4			15.5
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	18	216	3	0	982
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	216	3	0	982
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 57.5%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	17	199	3	0	903
Future Volume (Veh/h)	9	17	199	3	0	903
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)	10	18	216	3	0	982
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			259
pX, platoon unblocked	0.75					
vC, conflicting volume	1198	216			219	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1099	216			219	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	98			100	
cM capacity (veh/h)	177	824			1350	

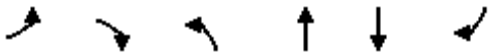
Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	28	216	3	982
Volume Left	10	0	0	0
Volume Right	18	0	3	0
cSH	358	1700	1700	1350
Volume to Capacity	0.08	0.13	0.00	0.00
Queue Length 95th (m)	2.0	0.0	0.0	0.0
Control Delay (s)	15.9	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	15.9	0.0		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	57.5%	ICU Level of Service	B
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	37	4	45	110	0
Future Volume (vph)	0	37	4	45	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.865					
Flt Protected				0.996		
Satd. Flow (prot)	1629	0	0	1876	1883	0
Flt Permitted				0.996		
Satd. Flow (perm)	1629	0	0	1876	1883	0
Link Speed (k/h)	31			60	60	
Link Distance (m)	157.8			356.4	206.3	
Travel Time (s)	18.3			21.4	12.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	40	4	49	120	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	40	0	0	53	120	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	37	4	45	110	0
Future Volume (Veh/h)	0	37	4	45	110	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	40	4	49	120	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	177	120	120			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	177	120	120			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	96	100			
cM capacity (veh/h)	811	931	1468			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	40	53	120
Volume Left	0	4	0
Volume Right	40	0	0
cSH	931	1468	1700
Volume to Capacity	0.04	0.00	0.07
Queue Length 95th (m)	1.1	0.1	0.0
Control Delay (s)	9.0	0.6	0.0
Lane LOS	A	A	
Approach Delay (s)	9.0	0.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	15.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	288.8	353.3	156.8	32.6	38.3	53.2	119.3	53.2
Average Queue (m)	104.5	249.5	156.8	14.3	12.7	28.7	66.9	9.3
95th Queue (m)	315.5	426.5	161.4	27.7	28.1	58.1	109.0	32.4
Link Distance (m)	403.0	403.0	158.7		235.1		194.2	
Upstream Blk Time (%)	6	10	80					
Queuing Penalty (veh)	0	0	0					
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)						0	16	0
Queuing Penalty (veh)						1	27	0

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	NB	SB
Directions Served	LR	TR	L
Maximum Queue (m)	17.6	6.4	13.8
Average Queue (m)	6.9	1.6	3.4
95th Queue (m)	14.1	5.8	11.2
Link Distance (m)	185.6	194.2	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			38.0
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	94.4	415.4	19.3	63.1
Average Queue (m)	43.2	320.1	8.1	33.0
95th Queue (m)	80.3	501.9	17.2	53.0
Link Distance (m)	386.8	417.1	501.1	339.4
Upstream Blk Time (%)		23		
Queuing Penalty (veh)		0		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	30.0	137.7	231.3	112.9	178.2	84.1	57.4	50.6	171.3	214.4	162.0
Average Queue (m)	14.3	40.5	119.0	16.1	83.6	9.9	27.3	24.5	41.3	150.6	122.3
95th Queue (m)	26.3	143.3	249.0	69.5	155.1	46.8	52.6	43.6	137.4	229.5	196.4
Link Distance (m)			351.4		386.8			425.2		213.8	
Upstream Blk Time (%)										4	
Queuing Penalty (veh)										34	
Storage Bay Dist (m)	68.0	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)			39		25		1			46	29
Queuing Penalty (veh)			69		20		1			260	200

Intersection: 5: Watson Pkwy N & West Site Access

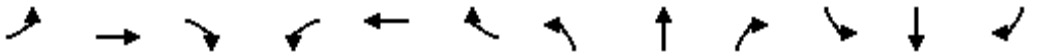
Movement	WB	NB	SB
Directions Served	LR	R	LT
Maximum Queue (m)	18.7	4.8	100.3
Average Queue (m)	6.1	0.3	12.7
95th Queue (m)	15.2	2.4	75.3
Link Distance (m)	233.2	213.8	235.1
Upstream Blk Time (%)			0
Queuing Penalty (veh)			1
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Watson Rd N & East Site Access

Movement	EB	NB
Directions Served	LR	LT
Maximum Queue (m)	13.1	3.2
Average Queue (m)	6.9	0.2
95th Queue (m)	14.1	1.9
Link Distance (m)	149.1	339.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 613



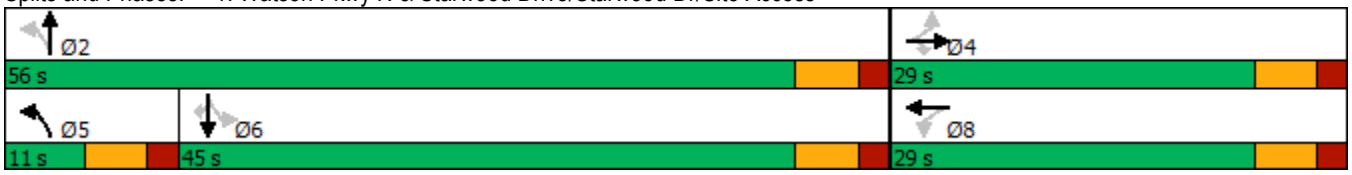
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	23	16	294	108	20	118	423	542	114	175	297	67
Future Volume (vph)	23	16	294	108	20	118	423	542	114	175	297	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	84.0		0.0	0.0		0.0	82.0		45.7	45.7		45.7
Storage Lanes	0		1	0		0	1		0	1		1
Taper Length (m)	50.0			7.5			66.0			7.6		
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
Ped Bike Factor		1.00					1.00					0.98
Frt			0.850		0.935			0.974				0.850
Flt Protected		0.971			0.979		0.950			0.950		
Satd. Flow (prot)	0	1850	1601	0	1724	0	1772	1590	0	1789	1830	1445
Flt Permitted		0.769			0.839		0.411			0.390		
Satd. Flow (perm)	0	1461	1601	0	1477	0	765	1590	0	735	1830	1410
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			320		53			22				116
Link Speed (k/h)		40			50			60			60	
Link Distance (m)		417.2			169.5			258.9			212.4	
Travel Time (s)		37.5			12.2			15.5			12.7	
Confl. Peds. (#/hr)	5						3					3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	2%	2%	2%	2%	2%	3%	21%	2%	2%	5%	13%
Adj. Flow (vph)	25	17	320	117	22	128	460	589	124	190	323	73
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	42	320	0	267	0	460	713	0	190	323	73
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		6
Detector Phase	4	4	4	8	8		5	2		6	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		5.0	10.0		10.0	10.0	10.0
Minimum Split (s)	29.0	29.0	29.0	29.0	29.0		11.0	45.0		45.0	45.0	45.0
Total Split (s)	29.0	29.0	29.0	29.0	29.0		11.0	56.0		45.0	45.0	45.0
Total Split (%)	34.1%	34.1%	34.1%	34.1%	34.1%		12.9%	65.9%		52.9%	52.9%	52.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	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
Total Lost Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	6.0
Lead/Lag							Lead			Lag	Lag	Lag
Lead-Lag Optimize?							Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Min		Min	Min	Min
Act Effct Green (s)		14.9	14.9		14.9		36.1	36.1		24.3	24.3	24.3
Actuated g/C Ratio		0.23	0.23		0.23		0.57	0.57		0.38	0.38	0.38
v/c Ratio		0.12	0.52		0.70		0.89	0.79		0.68	0.46	0.12
Control Delay		22.9	6.6		29.8		34.2	18.4		30.2	17.0	1.4
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		22.9	6.6		29.8		34.2	18.4		30.2	17.0	1.4
LOS		C	A		C		C	B		C	B	A
Approach Delay		8.4			29.8			24.6			19.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		A			C			C			B	
Queue Length 50th (m)		4.0	0.0		23.0		28.3	56.8		17.9	27.4	0.0
Queue Length 95th (m)		13.2	19.0		57.1		#87.6	128.0		45.5	54.6	2.9
Internal Link Dist (m)		393.2			145.5			234.9			188.4	
Turn Bay Length (m)							82.0			45.7		45.7
Base Capacity (vph)		564	814		602		517	1274		481	1198	963
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.07	0.39		0.44		0.89	0.56		0.40	0.27	0.08

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 63.8			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 21.4		Intersection LOS: C	
Intersection Capacity Utilization 81.1%		ICU Level of Service D	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access



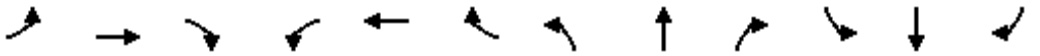
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	47	128	425	16	42	244
Future Volume (vph)	47	128	425	16	42	244
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	45.7	45.7		45.7	38.0	
Storage Lanes	0	0		0	1	
Taper Length (m)	7.6				32.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.901		0.995			
Flt Protected	0.987				0.950	
Satd. Flow (prot)	1708	0	1670	0	1825	1830
Flt Permitted	0.987				0.950	
Satd. Flow (perm)	1708	0	1670	0	1825	1830
Link Speed (k/h)	60		60			60
Link Distance (m)	206.3		212.4			309.3
Travel Time (s)	12.4		12.7			18.6
Confl. Peds. (#/hr)	1	1		3	3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	15%	0%	0%	5%
Adj. Flow (vph)	51	139	462	17	46	265
Shared Lane Traffic (%)						
Lane Group Flow (vph)	190	0	479	0	46	265
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	47	128	425	16	42	244
Future Volume (Veh/h)	47	128	425	16	42	244
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)	51	139	462	17	46	265
Pedestrians	3		1			1
Lane Width (m)	3.7		3.7			3.7
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)			212			
pX, platoon unblocked						
vC, conflicting volume	832	474			482	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	832	474			482	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	84	77			96	
cM capacity (veh/h)	326	592			1088	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	190	479	46	265
Volume Left	51	0	46	0
Volume Right	139	17	0	0
cSH	486	1700	1088	1700
Volume to Capacity	0.39	0.28	0.04	0.16
Queue Length 95th (m)	14.5	0.0	1.0	0.0
Control Delay (s)	17.1	0.0	8.5	0.0
Lane LOS	C		A	
Approach Delay (s)	17.1	0.0	1.3	
Approach LOS	C			

Intersection Summary			
Average Delay	3.7		
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		



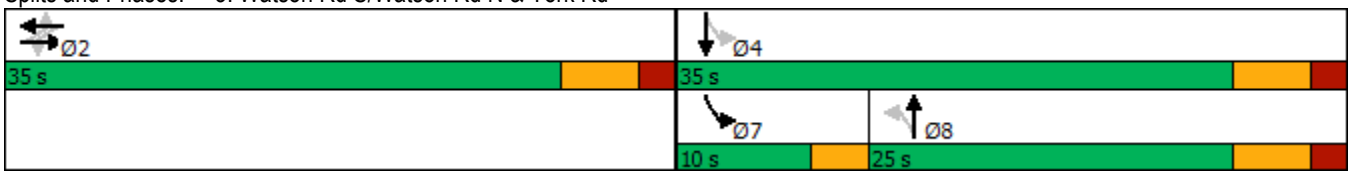
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	8	433	30	18	477	151	83	80	54	37	9	2
Future Volume (vph)	8	433	30	18	477	151	83	80	54	37	9	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	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		0.991			0.968			0.966			0.995	
Flt Protected		0.999			0.999			0.981			0.963	
Satd. Flow (prot)	0	1712	0	0	1737	0	0	1365	0	0	1796	0
Flt Permitted		0.987			0.980			0.852			0.729	
Satd. Flow (perm)	0	1692	0	0	1704	0	0	1185	0	0	1360	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			27			24			2	
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		410.1			425.7			511.6			356.4	
Travel Time (s)		24.6			25.5			30.7			21.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	100%	10%	2%	0%	5%	14%	45%	38%	9%	2%	5%	0%
Adj. Flow (vph)	9	471	33	20	518	164	90	87	59	40	10	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	513	0	0	702	0	0	236	0	0	52	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		2			2			8		7	4	
Permitted Phases	2			2			8			4		
Detector Phase	2	2		2	2		8	8		7	4	
Switch Phase												
Minimum Initial (s)	17.0	17.0		17.0	17.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0		25.0	25.0		10.0	35.0	
Total Split (%)	50.0%	50.0%		50.0%	50.0%		35.7%	35.7%		14.3%	50.0%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		3.0	4.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		0.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		6.0			6.0			6.0			6.0	
Lead/Lag							Lag	Lag		Lead		
Lead-Lag Optimize?							Yes	Yes		Yes		
Recall Mode	Max	Max		Max	Max		None	None		None	None	
Act Effct Green (s)		29.6			29.6			15.0			15.0	
Actuated g/C Ratio		0.52			0.52			0.26			0.26	
v/c Ratio		0.58			0.78			0.71			0.14	
Control Delay		13.4			19.9			29.4			15.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		13.4			19.9			29.4			15.6	
LOS		B			B			C			B	
Approach Delay		13.4			19.9			29.4			15.6	
Approach LOS		B			B			C			B	
Queue Length 50th (m)		34.8			54.5			19.9			4.0	
Queue Length 95th (m)		68.4			#126.3			41.3			10.9	
Internal Link Dist (m)		386.1			401.7			487.6			332.4	
Turn Bay Length (m)												

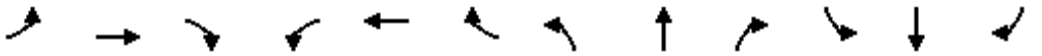
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		887			903			414			699	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.58			0.78			0.57			0.07	

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 56.7			
Natural Cycle: 75			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 66.1%		ICU Level of Service C	
Analysis Period (min) 15			

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Watson Rd S/Watson Rd N & York Rd





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	545	416	119	17	491	90	231	545	26	58	369	489
Future Volume (vph)	545	416	119	17	491	90	231	545	26	58	369	489
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	68.0		0.0	59.0		68.0	67.0		0.0	102.0		112.0
Storage Lanes	2		0	1		1	1		0	1		1
Taper Length (m)	100.0			76.0			7.6			83.0		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.967				0.850		0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3404	1771	0	1393	1847	1328	1630	1708	0	1738	1883	1570
Flt Permitted	0.159			0.227			0.268			0.169		
Satd. Flow (perm)	570	1771	0	333	1847	1328	460	1708	0	309	1883	1570
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				117		3				134
Link Speed (k/h)		60			60			60			60	
Link Distance (m)		365.4			410.1			438.0			240.2	
Travel Time (s)		21.9			24.6			26.3			14.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	6%	1%	31%	4%	23%	12%	11%	27%	5%	2%	4%
Adj. Flow (vph)	592	452	129	18	534	98	251	592	28	63	401	532
Shared Lane Traffic (%)												
Lane Group Flow (vph)	592	581	0	18	534	98	251	620	0	63	401	532
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	5	2		1	6		7	4		3	8	5
Permitted Phases	2			6		6	4			8		8
Detector Phase	5	2		1	6	6	7	4		3	8	5
Switch Phase												
Minimum Initial (s)	6.0	10.0		6.0	10.0	10.0	6.0	7.0		6.0	7.0	6.0
Minimum Split (s)	9.0	34.0		9.0	34.0	34.0	9.0	31.0		9.0	31.0	9.0
Total Split (s)	10.0	34.0		10.0	34.0	34.0	9.0	31.0		9.0	31.0	10.0
Total Split (%)	11.9%	40.5%		11.9%	40.5%	40.5%	10.7%	36.9%		10.7%	36.9%	11.9%
Yellow Time (s)	3.0	4.0		3.0	4.0	4.0	3.0	4.0		3.0	4.0	3.0
All-Red Time (s)	0.0	2.0		0.0	2.0	2.0	0.0	2.0		0.0	2.0	0.0
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)	3.0	6.0		3.0	6.0	6.0	3.0	6.0		3.0	6.0	3.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	Max		None	None	None	None	None		None	None	None
Act Effct Green (s)	37.8	32.1		35.1	25.8	25.8	32.9	25.2		32.1	23.0	36.2
Actuated g/C Ratio	0.47	0.40		0.44	0.32	0.32	0.41	0.31		0.40	0.29	0.45
v/c Ratio	1.14	0.81		0.08	0.90	0.19	0.91	1.15		0.27	0.74	0.68
Control Delay	103.9	33.7		12.1	46.7	4.1	57.5	116.5		16.8	35.6	18.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	103.9	33.7		12.1	46.7	4.1	57.5	116.5		16.8	35.6	18.3
LOS	F	C		B	D	A	E	F		B	D	B
Approach Delay		69.1			39.3			99.5			25.2	
Approach LOS		E			D			F			C	
Queue Length 50th (m)	~39.0	73.2		1.5	82.5	0.0	26.7	~128.7		5.9	59.3	50.2

Double Left Turn-Lane

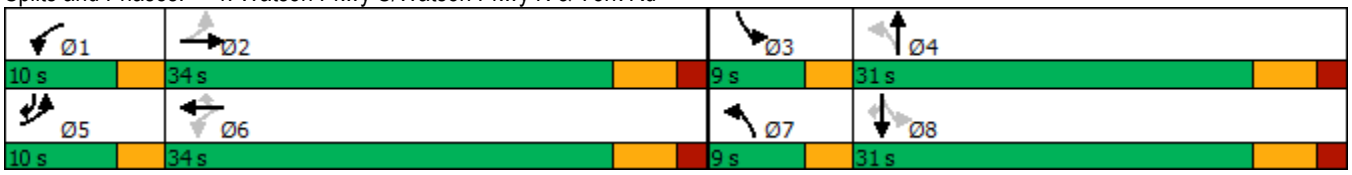
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (m)	#75.7	#159.3		4.9	#139.6	7.9	#67.8	#193.2		13.0	91.5	87.2
Internal Link Dist (m)		341.4			386.1			414.0			216.2	
Turn Bay Length (m)	68.0			59.0		68.0	67.0			102.0		112.0
Base Capacity (vph)	519	721		242	651	544	276	540		232	593	782
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	1.14	0.81		0.07	0.82	0.18	0.91	1.15		0.27	0.68	0.68

Intersection Summary			
Area Type:	Other		
Cycle Length: 84			
Actuated Cycle Length: 80.1			
Natural Cycle: 105			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.15			
Intersection Signal Delay: 59.2		Intersection LOS: E	
Intersection Capacity Utilization 93.3%		ICU Level of Service F	
Analysis Period (min) 15			

~ 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: 4: Watson Pkwy S/Watson Pkwy N & York Rd



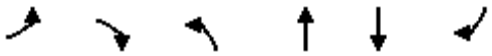
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	12	14	732	13	0	584
Future Volume (vph)	12	14	732	13	0	584
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.928			0.850		
Flt Protected	0.977					
Satd. Flow (prot)	1708	0	1883	1601	0	1883
Flt Permitted	0.977					
Satd. Flow (perm)	1708	0	1883	1601	0	1883
Link Speed (k/h)	50		50			50
Link Distance (m)	247.1		240.2			258.9
Travel Time (s)	17.8		17.3			18.6
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	15	796	14	0	635
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	796	14	0	635
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 48.5%		ICU Level of Service A	
Analysis Period (min) 15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	12	14	732	13	0	584
Future Volume (Veh/h)	12	14	732	13	0	584
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)	13	15	796	14	0	635
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)			240			259
pX, platoon unblocked	0.68	0.66			0.66	
vC, conflicting volume	1431	796			810	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1233	432			453	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	96			100	
cM capacity (veh/h)	134	411			730	

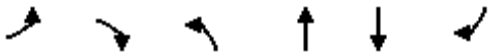
Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total	28	796	14	635
Volume Left	13	0	0	0
Volume Right	15	0	14	0
cSH	209	1700	1700	730
Volume to Capacity	0.13	0.47	0.01	0.00
Queue Length 95th (m)	3.6	0.0	0.0	0.0
Control Delay (s)	24.8	0.0	0.0	0.0
Lane LOS	C			
Approach Delay (s)	24.8	0.0		0.0
Approach LOS	C			

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	0	39	157	64	0
Future Volume (vph)	0	0	39	157	64	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected				0.990		
Satd. Flow (prot)	1883	0	0	1865	1883	0
Flt Permitted				0.990		
Satd. Flow (perm)	1883	0	0	1865	1883	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	157.8			356.4	206.3	
Travel Time (s)	11.4			25.7	14.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	42	171	70	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	0	0	213	70	0
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 20.4%		ICU Level of Service A	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	0	39	157	64	0
Future Volume (Veh/h)	0	0	39	157	64	0
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	42	171	70	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				356		
pX, platoon unblocked						
vC, conflicting volume	325	70	70			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	325	70	70			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	97			
cM capacity (veh/h)	651	993	1531			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	0	213	70
Volume Left	0	42	0
Volume Right	0	0	0
cSH	1700	1531	1700
Volume to Capacity	0.04	0.03	0.04
Queue Length 95th (m)	0.0	0.7	0.0
Control Delay (s)	0.0	1.6	0.0
Lane LOS	A	A	
Approach Delay (s)	0.0	1.6	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Watson Pkwy N & Starwood Drive/Starwood Dr/Site Access

Movement	EB	EB	WB	NB	NB	SB	SB	SB
Directions Served	LT	R	LTR	L	TR	L	T	R
Maximum Queue (m)	19.1	46.8	159.1	76.6	95.7	52.2	88.2	39.3
Average Queue (m)	6.4	21.5	159.1	33.0	36.5	26.1	31.5	9.0
95th Queue (m)	15.3	37.9	163.3	61.6	73.3	46.5	65.8	25.7
Link Distance (m)	403.0	403.0	158.7		235.1		194.2	
Upstream Blk Time (%)			100					
Queuing Penalty (veh)			0					
Storage Bay Dist (m)				82.0		45.7		45.7
Storage Blk Time (%)				0	0	2	1	0
Queuing Penalty (veh)				3	1	8	4	0

Intersection: 2: Watson Pkwy N/Watson Pkwy N & Watson Rd N

Movement	WB	SB	SB
Directions Served	LR	L	T
Maximum Queue (m)	30.6	11.5	1.7
Average Queue (m)	13.7	3.1	0.1
95th Queue (m)	23.7	10.1	1.2
Link Distance (m)	185.6		303.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)		38.0	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Watson Rd S/Watson Rd N & York Rd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	113.7	111.0	67.0	18.2
Average Queue (m)	37.6	51.1	33.7	8.2
95th Queue (m)	80.0	92.6	58.3	17.8
Link Distance (m)	386.8	417.1	501.1	339.4
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Watson Pkwy S/Watson Pkwy N & York Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	TR	L	T	R	L	TR	L	T	R
Maximum Queue (m)	118.0	168.0	369.3	41.9	154.0	108.7	74.6	443.7	23.6	85.8	86.3
Average Queue (m)	112.7	150.3	266.5	5.5	88.7	26.4	70.2	399.9	9.1	44.4	44.9
95th Queue (m)	134.1	203.4	478.7	31.6	156.1	89.2	89.0	545.7	19.1	72.4	76.9
Link Distance (m)			351.4		386.8			425.2		213.8	
Upstream Blk Time (%)			40					66			
Queuing Penalty (veh)			0					0			
Storage Bay Dist (m)	68.0	68.0		59.0		68.0	67.0		102.0		112.0
Storage Blk Time (%)	95	91	7		30		31	44			0
Queuing Penalty (veh)	506	485	39		32		179	101			0

Intersection: 5: Watson Pkwy N & West Site Access

Movement	WB
Directions Served	LR
Maximum Queue (m)	15.0
Average Queue (m)	5.0
95th Queue (m)	12.7
Link Distance (m)	233.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Watson Rd N & East Site Access

Movement	NB
Directions Served	LT
Maximum Queue (m)	6.9
Average Queue (m)	0.7
95th Queue (m)	4.8
Link Distance (m)	339.4
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 1357

APPENDIX F

ITE Trip Generation Manual 11th Edition

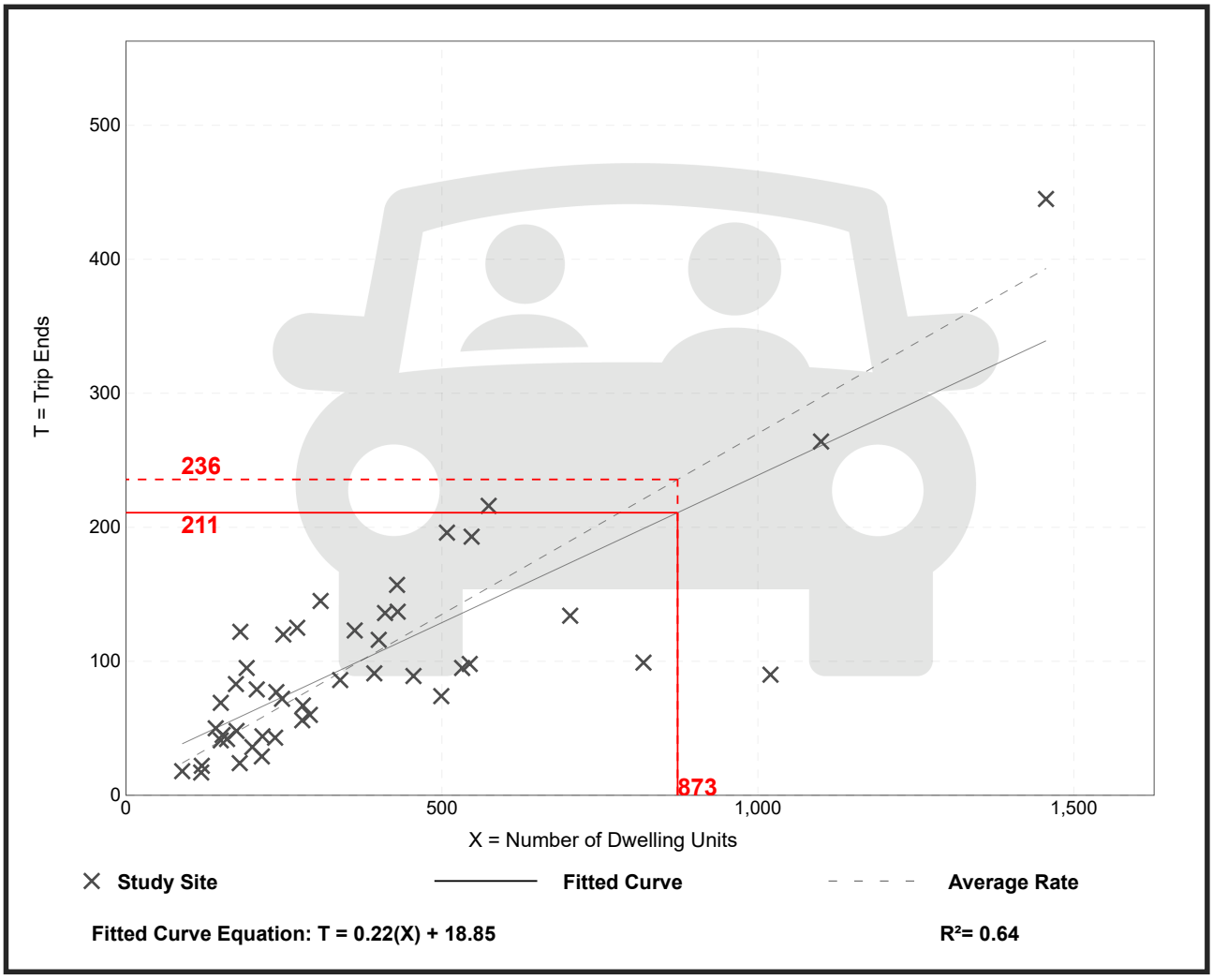
Multifamily Housing (High-Rise)
Not Close to Rail Transit (222)

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: 45
Avg. Num. of Dwelling Units: 372
Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.27	0.09 - 0.67	0.11

Data Plot and Equation



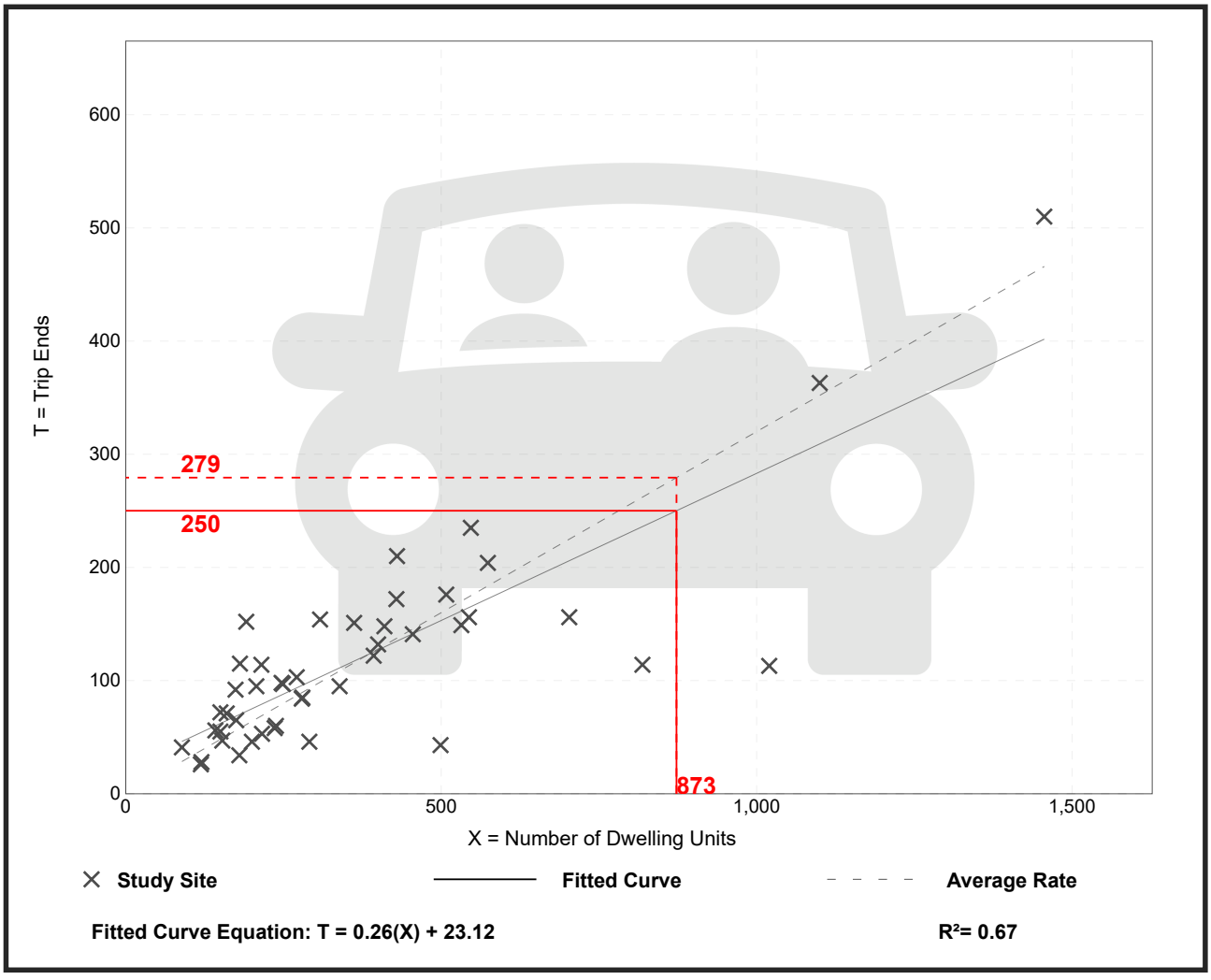
Multifamily Housing (High-Rise)
Not Close to Rail Transit (222)

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:	45
Avg. Num. of Dwelling Units:	372
Directional Distribution:	62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.32	0.09 - 0.80	0.13

Data Plot and Equation



Fitted Curve Equation: T = 0.26(X) + 23.12

R^2= 0.67

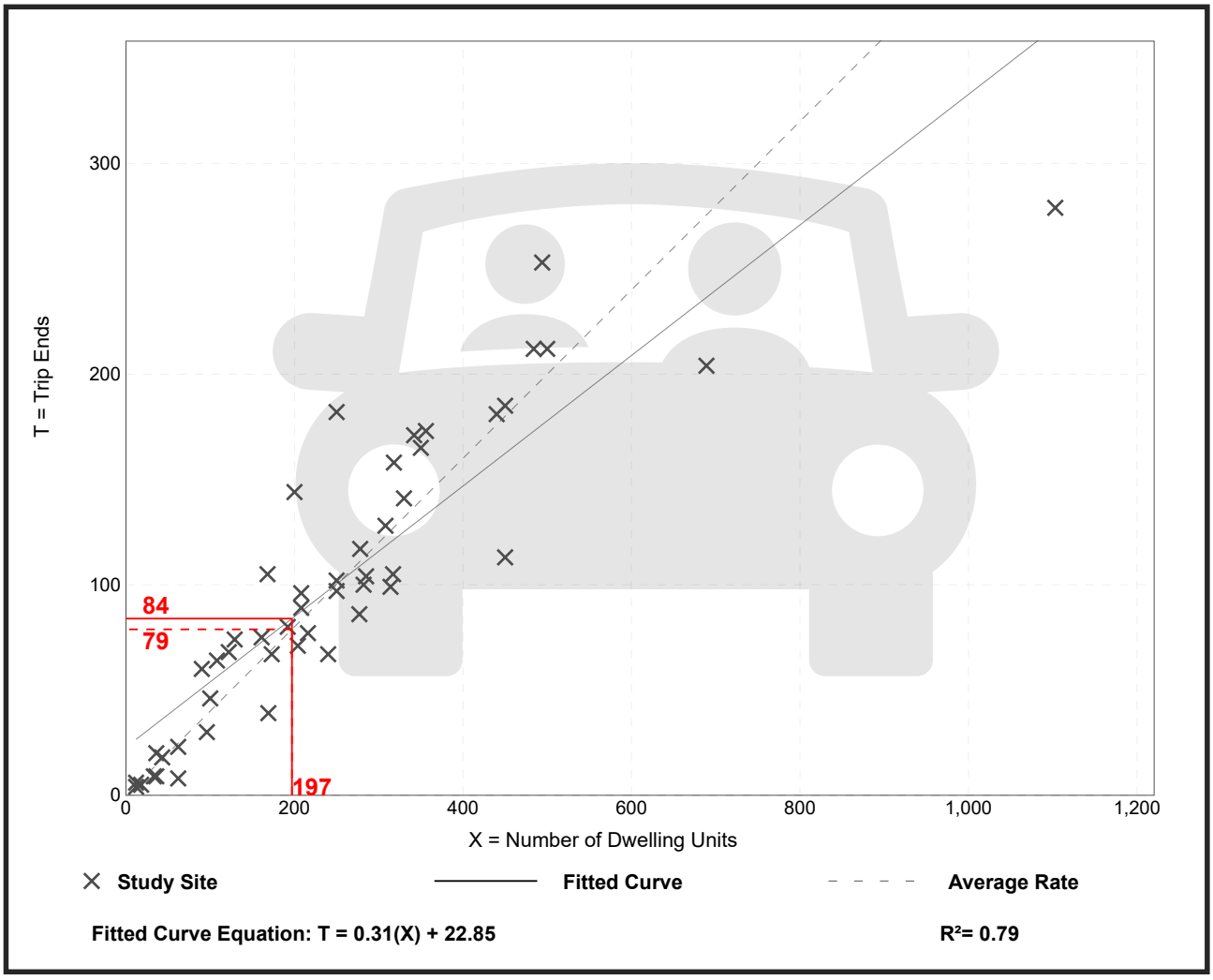
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

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: 49
Avg. Num. of Dwelling Units: 249
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



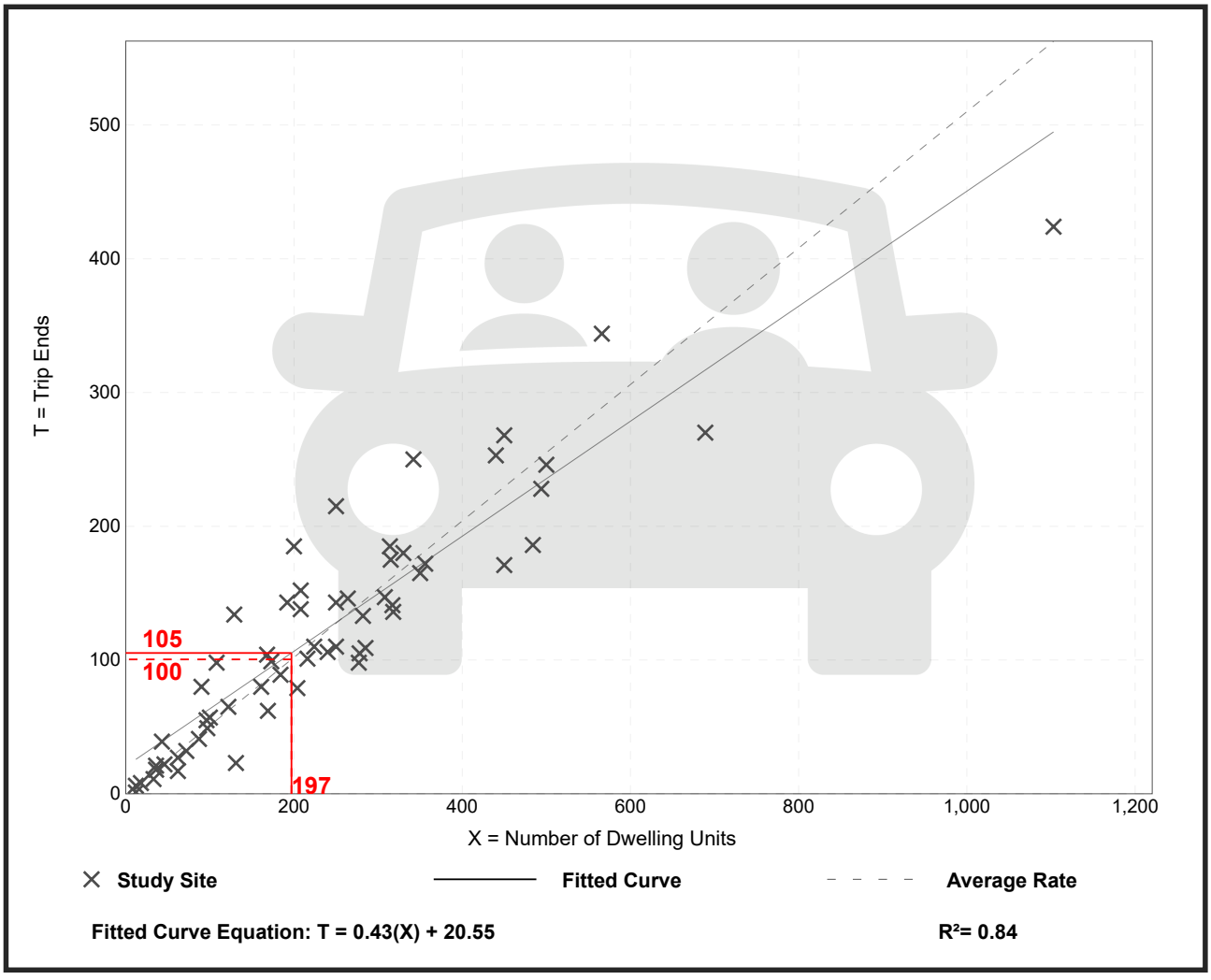
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

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:	59
Avg. Num. of Dwelling Units:	241
Directional Distribution:	63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



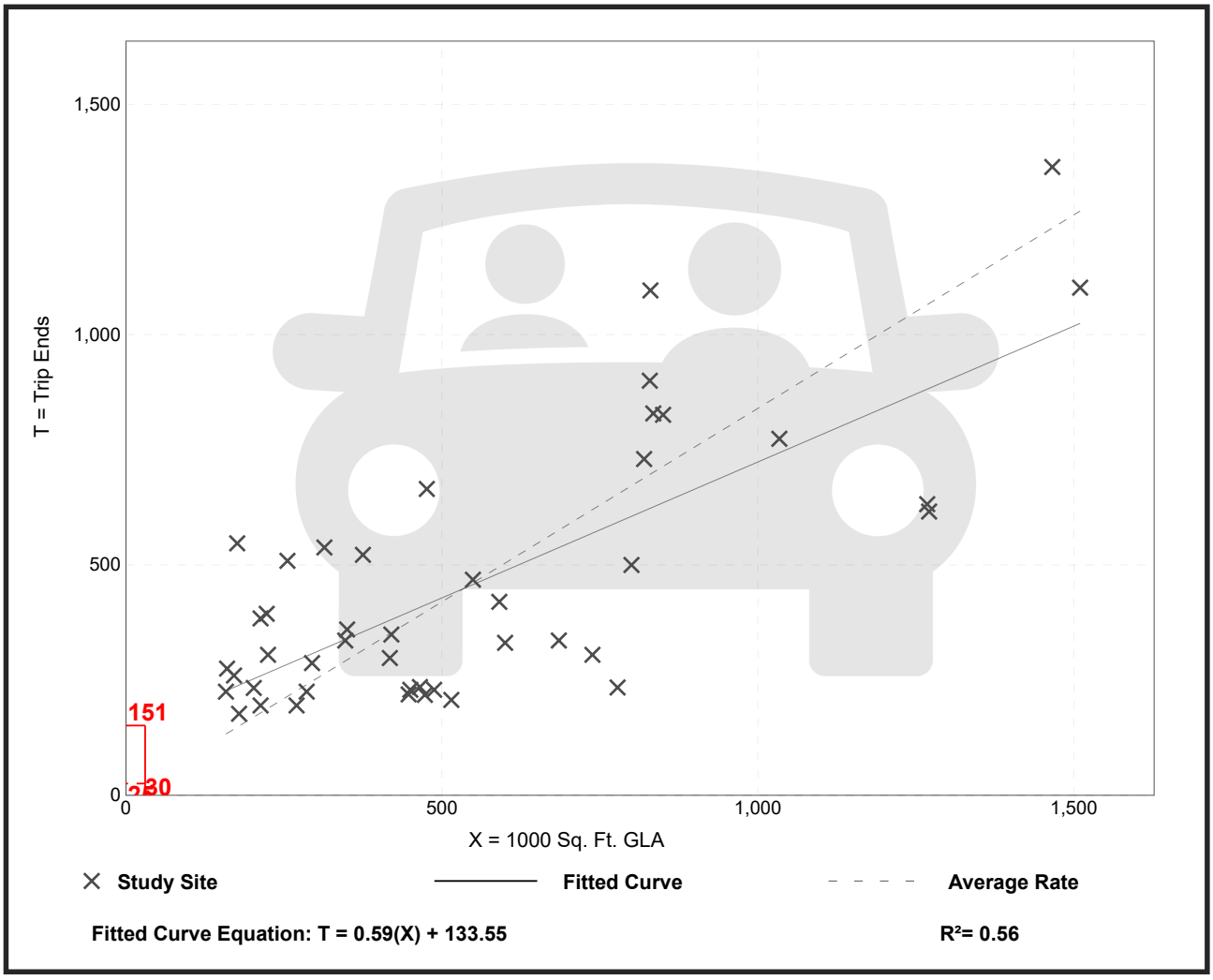
Shopping Center (>150k)
(820)

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: 44
Avg. 1000 Sq. Ft. GLA: 546
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
0.84	0.30 - 3.11	0.42

Data Plot and Equation



Fitted Curve Equation: T = 0.59(X) + 133.55

R^2= 0.56

Trip Gen Manual, 11th Edition ● Institute of Transportation Engineers

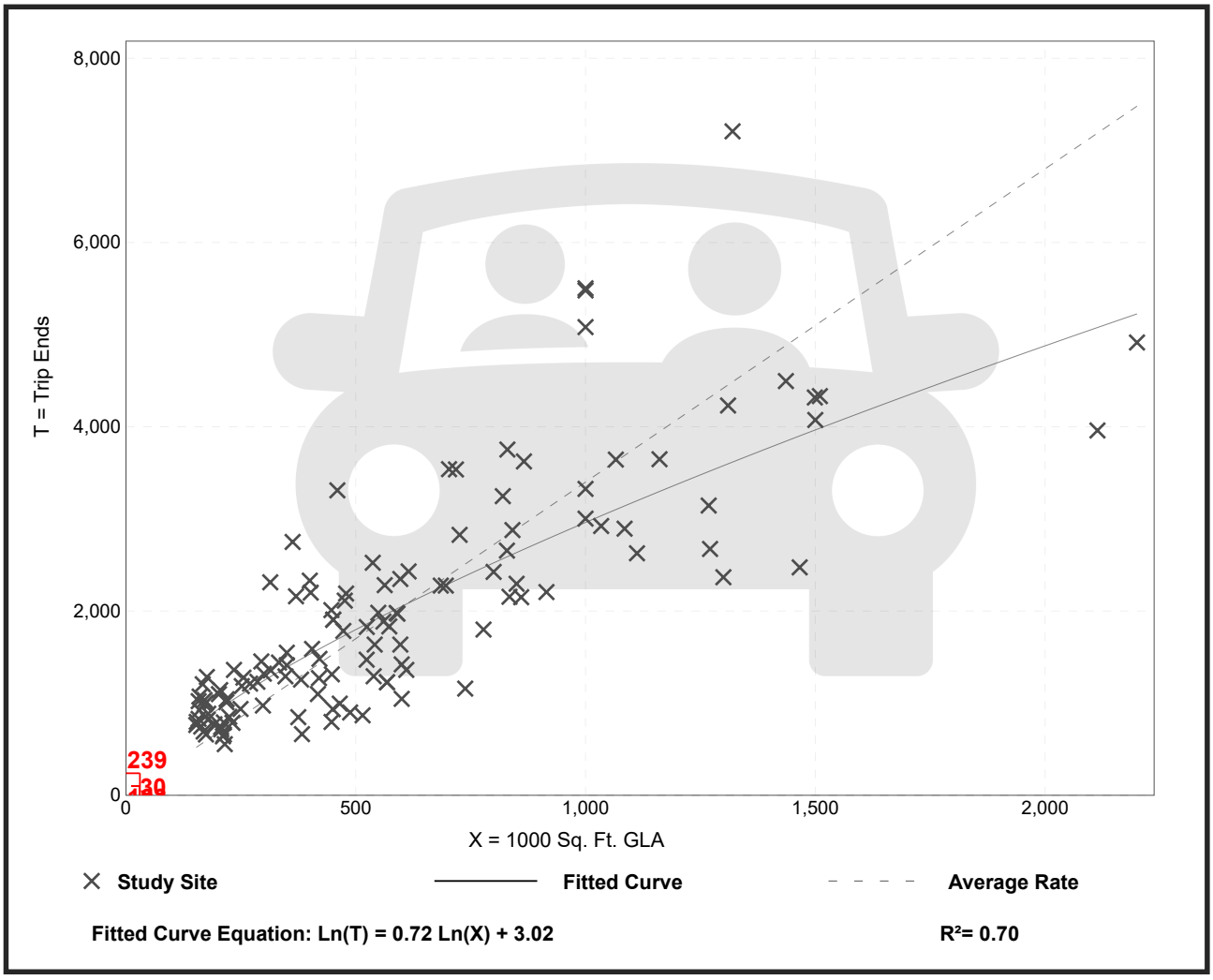
Shopping Center (>150k)
(820)

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: 126
Avg. 1000 Sq. Ft. GLA: 581
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GLA

Average Rate	Range of Rates	Standard Deviation
3.40	1.57 - 7.58	1.26

Data Plot and Equation



APPENDIX G

Transportation Tomorrow Survey Results

Wed Oct 26 2022 16:28:37 GMT-0400 (Eastern Daylight Time) - Run Time: 2477ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig

Column: 2006 GTA zone of destination - gta06_dest

Filters:

(2006 GTA zone of destination - gta06_dest In 8016,8017,8013,8012,8001,8002,8008

and

Start time of trip - start_time In 0630-0930

and

Trip purpose of destination - purp_dest In H, M,)

Trip 2016

Table:

,8008,8012,8013

7481,0,36,0

8010,0,0,9

8012,0,70,0

8014,0,26,71

8045,0,18,0

8189,0,0,29

8191,0,28,0

8356,22,0,0

Wed Oct 26 2022 16:30:28 GMT-0400 (Eastern Daylight Time) - Run Time: 2652ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest

Column: 2006 GTA zone of origin - gta06_orig

Filters:

(2006 GTA zone of origin - gta06_orig In 8016,8017,8013,8012,8001,8002,8008

and

Start time of trip - start_time In 0630-0930

and

Trip purpose of origin - purp_orig In H, M,)

Trip 2016

Table:

,8001,8012,8013,8017

1277,30,0,0,0

3324,0,0,26,0

3618,0,0,55,0

3660,0,0,26,0

4124,0,0,25,0

4165,0,16,0,0

4175,0,0,34,0

5198,0,0,21,0

5224,0,0,14,0

5225,0,0,25,0

7031,0,46,0,0

7042,0,44,0,0

7053,0,0,21,0

7353,0,0,17,0

7361,0,0,0,22

7367,0,0,46,0

7414,0,0,14,0

8002,0,46,0,0

8004,0,18,0,0

8010,0,0,9,0

8012,0,179,0,172

8013,0,42,45,0

8014,0,172,212,0

8026,0,18,0,0

8035,0,14,0,0

8039,0,131,0,0

8041,0,23,0,0

8056,0,16,14,0

8057,0,19,26,0

8063,0,0,12,0

8069,0,0,25,0

8070,0,23,0,0

8083,0,0,26,0

8087,0,0,12,0

8107,0,55,65,0

8111,0,0,55,0

8112,0,19,0,0

8113,0,35,0,0

8117,0,17,0,0

8121,0,26,0,0

8123,0,35,17,0

8128,0,16,0,0

8135,0,0,46,0

8136,0,23,9,0

8143,0,17,0,0

8144,0,0,18,0

8145,0,17,0,0

8184,0,35,0,0

8188,0,26,37,0

8189,0,0,29,0

8191,0,18,0,0

8301,0,0,17,0

9057,0,75,0,0

Wed Oct 26 2022 16:29:13 GMT-0400 (Eastern Daylight Time) - Run Time: 2615ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of origin - gta06_orig

Column: 2006 GTA zone of destination - gta06_dest

Filters:

(2006 GTA zone of destination - gta06_dest In 8016,8017,8013,8012,8001,8002,8008

and

Start time of trip - start_time In 1530-1830

and

Trip purpose of destination - purp_dest In H, M,)

Trip 2016

Table:

,8012,8013,8017

2065,0,17,0

3324,0,26,0

3418,24,0,0

3620,0,27,0

3660,0,26,0

4124,0,25,0

4165,16,0,0

5198,0,21,0

7031,46,0,0

7042,44,0,0

7147,14,0,0

7367,0,46,0

7414,0,14,0

7418,0,25,0

8002,46,0,0

8004,22,0,0

8012,35,0,86

8013,38,0,0

8014,94,0,0

8021,38,0,0

8024,26,0,0

8026,18,0,0

8028,0,29,0

8032,36,0,0

8039,59,9,0

8041,23,0,0

8056,0,14,0

8057,50,14,0

8069,0,25,0

8070,23,0,0

8086,0,45,0

8094,41,0,0

8095,0,0,22

8105,0,14,0

8107,37,65,0

8111,0,55,0

8112,19,0,0

8123,35,17,0

8128,16,0,0

8135,17,0,0

8136,0,26,0

8137,51,0,0

8144,0,18,0

8145,17,0,0

8146,28,0,0

8172,0,37,0

8188,26,0,0

8191,18,0,43

8325,33,0,0

9057,35,0,0

Wed Oct 26 2022 16:31:12 GMT-0400 (Eastern Daylight Time) - Run Time: 2375ms

Cross Tabulation Query Form - Trip - 2016 v1.1

Row: 2006 GTA zone of destination - gta06_dest

Column: 2006 GTA zone of origin - gta06_orig

Filters:

(2006 GTA zone of origin - gta06_orig In 8016,8017,8013,8012,8001,8002,8008

and

Start time of trip - start_time In 1530-1830

and

Trip purpose of origin - purp_orig In H, M,)

Trip 2016

Table:

,8012,8013

8013,38,0

8018,0,14

8026,18,0

8047,21,0

8057,0,12

8094,23,0

8095,55,0

8104,23,0

8107,37,0

8136,0,51

8137,51,0

8142,22,0

8189,0,29

8205,0,25

APPENDIX H

Relevant Zoning By-Law Excerpts

4.13.4.1 Parking Ratios for ***Malls***

Type of ***Use*** or ***Building***	Minimum Required ***Parking Spaces***
Neighbourhood Commercial Shopping Centre (NC ***Zone***)	1 per 18 m² ***Gross Floor Area*** (G.F.A.)
Community Commercial Shopping Centre (CC ***Zone***)	1 per 18 m² G.F.A.
15006 Regional Commercial Shopping Centre (RC ***Zone***)	1 per 20 m² G.F.A.
Service Commercial ***Mall*** (SC.1 and SC.2 ***Zones***)	1 per 16.5 m² G.F.A.
19063 Industrial ***Mall***	- 1 ***Parking Space*** per 50 square metres up to 1,000 square metres of ***Gross Floor Area***. - 1 ***Parking Space*** per 100 square metres between 1,000 square metres and 5,000 square metres of ***Gross Floor Area***, and - 1 ***Parking Space*** per 150 square metres over 5,000 square metres of ***Gross Floor Area.***

4.13.4.1 a) In a NC, CC, B.3, B.4, SC.1, or SC.2 ***Zone*** where a ***Restaurant*** or ***Tavern*** occupies more than 30% of the ***Gross Floor Area*** of a ***Mall***, the specific parking ratio requirement for the ***Restaurant*** or ***Tavern*** shall be required in addition to the ***Mall*** requirement for the remaining ***Gross Floor Area*** of the ***Mall***; and

b) Where an upper ***Storey*** of a ***Mall*** has been declared for ***Office Use*** only, then the parking requirement for that section of the ***Mall*** shall be in accordance with the ***Office*** parking ratio listed in Section 4.13.4.2.

4.13.4.2 Standard Commercial ***Use*** Ratios

Type of ***Use*** or ***Building***	Minimum Required ***Parking Spaces***
Office	1 per 33 m² G.F.A.
Retail Establishment	1 per 16.5 m² G.F.A.

15378

Restaurant, Tavern	1 per 7.5 m² G.F.A.
Restaurant (Take-out)	1 per 9 m² G.F.A.

Despite the ratios listed in Section 4.13.4.2, the parking ratios for the following ***Uses*** shall apply:

Type of ***Use*** or ***Building***	Minimum Required ***Parking Spaces***
Building Supply	
Interior Retail	1 per 20 m² G.F.A. for ***Building***
Outdoor Retail	1 per 50 m² G.F.A. for ***Outdoor Sales and Display Area***
Interior Warehouse ***–***	1 per 50 m² G.F.A. for ***Warehouse*** area
Car wash - Manual	2 per bay plus 5 waiting spaces per bay
Automatic	5 per bay plus 15 waiting spaces per bay
Catering Service	1 per 50 m² G.F.A.
Cleaning Establishment	1 per 50 m² G.F.A.
Commercial Entertainment	1 per 5 seats or 1 per 5 m² G.F.A., whichever is greater.
Commercial School	1 per 2 staff members plus 1 per 28 m² classroom floor space
Computer Establishment	1 per 33 m² G.F.A.
Construction and Farm Equipment Sales	1 per 33 m² G.F.A.
Contractor's Yard	greater a minimum of 4 per yard or 1 per 50 m² G.F.A. whichever is greater
Convenience Store	1 per 16.5 m² G.F.A.
Day Care Centre	1 per 10 children plus 1 for the facility
Dry Cleaning Outlet	1 per 33 m² G.F.A
Factory Sales Outlet	1 per 33 m² G.F.A. of sales area
Financial Establishment	1 per 16.5 m² G.F.A.
Garden Centre	
Interior Retail	1 per 20 m² G.F.A. for ***Building***

	Outdoor Retail	1 per 50 m² G.F.A. for ***Outdoor Sales and Display Area***
	Hardware Store	1 per 20 m² G.F.A.
	Hotel	1 per guest room plus 1 per 10 m² G.F.A. open to the public excluding corridors, lobbies or foyers.
	Liquor Store	1 per 16.5 m² G.F.A.
19063	***Manufacturing***	- 1 ***Parking Space*** per 50 square metres up to 1,000 square metres of ***Gross Floor Area***. - 1 ***Parking Space*** per 100 square metres between 1,000 square metres and 5,000 square metres of ***Gross Floor Area***, and - 1 ***Parking Space*** per 150 square metres over 5,000 square metres of ***Gross Floor Area.***
	Medical Clinic	6 per practitioner or 1 per 15.5 m² G.F.A., whichever is greater.
	Medical Office	7 per practitioner
	Monument Sales Establishment	1 per 50 m² G.F.A.
	Office Supply	1 per 25 m² G.F.A.
	Personal Service Establishment	1 per 16.5 m² G.F.A.
	Print Shop	1 per 50 m² G.F.A.
	Storage Facility	1 per 50 m² G.F.A.
	Recreation Centre	1 per 10 m² G.F.A., or 1 per 5 seats whichever is greater, except in the case of: i) a ***Golf Course*** which shall provide 6 per hole ii) a miniature golf course or driving range which shall provide 1 per tee or hole.

		iii) A bowling alley which shall provide 1 per 6 lanes plus 1 for each 23 m² of ***Gross Floor Area Used*** for an ***Accessory Use***.
	Repair Service	1 per 33 m² G.F.A.
	Research Establishment	1 per 33 m² G.F.A.
	Retail Sales/service/Rental of • Furniture and Appliances • Electronic and Audio Visual Equipment	 1 per 33 m² G.F.A. 1 per 20 m² G.F.A.
	Tradesperson's Shop	1 per 40 m² G.F.A
	Trucking Operation	1 per 50 m² G.F.A.
	Vehicle Gas Bar	a minimum of 2
	Vehicle Service Station and ***Vehicle Repair Shop*** and ***Vehicle Speciality Repair Shop***	1 per 14 m² G.F.A.
	Vehicle Sales Establishment/ Recreation ***Vehicles*** and Equipment Sales	1 per 25 m² G.F.A. or a minimum of 2, whichever is greater (parking is exclusive of display and storage areas)
	Veterinary Service	1 per 25 m² G.F.A.
	Warehouse	1 per 200 m² G.F.A.

18116 4.13.4.3 Residential Land ***Use*** Ratios

	Type of ***Use*** or ***Building***	Minimum Required ***Parking Spaces***
	Apartment Building	for the first 20 units: 1.5 per unit, and for each unit in excess of 20: 1.25 per unit
	Bed and Breakfast establishment	1 per guest room and 1 for the proprietor
	Group Home	1 per ***Building*** plus 1 for staff
18116	***Lodging House Type 1***	1 per ***Building*** plus 1 per 3 ***Lodging Units***.

	Nursing Home	1 per 3 beds
	Semi-Detached/Duplex Dwelling	1 per unit
	Single Detached Dwelling	1 per unit
20555	***Additional Residential Dwelling Unit***	1 per unit
	Townhouse	1 per unit
	Tourist Home	1 per ***Building*** plus 1 per guest room

4.13.4.3.1 Despite Section 4.13.4.3, the minimum required ***Parking Spaces*** for an ***Apartment Building*** in the R.4C Zone shall be 1 per unit.

20555 4.13.4.3.2 Despite Section 4.13.4.3, if no legal off-street ***Parking Space*** can be provided for the primary ***Dwelling***, as of the date of the passing of this ***Bylaw***, no ***Parking Spaces*** are required for the ***Additional Residential Dwelling Units***.

4.13.4.4 Miscellaneous ***Use*** Parking Ratios

Type of ***Use*** or ***Building***	Minimum Required ***Parking Spaces***
Aggregate Extraction	4 per operation
Arena (no seats)	1 per 33 m² G.F.A.
Public Hall including: • ***Arena*** (with seats) • Assembly Hall • Auditorium • ***Religious Establishment*** • Gymnasium • ***Auction Centre*** • ***Club*** • Other place of assembly • Auditorium or Gymnasium accessory to another ***Use***	1 per 5 seats or 1 per 10 m² G.F.A. ***Used*** for a hall, auditorium or similar ***Use*** involving the assembly of persons, whichever is greater. Where public assembly seating is provided in the form of fixed benches or pews, then 0.5 metres of each such bench or pew length shall be considered as equalling one seat. The number of persons to be accommodated for public assembly activities with movable seating shall be based on 1 person per 1 m^2 of movable seating.
Medical Treatment Facility	1.25 spaces per bed
School – Elementary	1 per classroom plus a minimum of 4 visitor ***Parking Spaces*** plus any required parking for a ***Public Hall*** if such exists.

Table 5.3 Required parking rates in all zones except downtown zones

Row	Use	Lots identified with parking adjustment (PA) suffix		Lots without parking adjustment (PA) suffix
		Minimum required	**Maximum permitted**	**Minimum required**
Residential uses				
1.	**Additional residential dwelling unit** (2)(5)	1 space per **dwelling unit**	Not applicable	1 space per **dwelling unit**
2.	**Apartment building** (6)(7)	For the first 20 **dwelling units**: 1.5 spaces per **dwelling unit**, and for each **dwelling unit** in excess of 20: 1.25 spaces per **dwelling unit**. A minimum of 20% of the required **parking spaces** shall be for the use of visitor parking	1.5 spaces per **dwelling unit** plus, 0.25 visitor spaces per **dwelling unit**	For the first 20 **dwelling units**: 1.5 spaces per **dwelling unit**, and for each **dwelling unit** in excess of 20: 1.25 spaces per **dwelling unit**. A minimum of 20% of the required **parking spaces** shall be for the use of visitor parking
3.	**Bed and breakfast**	1 space per **building**, plus 1 space for owner	Not applicable	1 space per **building**, plus 1 space for owner
4.	**Duplex dwelling**	1 space per **dwelling unit**	Not applicable	1 space per **dwelling unit**
5.	**Emergency shelter**	1 space per 4 beds	Not applicable	1 space per 4 beds
6.	**Group home** (4)	1 space per **building**, plus 1 space per staff	Not applicable	1 space per **building**, plus 1 space per staff
7.	**Home occupation**	In accordance with Section 4.15.2	Not applicable	In accordance with Section 4.15.2
8.	**Hospice**	1 space per 3 beds	Not applicable	1 space per 3 beds
9.	**Live-work unit**	In addition to the non-residential parking rate, 1 space per **dwelling unit**	In addition to the non-residential parking rate, 1.5 spaces per **dwelling unit**	In addition to the non-residential parking rate, 1 space per **dwelling unit**
10.	**Lodging house type 1** (3)(4)	1 space per **building**, plus 1 per 3 **lodging units**	Not applicable	1 space per **building**, plus 1 per 3 **lodging units**
11.	**Long term care facility**	1 space per 3 beds	Not applicable	1 space per 3 beds

Table 5.3 Continued– Required parking rates in all zones except downtown zones

Row	Use	Lots identified with parking adjustment (PA) suffix		Lots without parking adjustment (PA) suffix
		Minimum required	**Maximum permitted**	**Minimum required**
12.	**Mixed-use building** (6)	In addition to the non-residential parking rate, 1 space per **dwelling unit** plus 0.1 visitor spaces per **dwelling unit**	In addition to the non-residential parking rate, 1.5 spaces per **dwelling unit** plus 0.25 visitor spaces per **dwelling unit**	In addition to the non-residential parking rate, 1 space per **dwelling unit** plus 0.15 visitor spaces per **dwelling unit**
13.	**Retirement residential facility**	1 space per 3 beds	Not applicable	1 space per 3 beds
14.	**Single detached dwelling**	1 space per **dwelling unit**	Not applicable	1 space per **dwelling unit**
15.	**Semi-detached dwelling**	1 space per **dwelling unit**	Not applicable	1 space per **dwelling unit**
16.	**Supportive housing**	1 space per 4 beds	Not applicable	1 space per 4 beds
17.	**Townhouse– back-to-back, cluster, stacked, and stacked back-to-back**	1 space per **dwelling unit**, plus 0.2 visitor spaces per **dwelling unit**	1.5 spaces per **dwelling unit**, plus 0.5 visitor spaces per **dwelling unit**	1 space per **dwelling unit**, plus 0.2 visitor spaces per **dwelling unit**
18.	**Townhouse– on-street**	1 space per **dwelling unit**	Not applicable	1 space per **dwelling unit**
19.	**Townhouse– rear access on-street**	1 space per **dwelling unit**	Not applicable	1 space per **dwelling unit**
20.	**Triplex** (6)(7)	1 space per **dwelling unit**	Not applicable	1 space per **dwelling unit**
Commercial, service, retail and related land uses				
21.	**Animal boarding establishment**	2 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	4 spaces per 100 m^2 of **GFA**
22.	**Animal care establishment**	2 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	4 spaces per 100 m^2 of **GFA**
23.	**Artisan studio**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
24.	**Auction centre**	3.5 spaces per 100 m^2 of **GFA**	6 spaces per 100 m^2 of **GFA**	4 spaces per 100 m^2 of **GFA**
25.	**Building supply**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**

Table 5.3 Continued– Required parking rates in all zones except downtown zones

Row	Use	Lots identified with parking adjustment (PA) suffix		Lots without parking adjustment (PA) suffix
		Minimum required	**Maximum permitted**	**Minimum required**
26.	**Catering service**	2 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**
27.	**Cleaning establishment**	2 spaces per 100m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**
28.	**Commercial entertainment**	5 spaces per 100 m^2 of **GFA**	10 spaces per 100 m^2 of **GFA**	10 spaces per 100 m^2 of **GFA**
29.	**Conference and convention facility**	5.5 spaces per 100 m^2 of **GFA**	7.5 spaces per 100 m^2 of **GFA**	5.5 spaces per 100 m^2 of **GFA**
30.	**Contractor's yard**	1 space per 100 m^2 of **GFA**	1.5 spaces per 100 m^2 of **GFA**	1 space per 100 m^2 of **GFA**
31.	**Convenience store**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	4 spaces per 100m^2 of **GFA**
32.	**Day care centre**	3 spaces per 100 m^2 of **GFA**	Not applicable	3 spaces per 100 m^2 of **GFA**
33.	**Financial establishment**	3 spaces per 100 m^2 of **GFA**	4.5 spaces per 100 m^2 of **GFA**	5 spaces per 100 m^2 of **GFA**
34.	**Fitness centre**	5 spaces per 100 m^2 of **GFA**	5.5 spaces per 100 m^2 of **GFA**	5 spaces per 100 m^2 of **GFA**
35.	**Funeral home**	3.5 spaces per 100 m^2 of **GFA**	6 spaces per 100 m^2 of **GFA**	4 spaces per 100 m^2 of **GFA**
36.	**Garden centre**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100m^2 of **GFA**
37.	**Home improvement warehouse**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**
38.	**Hotel**	0.75 spaces per guest room	1 space per guest room	1 space per guest room
39.	**Major equipment supply and service**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
40.	**Medical clinic**	3 spaces per 100 m^2 of **GFA**	4 spaces per 100 m^2 of **GFA**	5 spaces per 100 m^2 of **GFA**
41.	**Micro-brewery**	1 space per 100 m^2 of **GFA**	1.5 space per 100 m^2 of **GFA**	1 space per 100 m^2 of **GFA**

Table 5.3 Continued– Required parking rates in all zones except downtown zones

Row	Use	Lots identified with parking adjustment (PA) suffix		Lots without parking adjustment (PA) suffix
		Minimum required	**Maximum permitted**	**Minimum required**
42.	**Nightclub**	5 spaces per 100 m^2 of **GFA**	10 spaces per 100 m^2 of **GFA**	10 spaces per 100 m^2 of **GFA**
43.	**Office**	2.5 spaces per 100 m^2 of **GFA**	5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
44.	**Propane retail outlet**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
45.	**Repair service**	1 space per 100 m^2 of **GFA**	1.5 spaces per 100 m^2 of **GFA**	1 space per 100 m^2 of **GFA**
46.	**Restaurant**	5 spaces per 100 m^2 of **GFA**	12.5 spaces per 100 m^2 of **GFA**	9 spaces per 100 m^2 of **GFA**
47.	**Restaurant, take-out**	5 spaces per 100 m^2 of **GFA**	10 spaces per 100 m^2 of **GFA**	9 spaces per 100 m^2 of **GFA**
48.	**Retail establishment**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
49.	**Service establishment**	4 spaces per 100 m^2 of **GFA**	5 spaces per 100 m^2 of **GFA**	4 spaces per 100 m^2 of **GFA**
50.	**School, commercial**	1 space per 100 m^2 of **GFA**	5 spaces per 100 m^2 of **GFA**	4 spaces per 100 m^2 of **GFA**
51.	**Storage facility**	1 space per 100 m^2 of **GFA**	1.5 spaces per 100 m^2 of **GFA**	1 space per 100 m^2 of **GFA**
52.	**Taxi establishment**	2.5 spaces per 100 m^2 of **GFA**	5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
53.	**Tradesperson's shop**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
54.	**Transportation depot**	1 space per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**
55.	**Vehicle body shop**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
56.	**Vehicle rental establishment**	1 space per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**
57.	**Vehicle repair establishment**	1.5 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**	3 spaces per 100 m^2 of **GFA**
58.	**Vehicle sales establishment**	1 space per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**	2 spaces per 100 m^2 of **GFA**

5.8 Bicycle parking rates

(a) **Bicycle parking spaces, long term** and **bicycle parking spaces, short term** shall be provided in accordance with Table 5.7 and Table 5.8.

(b) Where a **lot** contains more than one **use**, not within a **multi-unit building**, the required number of **bicycle parking spaces** is the sum of all **bicycle parking spaces** required for each **use**.

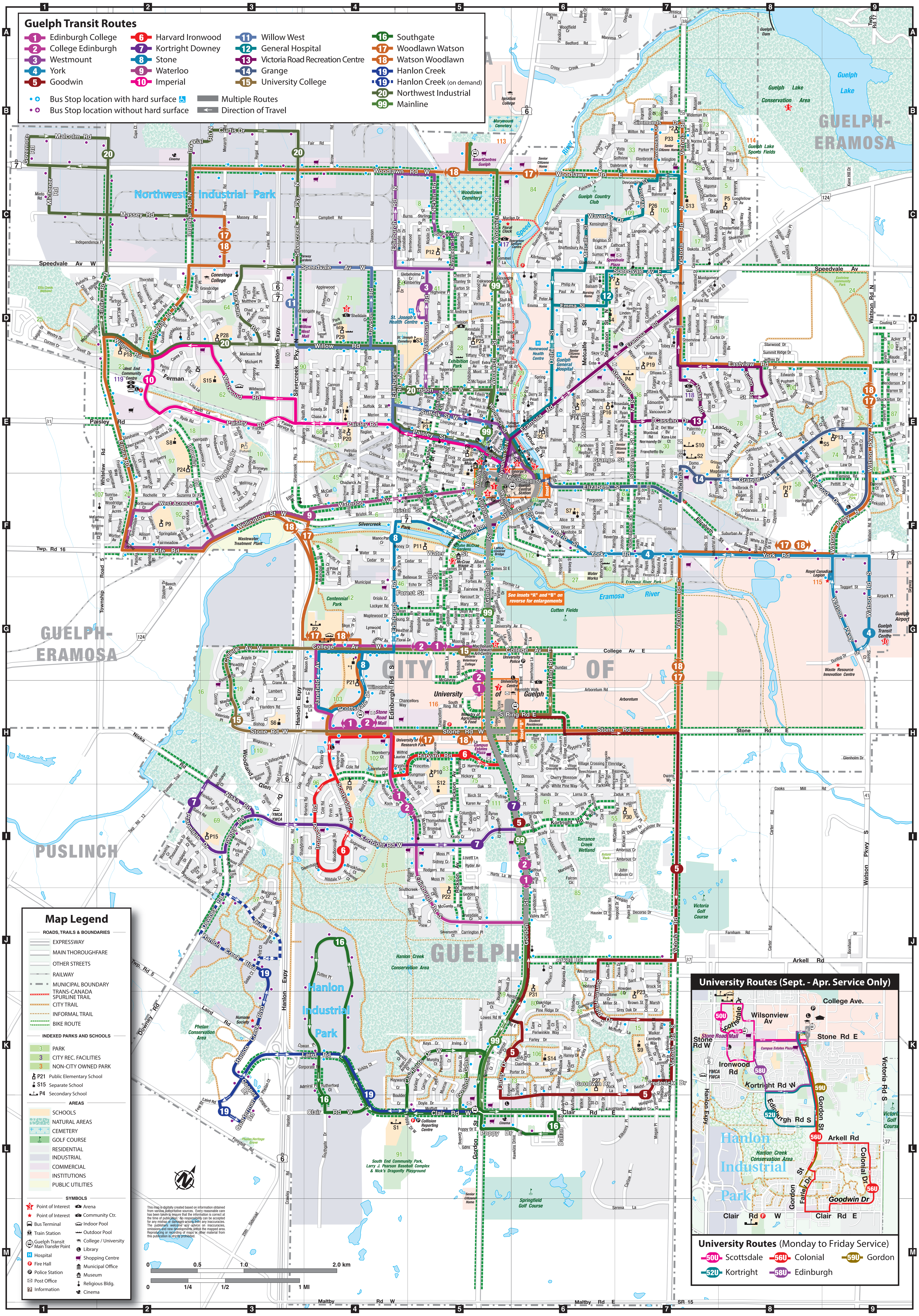
Table 5.7 - Required bicycle parking rates in all zones except downtown zones

Row	Use	Bicycle parking spaces, short term – minimum required	Bicycle parking spaces, long term – minimum required
1.	Residential • **Apartment building** (1) • **Townhouse** – **back-to-back, cluster, stacked, stacked back-to-back** (where individual **garages** are not provided) (1)	0.1 spaces per **dwelling unit**, 2 spaces minimum	1 space per **dwelling unit**, 2 spaces minimum
2.	**Supportive housing**	0.1 spaces per **dwelling unit** or suite, 2 spaces minimum	1 space per **dwelling unit** or suite, 2 spaces minimum
3.	**Live-work unit, mixed-use building** (1)	In addition to the non-residential parking requirement, 0.1 spaces per **dwelling unit** is required, 2 spaces minimum	In addition to the non-residential parking requirement, 1 space per **dwelling uni**t is required, 2 spaces minimum
4.	**Multi-unit building** (commercial) (includes individual **buildings** on the same **lot** as the **multi-unit building**)	0.2 spaces per 100 m^2 **GFA**, 2 spaces minimum	0.1 spaces per 100 m^2 **GFA**, 2 spaces minimum
5.	**Multi-unit building** (industrial) (includes individual **buildings** on the same **lot** as the **multi-unit building**)	0.03 spaces per 100 m^2 **GFA**, 2 spaces minimum	0.07 spaces per 100 m^2 **GFA**, 2 spaces minimum
6.	Commercial, service, retail • **Convenience store** • **Financial establishment** • **Fitness centre** • **Retail establishment** • **Service establishment** • **School, commercial**	0.2 spaces per 100 m^2 **GFA**, 2 spaces minimum	0.1 spaces per 100 m^2 **GFA**, 2 spaces minimum
7.	**Day care centre**	0.3 spaces per 100 m^2 **GFA**, 2 spaces minimum	0.2 spaces per 100 m^2 **GFA**, 2 spaces minimum

APPENDIX I

Transit Maps

City of GUELPH Street Index



APPENDIX J

Signal Warrants

TRAFFIC SIGNAL WARRANTS - JUSTIFICATION 7 (PROJECTED VOLUMES)

GENERAL INFORMATION **FUTURE WEEKDAY PEAK HOUR**

Analyst	Placeholder	**Jurisdiction**	City of Guelph	
Agency or Company	Crozier	**Date**	November 24, 2022	
Analysis Period	2025 future	**East-West Street**	Watson Pkwy	
		North-South Street	Starwood Dr	
Flow Conditions	Restricted flow (urban)	**Major Street**	East-West	
'T' Intersection	No	**Approach lanes per direction**	1	Major Street
Existing Intersection	Yes	**Approach lanes per direction**	2	Minor Street
Additional Comments				

Justification 1: Minimum Vehicle Volumes **JUSTIFIED** **Yes**

Justification	Guidance Approach Lanes				Compliance			120%
	1 Lanes		2 or More Lanes		Sectional		Entire %	Satisfied
Flow Conditions	**Free Flow**	**Restricted Flow**	**Free Flow**	**Restricted Flow**	**Average Hourly Volumes**	**%**		
A. Vehicle volume, all approaches		720			**1130**	157%	157%	Yes
B. Vehicle volume, along minor streets		170			**372**	219%	219%	Yes

Justification 2: Delay To Cross Traffic **JUSTIFIED** **No**

Justification	Guidance Approach Lanes				Compliance			120%
	1 Lanes		2 or More Lanes [1]		Sectional		Entire %	Satisfied
Flow Conditions	**Free Flow**	**Restricted Flow**	**Free Flow**	**Restricted Flow**	**Average Hourly Volumes**	**%**		
A. Vehicle volume, major street		720			**759**	105%	105%	No
B. Combined vehicle and pedestrian volume crossing artery from minor streets		75			**197**	262%	262%	Yes

CONCLUSION

The results of the calculations show that justifications are met.
Therefore traffic control signal is justified at this intersection for the horizon year 2025 future

Note: 1. The minimum volumes were corrected from 120 vehicles and 170 vehicles in OTM, March 2012 to 50 vehicles and 70 vehicles to match Justification 2B.

APPENDIX K

Vehicle Maneuvering Diagrams

WATSON PARKWAY

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

BLOCK 1
113 PARKING SPACES
COMMERCIAL
959.35 m²
10326 ft²

BLOCK 2
112 PARKING SPACES
COMMERCIAL
1858.77 m²
20006 ft²

BLOCK 3

PARK
4488 m²

WATSON ROAD

PROPERTY LINE

OUTLINE OF FLOOR 2-10 ABOVE

OUTLINE OF FLOOR 2-12 ABOVE

OUTLINE OF FLOOR 2-14 ABOVE

DROP OFF

ENTRANCE

LOADING (MIN. VERTICAL CLEARANCE OF 6m)

SNOW STORAGE AREA

6.0% SLOPE UP FROM GUTTER/CURB OUTLET

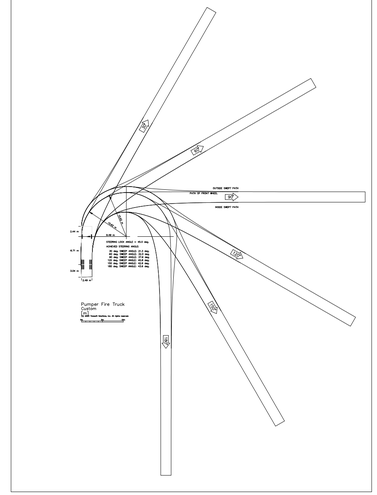
12.0 m

16.5 m

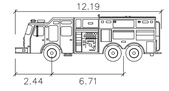
FLOOD LINE

SCALE: 1:500

SWEEP PATH



VEHICLE PROFILE



Pumper Fire Truck

	meters
Width	: 2.49
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 45.0

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	09/11/2023

Project
GUELPH WATSON HOLDINGS INC.
115 WATSON PARKWAY
CITY OF GUELPH

Drawing
FIRE TRUCK
VEHICLE MANEUVERING ANALYSIS

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON. L9T 6P4
905-875-0026 T
905-875-4915 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	Design By	Project	
M.F.		2358-6526	
Check By	Check By	Scale	Drawing
I.L.		1:500	T300

WATSON PARKWAY

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

OUTDOOR AMENITY
AT GROUND LEVEL
2376.1 M²

BLOCK 1
113 PARKING SPACES

BLOCK 2
112 PARKING SPACES

BLOCK 3

COMMERCIAL
959.35 m²
10326 ft²

COMMERCIAL
1858.77 m²
20008 ft²

PARK
4488 m²

PROPERTY LINE

WATSON ROAD

SNOW STORAGE AREA

OUTLINE OF FLOOR 2-10 ABOVE

OUTLINE OF FLOOR 2-12 ABOVE

OUTLINE OF FLOOR 2-14 ABOVE

DROP OFF

ENTRANCE

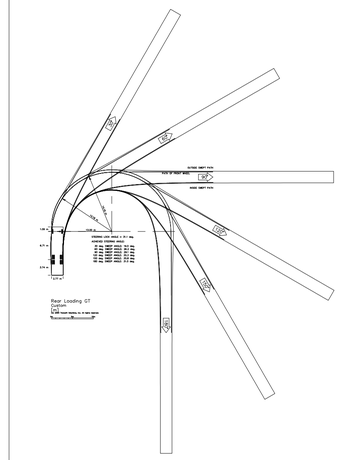
Rear Loading GT

12.0 m

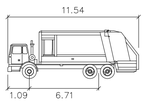
15.5 m

SCALE: 1:500

SWEEP PATH



VEHICLE PROFILE



Rear Loading GT

meters

Width	: 2.77
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 31.1

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	09/11/2023

Project

GUELPH WATSON HOLDINGS INC.
115 WATSON PARKWAY
CITY OF GUELPH

Drawing

WASTE COLLECTION
VEHICLE MANEUVERING ANALYSIS

CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON, L9T 6P4
905-875-0026 T
905-875-4915 F
www.CFCrozier.ca
info@CFCrozier.ca

Drawn By	Design By	Project	
M.F.		2358-6526	
Check By	Check By	Scale	Drawing
I.L.		1:500	T301

WATSON PARKWAY

FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION

PROPERTY LINE

COMMERCIAL
959.35 m²
10326 ft²

COMMERCIAL
1858.77 m²
20008 ft²

BLOCK 1
113 PARKING SPACES

BLOCK 2
112 PARKING SPACES

BLOCK 3

DROP OFF
ENTRANCE
LOADING
GARBAGE
INDOOR AMENITY
OUTDOOR AMENITY
COMMON
SNOW STORAGE AREA
Rear Loading GT
OUTLINE OF FLOOR 2-12 ABOVE
OUTLINE OF FLOOR 2-14 ABOVE
OUTLINE OF FLOOR 2-10 ABOVE
12.0 m
15.5 m
17.0 m

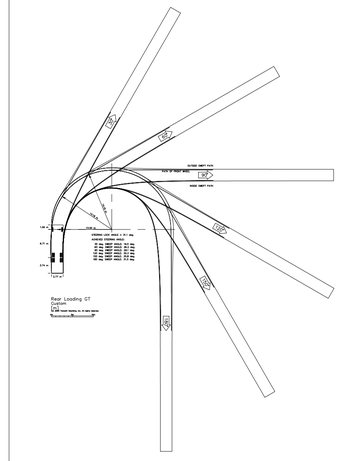
PARK
4488 m²

WATSON ROAD

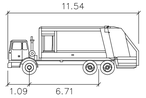
FLOOD LINE

SCALE: 1:500

SWEEP PATH



VEHICLE PROFILE



Rear Loading GT

	meters
Width	: 2.77
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 31.1

No.	ISSUE	DATE: MM/DD/YYYY
1	ISSUED FOR SUBMISSION	09/11/2023

Project
GUELPH WATSON HOLDINGS INC.
115 WATSON PARKWAY
CITY OF GUELPH

Drawing
WASTE COLLECTION
VEHICLE MANEUVERING ANALYSIS

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
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MILTON, ON. L9T 6P4
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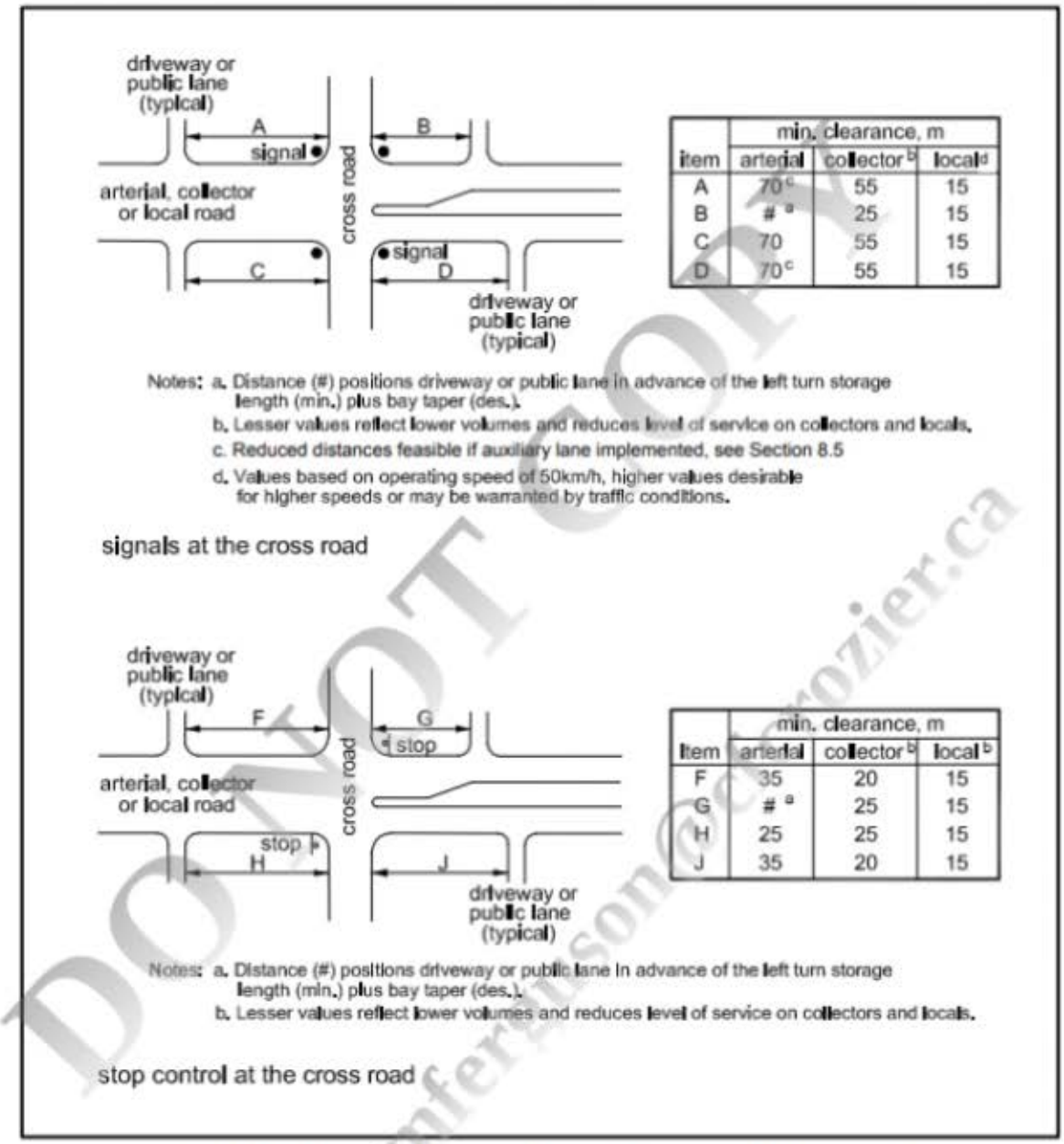
Drawn By	Design By	Project	
M.F.		2358-6526	
Check By	Check By	Scale	Drawing
I.L.		1:500	T302

APPENDIX L

TAC Excerpts



Item	min. clearance, m		
	arterial	collector [b]	local [d]
A	70 [c]	55	15
B	# [a]	25	15
C	70	55	15
D	70 [c]	55	15

Notes: a. Distance (#) positions driveway or public lane in advance of the left turn storage length (min.) plus bay taper (des.).
b. Lesser values reflect lower volumes and reduces level of service on collectors and locals.
c. Reduced distances feasible if auxiliary lane implemented, see Section 8.5
d. Values based on operating speed of 50km/h, higher values desirable for higher speeds or may be warranted by traffic conditions.

signals at the cross road

Item	min. clearance, m		
	arterial	collector [b]	local [b]
F	35	20	15
G	# [a]	25	15
H	25	25	15
J	35	20	15

Notes: a. Distance (#) positions driveway or public lane in advance of the left turn storage length (min.) plus bay taper (des.).
b. Lesser values reflect lower volumes and reduces level of service on collectors and locals.

stop control at the cross road

Figure 8.8.2: Suggested Minimum Corner Clearances to Accesses or Public Lanes at Major Intersections

Inadequate corner clearance between accesses and signalized intersections along a major road, such as a major arterial, can create serious operational problems including:

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:

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- For multi-lane highways: For left turns onto highways with more than a single lane in each direction, 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:

$$ISD = 0.278\, V_{major}\, t_g \qquad (9.9.1)$$

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.

Table 9.9.4: Design Intersection Sight Distance – Case B1, Left Turn From Stop

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	41.7	45
30	35	62.6	65
40	50	83.4	85
50	65	104.3	105
60	85	125.1	130
70	105	146.0	150
80	130	166.8	170
90	160	187.7	190
100	185	208.5	210
110	220	229.4	230
120	250	250.2	255
130	285	271.1	275

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

Sight distance design for left turns at divided-highway intersections should consider multiple design vehicles and median width. If the design vehicle used to determine sight distance for a divided-highway intersection is larger than a passenger car, then sight distance for left turns will need to be checked for that selected design vehicle and for smaller design vehicles as well. If the divided-highway median is wide enough to store the design vehicle with a clearance to the through lanes of approximately 1 m at both ends of the vehicle, no separate analysis for the departure sight triangle for left turns is needed on the minor-road approach for the near roadway to the left. In most cases, the departure sight triangle for right turns (case B2) will provide sufficient sight distance for a passenger car to cross the near roadway to reach the median. Possible exceptions are addressed in the discussion of case B3.

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.

Table 9.9.6: Design Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	36.1	40
30	35	54.2	55
40	50	72.3	75
50	65	90.4	95
60	85	108.4	110
70	105	126.5	130
80	130	144.6	145
90	160	162.6	165
100	185	180.7	185
110	220	198.8	200
120	250	216.8	220
130	285	234.9	235

Note: Intersection sight distance shown is for a stopped passenger car to turn right onto or to cross a two-lane highway with no median and with grades of 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

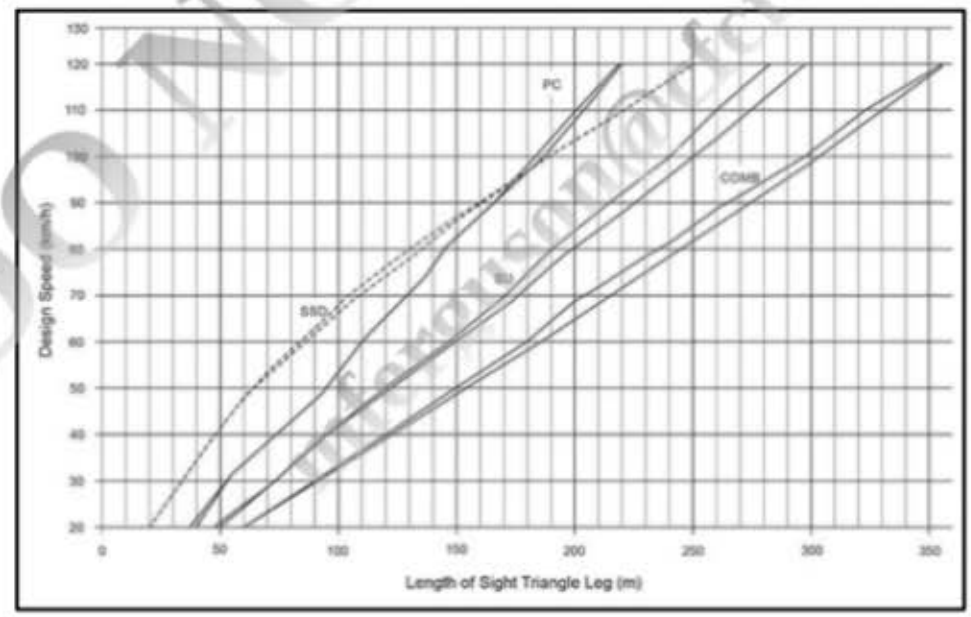

Figure 9.9.5: Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver (Calculated and Design Values Plotted)