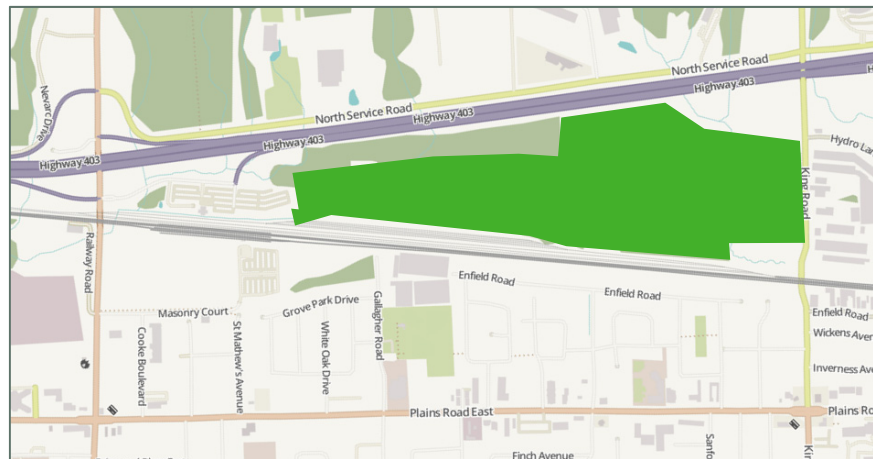




Mixed Use Employment Development 1200 King Road

Traffic Impact Study



Prepared for:
Metropolitan Consulting Incorporated

April 2015

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PROJECT SUMMARY

PROJECT NAME: **MIXED USE EMPLOYMENT DEVELOPMENT**
1200 KING ROAD, BURLINGTON ON
TRAFFIC IMPACT STUDY

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REPORT DATE: **APRIL 2015**
PROJECT NUMBER: **131920**



EXECUTIVE SUMMARY

CONTENT

This report summarizes the findings and recommendations of the Traffic Impact Study prepared for the planned mixed use employment development located at 1200 King Road in the City of Burlington. The report documents the additional traffic that is expected to occur as a result of the development including a detailed assessment of the impact of this traffic on the surrounding road network. The conclusions and recommendations of the study are summarized below and outlined in more detail in the body of the report.

CONCLUSIONS

Based on the investigations carried out, the study findings and conclusions are summarized as follows:

- ▶ **Proposed Development:** The proposed development is located at 1200 King Road in the City of Burlington. Penta Properties Inc. is proposing to develop the approximately 50 hectare parcel of land bound by King Road to the east, the Aldershot Go Station to the west, Highway 403 to the north and the CNR tracks to the south.

The development is planned to consist of mixed use, business corridor, and employment commercial lots totaling 1,164,830 square feet of GFA as well as a recreation facility (Arena) with seating for up to 9,000 people and approximately 2,000 high-rise apartment units. At this time there is no concept plan for the size and scale of buildings on the lands nor is the anchor tenant of the Arena facility known.

- ▶ **Development Generated Traffic:** The Phase 5 full build-out of the subject site is estimated to generate approximately 2,240 total vehicle trips during the AM peak hour, 3,009 total vehicle trips during the PM peak hour and approximately 1,588 total vehicle trips during an Arena peak hour. The site's modal split is anticipated to be 30 percent and will reduce the site's net trip generation to approximately 1,621 AM peak hour trips, 2,079 PM peak hour trips, and 1,121 Arena peak hour trips.

To achieve the modal split target it is imperative that transit services be provided along the South Service Road and King Road and that sidewalk be provided within the subject lands.

- ▶ **Site Design:** The private driveway connections proposed to King Road that may service the proposed Mixed Retail & Service blocks may require additional study. When a site plan is developed for Lots 11-14 an access review should be undertaken. The proximity of Lots 13 and 14 to the CNR underpass may result in inadequate sightlines for vehicles approaching a potential driveway location or for vehicles entering the King Road right-of-way.
- ▶ **Study Area:** The study area is generally defined as the Waterdown Road corridor from the North Service Road to Masonry Court, the King Road corridor from the North Service Road to Plains Road East and the South Service Road from Waterdown Road to its existing termination and ultimately the extension to King Road.
- ▶ **Existing Traffic Conditions:** Several of the existing signalized intersections within the study area are operating with high levels of delay during the PM Peak hour. The Waterdown Road intersection with the South Service Road and the King Road intersection with Plains Road East are considered to be at or approaching capacity. A number of capital works projects are planned for Waterdown Road and King Road that will assist in managing the future capacity needs of the area.



- ▶ **Forecast Traffic:** The forecast background traffic volumes in the vicinity of the subject site have been assessed for three horizon years. Namely the anticipated completion date of Phase 1 (Year 2020), the completion of Phase 4 (Year 2025) and the Phase 5 full build-out of the subject site (Year 2030). Market conditions could hasten or delay build-out. Initial estimates suggest build-out will occur at roughly 5 percent per year with the residential lands coming online near full build-out. The likely future traffic volumes in the vicinity of the subject site are estimated to consist of traffic generated by the future development of:
 - The Eagle Heights Subdivision;
 - The Grindstone Holding Lands on Flatt Road;
 - 101 Masonry Court Townhouse/Condominium Development;
 - The Future expansion of the GO Transit Aldershot Station parking area; &
 - Traffic generated by the build-out of the subject site.
- ▶ **Future Traffic Conditions:** Remedial measures will be required in the future to accommodate the forecast traffic volumes. With the estimated future traffic the peak hour traffic conditions at the key intersections in the study area are expected to continue to experience some congestion for the critical movements during the peak hours. The planned and assumed capital work projects will assist in managing the future capacity needs of the study area.

The capacity issues outlined under existing and background traffic conditions are anticipated to occur with or without the development of the subject lands. Remedial measures beyond those planned in the capital works will be required to accommodate the forecast traffic volumes with or without the development of the subject site.

- ▶ **Geometric & Traffic Control Improvements:** To accommodate the forecast traffic volumes associated with the development of the subject site and other developments a number of remedial measures are required. **Table ES.1** summarizes the potential remedial measures necessary to reasonably maintain acceptable long-term (Year 2030) intersection operations.

TABLE ES.1: POTENTIAL REMEDIAL MEASURES

Intersection	Remedial Measure	Obligation
Waterdown Road & North Service Road	Storage lane length modifications.	On-going monitoring required to confirm future capacity needs.
Waterdown Road & Highway 403 Westbound Off-Ramp	-	On-going monitoring required to confirm future capacity needs.
Waterdown Road & Highway 403 Eastbound Off-Ramp/South Service	Dual southbound left-turn lanes. Impact to the Highway 403 Bridge. Detailed design required.	Outside planned Capital Work projects



Road	Northbound right-turn lane. Impact to CNR bridge. Detailed design required.	Outside planned Capital Work projects
	Storage lane length modifications.	Ongoing monitoring required to confirm future queueing demands.
Waterdown Road & Masonry Court/Railway Road	Storage lane length modifications.	Ongoing monitoring required to confirm future queueing demands.
	Waterdown Road geometric expansion from two to four lanes. Including reconstruction of the Highway 403 bridge structure.	Part of the planned Capital Works. Class EA study complete.
South Service Road & GO Bus Driveway	-	On-going monitoring required to confirm future capacity needs.
South Service Road & West GO Driveway	-	GO Transit responsible for maintaining reasonable access to private driveway.
South Service Road & East GO Driveway/Highway 403 Eastbound On-Ramp	New South Service Road connection on east leg. Modifications to signal timings and lane geometrics to support the new connection.	Developed as part of subject site.
King Road & North Service Rd	King Road geometric expansion from two to four lanes. Including reconstruction of the Highway 403 bridge structure.	Part of the planned Capital Works.
King Road & South Service Rd	New signalized intersection. Modifications to lane geometrics to support the new connection.	Developed as part of subject site.
King Road & Plains Road East	Dual southbound left-turn lanes.	Outside planned Capital Work projects
	Westbound right-turn lane.	Outside planned Capital Work projects



Recommendations

Based on the findings of this study, it is recommended that:

- ▶ To achieve the modal split target of 30 percent it is imperative that transit services be provided along the South Service Road and King Road and that pedestrian facilities be developed within the subject lands.
- ▶ The City of Burlington consider modify or adding additional transit routes to operate along the South Service Road.
- ▶ The remedial measures outline in **Table ES.1** be reviewed by the City of Burlington and the MTO to determine the appropriateness of the future lane geometrics and the potential design constraints that will need to be addressed in order to accommodate the forecast traffic volumes.

Based on the findings of this study, no other roadway or traffic control improvements are required or recommended to accommodate the future traffic within the study area.



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1.0 INTRODUCTION

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) has been retained by Penta Properties Inc. to carry out a Traffic Impact Study for the proposed mixed use employment development located at 1200 King Road in the City of Burlington (subject site). The location of the development is illustrated in **Figure 1.1**.

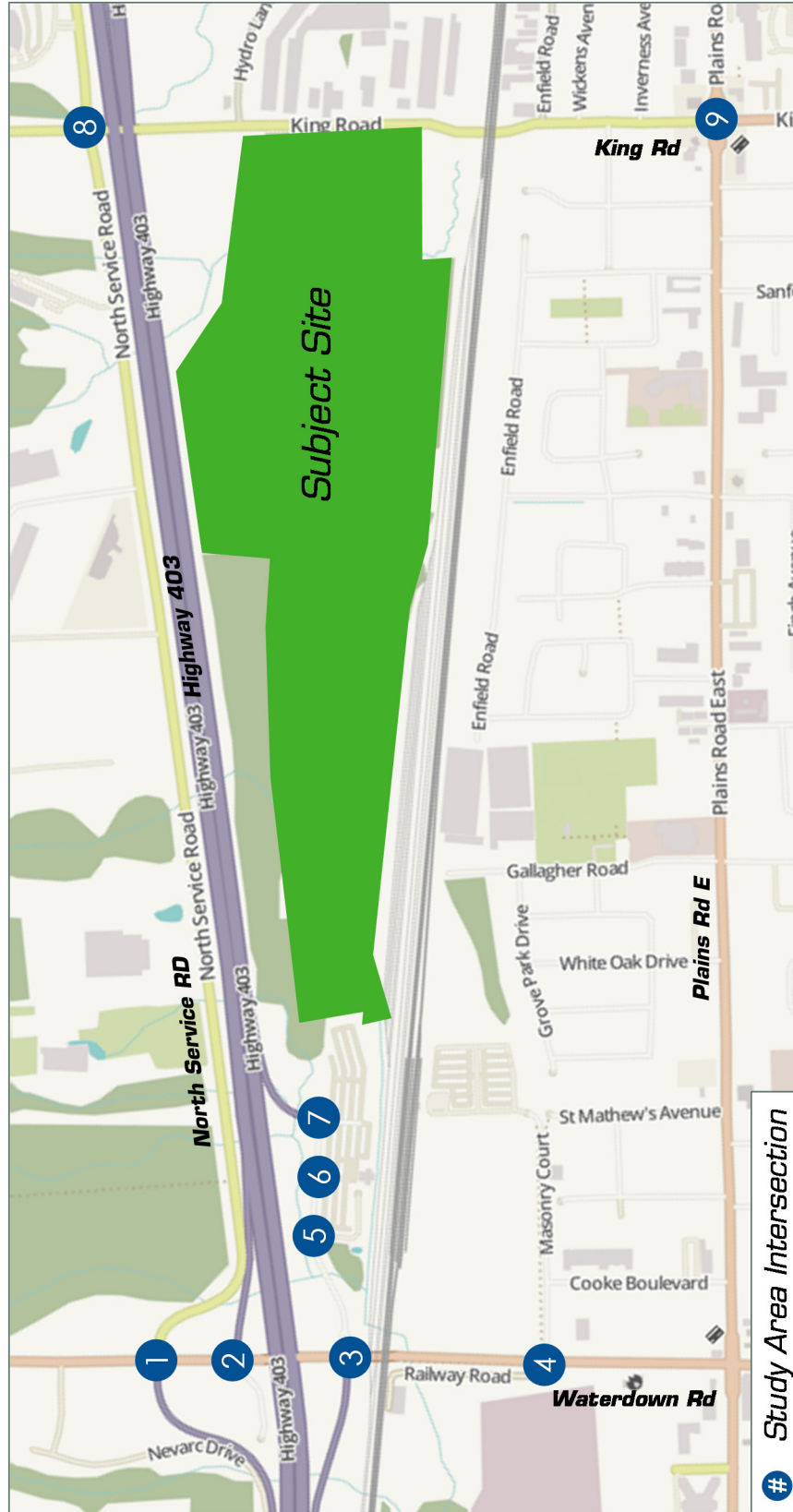
This study has been conducted to determine the impacts of additional traffic on the surrounding road network, and the remedial measures necessary to accommodate future traffic in a satisfactory manner. The scope of the study includes determination of the current traffic and site conditions within the study area, estimates of background traffic growth, estimates of additional traffic that will be generated by the build-out of the subject site, analyses of the impact of the future traffic and recommendations on the remedial measures necessary to accommodate this future traffic in a satisfactory manner.

Prior to commencing this study, the study's scope and various assumptions were vetted with the City of Burlington and Ministry of Transportation - Ontario (MTO). The study scope was circulated to the agencies for comment. The circulated scope of work and the comments received by the City of Burlington and the MTO can be found attached in **Appendix A**.

1.2 Study Area

The intersections that have been identified and assessed in this study are as follows:

1. Waterdown Road and North Service Road (signalized);
2. Waterdown Road and Highway 403 Westbound Off-Ramp (signalized);
3. Waterdown Road and Highway 403 Eastbound Off-Ramp/South Service Road (signalized);
4. Waterdown Road and Masonry Court/Railway Road (signalized);
5. South Service Road and GO Bus Driveway (signalized);
6. South Service Road and West GO Driveway (unsignalized);
7. South Service Road and Highway 403 Eastbound On-Ramp/East GO Driveway (signalized);
8. King Road and North Service Road (signalized);
9. King Road and Plains Road East (signalized);
 - A. The proposed South Service Road intersection with King Road;
 - B. The proposed South Service Road intersections with Block 1 Access A;
 - C. The proposed South Service Road intersections with Block 1 Access B, and
 - D. The proposed South Service Road intersections with Road B.



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Image Source: openstreetmap.org

1200 King Road
Traffic Impact Study



Figure 1.1
Location of
Subject Site

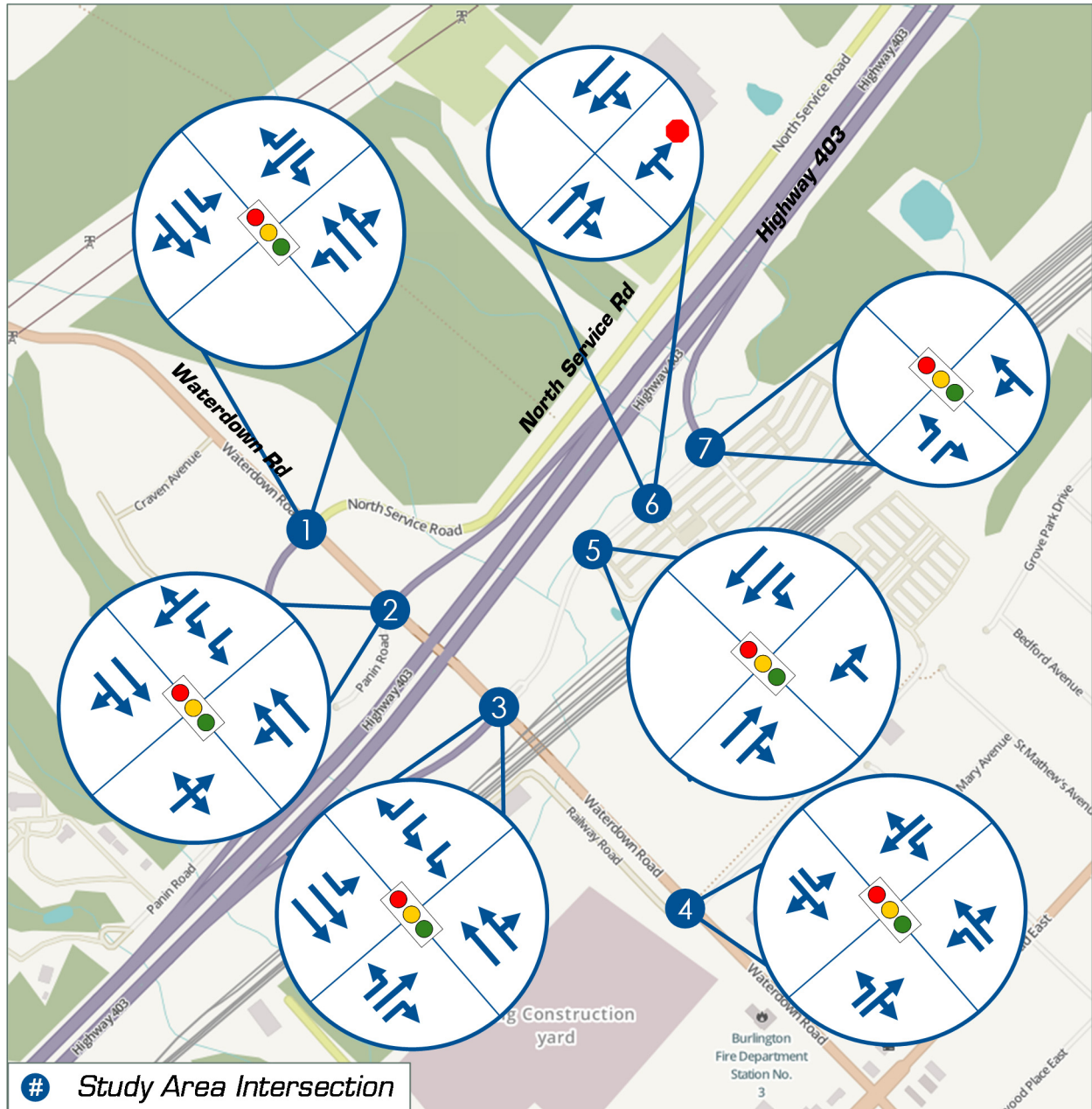


2.0 EXISTING CONDITIONS

This section provides an overview of the existing conditions on the roadways in the study area. The roadways that are located within the study area include Highway 403, Waterdown Road, King Road, Plains Road East, the North Service Road, the South Service Road, Masonry Court, Railway Road, and Hydro Lane. The existing lane configurations and traffic control are illustrated in **Figure 2.1A** and **Figure 2.1B**.

2.1 Existing Road Network

- ▶ **Highway 403** is an east/west 400-series highway that provides interregional travel between Woodstock Ontario and Mississauga Ontario. The highway has a basic 6 lane cross section with a posted speed limit of 100 kilometres per hour within the immediate study area. A full interchange is provided at Waterdown Road. The ramp terminal approaches to Waterdown Road and the South Service Road are signalized.
- ▶ **Waterdown Road** is a north/south minor arterial roadway with a basic three lane cross section south of the CNR corridor, and a basic four lane cross section north of the CNR corridor to the intersection of the North Service Road. North of the North Service Road, the cross section is reduced to a basic two lane cross section. The posted speed limit is 50 kilometres per hour. Discontinuous sidewalk facilities are provided along this road. This roadway is scheduled for reconstruction during 2015 from Plains Road East to Masonry Court. The reconstruction will allow for a future four-lane cross section. North of Highway 403 the roadway has been approved for widening. This area generally falls outside the current study area.
- ▶ **King Road** is a north/south minor arterial roadway with a basic three lane cross section with a centre two-way left-turn lane with a posted speed limit of 50 kilometres per hour. Sidewalk facilities and on-street bicycle lanes are provided along this road. The intersections with the North Service Road and Plains Road East are signalized.
- ▶ **Plains Road East** is an east/west multipurpose arterial with a basic five lane cross section and a posted speed limit of 60 kilometres per hour. Sidewalk facilities and on-street bicycle lanes are provided along this roadway. The intersection with King Road is signalized with auxiliary turn lanes.
- ▶ **North Service Road** is an east/west collector roadway with a basic two lane cross section and a posted speed limit of 60 kilometres per hour. Sidewalk facilities are not provided along this roadway. The intersections with Waterdown Road and King Road are signalized with auxiliary turn lanes. On-street bicycle lanes are provided along this roadway.
- ▶ **South Service Road** is an east/west collector roadway with a basic four lane cross section and a posted speed limit of 60 kilometres per hour. The intersection with the GO Bus Driveway and the Highway 403 Eastbound On-Ramp are signalized.
- ▶ **Masonry Court/Railway Road** is an east/west local roadway with a basic two lane cross section and an assumed speed limit of 50 kilometers per hour. Sidewalk facilities are provided along Masonry Court. The intersection with Waterdown Road is signalized with auxiliary turn lanes.



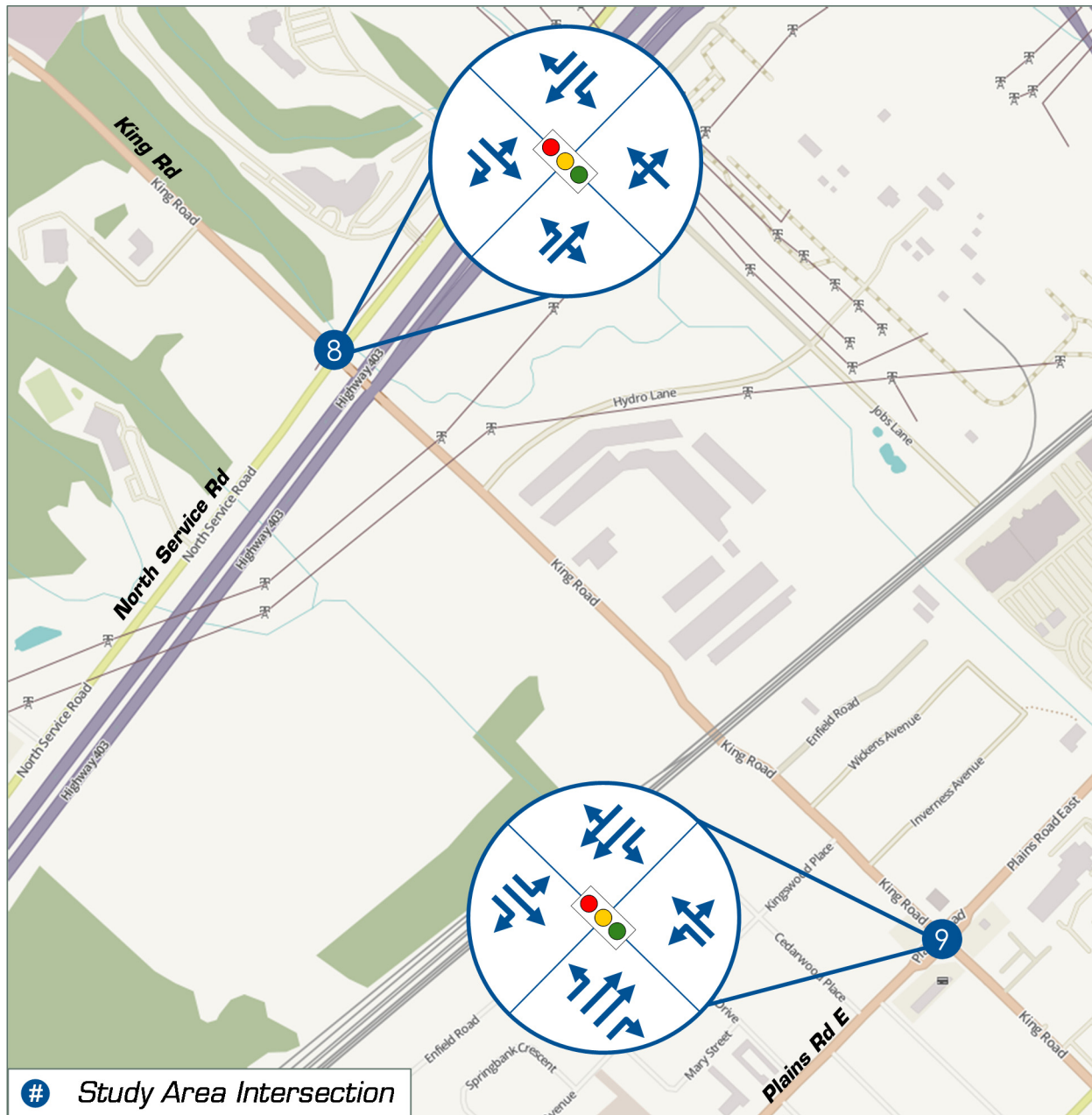
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1200 King Road
Traffic Impact Study



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Figure 2.1A
Existing Lane Configuration & Traffic
Control – Waterdown Rd Corridor



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Figure 2.1B
Existing Lane Configuration & Traffic
Control – King Rd Corridor



2.2 Existing Transit Service

Transit service in the area is provided by Burlington Transit, Hamilton Street Railway, GO Transit and Via Rail. Transit service in the area is centralized around the Aldershot GO Station (GO Station). The GO Station offers both GO Transit Bus and GO Transit Train service and functions as a turnaround point for the Burlington Transit and Hamilton Street Railway routes that service the area.

The GO Rail station platforms are accessible from areas north and south of the tracks and are connected via underground walkways. There is a bus loop located in the GO Station's northwest area. The bus loop has seven bays. Bay one is used for unloading, Bays 2-4 are utilized by GO Transit, Bay 5 is utilized by Burlington Transit, and Bay 6 is utilized by Hamilton Street Railway with Bay 7 currently being available as a spare.

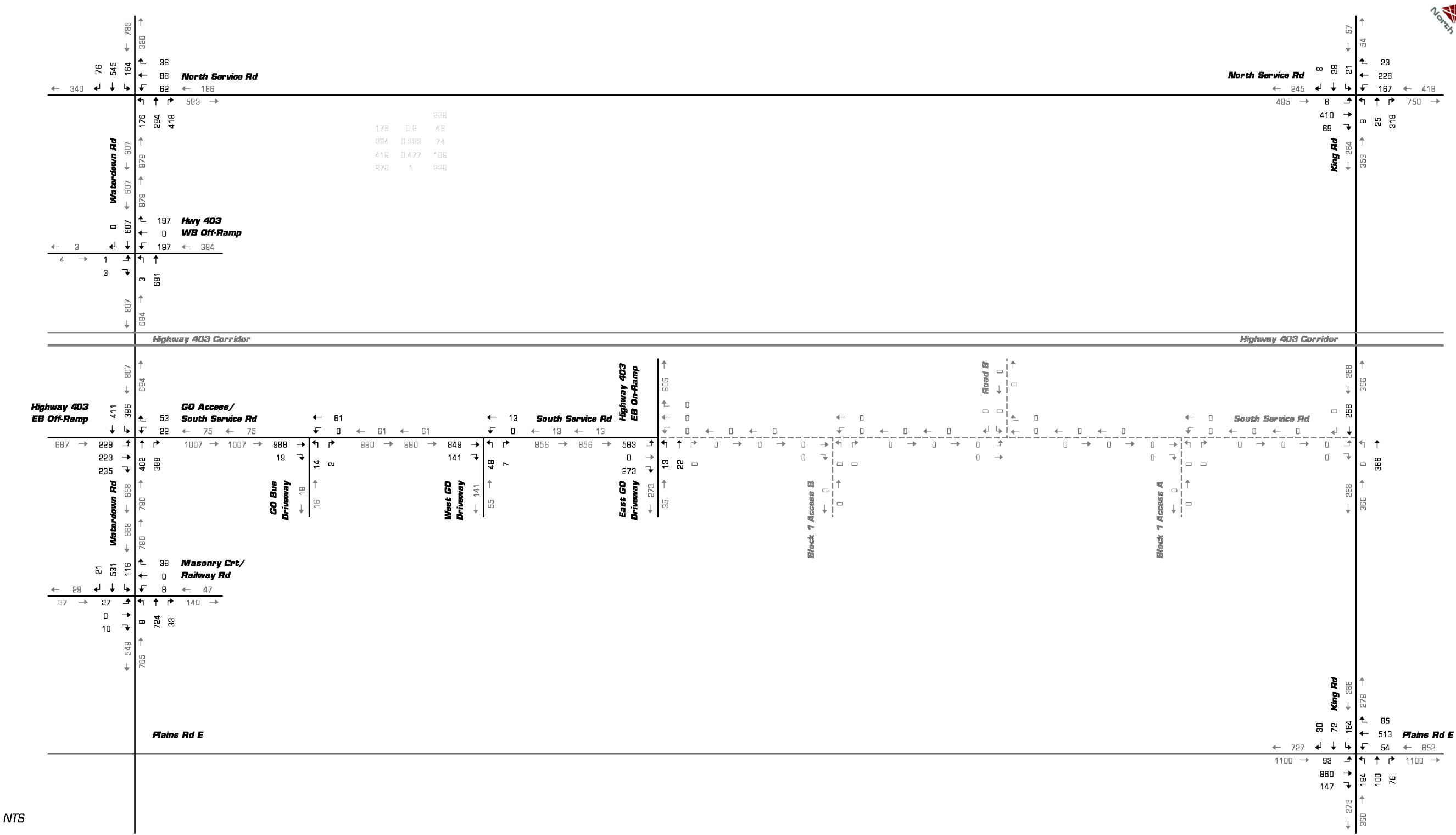
The GO Station's parking areas are located north and south of the tracks and are designed with pick-up/drop-off areas as well as large surface parking areas. In the future the south parking area will be expanded to include approximately 1,585 additional parking spaces.

Inter-province and international train service is provided by Via Rail's Quebec City-Windsor corridor, and the joint Via-Amtrak Maple Leaf train, connecting Toronto and New York through Niagara Falls.

2.3 Existing Traffic Volumes

The existing traffic volumes on the adjacent road network were obtained through turning movement counts (TMC) conducted by Paradigm during October 2014 and TMC data provided by the City of Burlington for the intersection of Plains Road East and King Road (September 2013).

The traffic signal timing plans were provided by the City of Burlington. The existing count data and signal timing data can be found attached in **Appendix B**. The existing AM and PM peak hour traffic volumes are illustrated in **Figure 2.2A** and **Figure 2.2B**.



1200 King Road
Traffic Impact Study



Figure 2.2A
Existing Traffic Volumes
- AM Peak Hour

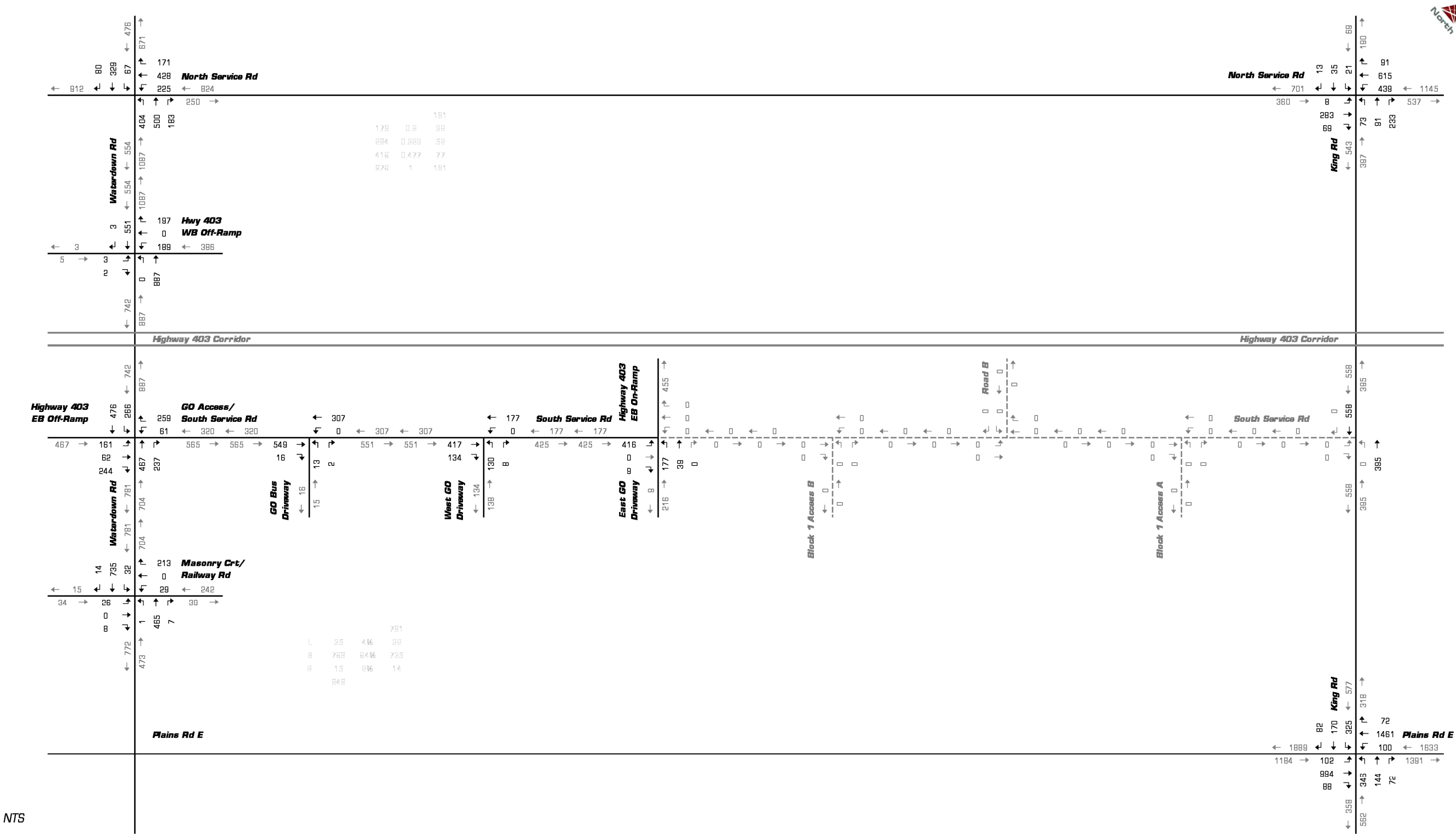


Figure 2.2B
Existing Traffic Volumes
- PM Peak Hour



2.4 Existing Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the efficiency of traffic flow at intersections. It is based on the delay experienced by individual vehicles executing the various movements. The delay is related to the number of vehicles desiring to make a particular movement, compared to the estimated capacity for that movement. The capacity is based on a number of criteria related to the opposing traffic flows. The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds at signalized intersections (50 seconds at unsignalized intersections), the movement is considered to have a LOS F and remedial measures are usually implemented, if they are feasible.

The operations of the intersections in the study area were evaluated using the existing lane configuration, traffic control and signal timing data along with the base year AM and PM peak hour traffic volumes. The findings are summarized in **Table 2.2**.

The intersection analysis considered three separate measures of performance:

- ▶ The LOS for each turning movement;
- ▶ The volume to capacity ratio (v/c) for each movement; and
- ▶ The 95th percentile queue lengths estimated using five 60-minute iterations of SimTraffic.

The level of service conditions on the existing road network have been assessed using Synchro 7.0 with HCM 2000 procedures. Movements are considered critical when the delay per vehicle is classified as LOS E or when v/c ratios exceed 0.85. The resulting level of service conditions for the existing traffic conditions are summarized in **Table 2.2A** and **Table 2.2B** and the following is noted:

AM Peak Hour

- ▶ The study area intersections are generally operating with acceptable levels of service. The southbound left-turn movement from Waterdown Road to the South Service Road is noted to be experiencing high levels of delay with extensive queuing conditions. Possible physical mitigation measures are restricted along this section of Waterdown Road due to the existing bridge structures spanning the Highway 403 and CNR corridors.
- ▶ Some minor queuing issues are occurring at the King Road intersection with Plains Road East during the AM peak hour. To mitigate the queuing issues, additional storage could be considered.
- ▶ No other movements are considered to be critical.

PM Peak Hour

- ▶ The northbound left-turn movement from Waterdown Road onto the Highway 403 Westbound on-ramp is noted to be experiencing minor queuing issues. In the future, this movement will operate with dual left-turn lanes. The infrastructure required to support the dual left-turn lanes is currently in place.
- ▶ The intersection of Waterdown Road and the Highway 403 Eastbound off-ramp/South Service Road is at capacity. Overall, delays are noted to be in the LOS E range with a v/c ratio greater than 1.00. The ability to implement physical mitigation measures is limited along this section of Waterdown Road due to the existing bridge structures spanning the Highway 403 and CNR corridors.



- ▶ The eastbound approach of Railway Road to Waterdown Road is operating with high levels of delay. Railway Road effectively functions as a private driveway connection. Mitigation measures are not likely to be implemented on this approach in the future.
- ▶ The westbound approach of the North Service Road to King Road is approaching capacity. Extensive queuing issues are occurring with the left-turn movement operating with a high v/c ratio.
- ▶ The intersection of King Road and Plains Road East is at capacity. Overall, delays are noted to be in the LOS E range with a v/c ratio of 0.99.
- ▶ No other movements are considered to be critical.

Detailed Synchro 7.0 output is provided in **Appendix C**.

The capacity issues and queuing conditions outlined above will continue to occur with or without the development of the subject site. Infrastructure improvements will be required to maintain acceptable operational conditions within the study area. Funding for these improvements should be a shared responsibility between the City of Burlington and Ministry of Transportation – Ontario. These projects are discussed in **Section 4.2**.

**TABLE 2.2A: BASE YEAR OPERATIONAL CONDITIONS – AM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
AM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					C 26.2 0.16 30 165 135	C 27.1 0.19 28 - -	C 25.2 0.03 13 125 112	C 26.5	A 5.9 0.35 27 60 33	B 12.0 0.30 67 - -	>	B 10.8	B 13.0 0.38 36 70 34	B 17.6 0.39 77 - -	>	B 16.6	B 14.8 0.33
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	<	D 41.0	>	D 41.0	C 34.7 0.39 54 140 86	C 26.5 0.13 31 - -	>	C 30.6	<	A 6.6 0.31 20 - -		A 6.6		A 5.2 0.26 79 - -	>	A 5.2	B 11.8 0.31
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 34.3 0.61 64 125 61	C 29.6 0.49 54 65 185	C 33.0 0.62	C 32.3	D 39.6 0.12 21 65 44		D 40.0 0.40 31 - -	D 39.9		C 26.7 0.56 87 - -	>	C 26.7	F 105.9 1.06 78 35 -43	B 18.4 0.22 187 - -	>	E 61.3	D 40.6 0.83
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	<	D 45.1	>	D 45.1	D 41.4 0.06 7 35 28	D 41.1 0.03 15 - -	>	D 41.2	A 4.4 0.02 11 90 79	B 10.1 0.63 105 - -	>	A 10.0	A 6.1 0.27 25 90 65	A 3.2 0.41 52 - -	>	A 3.7	A 9.1 0.59
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available		A 2.0 0.35 36 - -	>	A 2.0	<	A 1.2 0.02 3 - -		A 1.2	C 32.5 0.22 25 - -		>	C 32.5					A 2.4 0.34
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.38 1 - -	>	A 0.0	<	A 0.0 0.01 0 - -		A 0.0	C 21.7 0.23 18 - -		>	C 21.7					
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 4.4 0.52 52 - -		A 2.5 0.20 13 - -	A 3.8					<	C 27.4 0.20 20 - -		C 27.4					A 4.7 0.48
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	B 13.4 0.01 12 45 33	C 22.7 0.65 100 - -	>	C 22.6	B 17.9 0.49 33 80 47	B 16.3 0.31 40 - -	B 13.3 0.01 10 40 30	B 16.8	<	C 21.3 0.27 65 - -	>	C 21.3	<	B 19.2 0.10 18 25 19	B 18.3 0.00 6	B 19.1	C 20.2 0.49
	King Rd & Hydro Ln	TWSC	LOS Delay V/C 95th Storage Available					B 11.5 0.02 11 15 5		B 10.5 0.01 8 - -	B 11.2		A 0.0 0.23 0 - -	>	A 0.0	<	A 0.3 0.01 5 - -		A 0.3	
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	B 12.2 0.25 22 35 13	B 17.9 0.52 177 - -	B 13.7 0.13 33 35 2	B 16.9	A 9.4 0.16 23 30 7	B 16.4 0.37 59 - -	>	B 15.8	C 32.9 0.54 63 45 -18	D 38.3 0.53 77 - -	>	D 35.6	C 33.0 0.60 55 35 -20	C 34.2 0.22 34 15 20	C 32.6 0.02 35 - 35	C 33.3	C 21.2 0.47

MOE - Measure of Effectiveness
TCS - Traffic Control Signal
AWSC - All-Way Stop Control

TWSC - Two-Way Stop Control
LOS - Level of Service
V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane
< - Shared Left-Turn Lane
Q - Queue Length

95th - 95th Percentile Queue Length (m)
Ex - Existing Storage (m)
Avail. - Available Storage (m)

**TABLE 2.2B: BASE YEAR OPERATIONAL CONDITIONS – PM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
PM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					C 25.3 0.43 58 165 107	D 36.2 0.75 110 - -	C 22.5 0.12 22 125 103	C 30.4 25.8 0.80 72 60 -12	B 13.7 0.45 63 - -	> > > > >	B 18.2	C 22.3 0.25 19 70 51	C 26.4 0.37 54 - -	> > > > >	C 25.9	C 24.0 0.75	
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	< < < < <	D 46.3 0.07 8 - -	> > > > >	D 46.3	D 39.3 0.43 46 140 94	C 31.1 0.20 28 - -	> > > > >	D 35.2	< < < < <	A 7.7 0.41 51 - -		A 7.7	A 4.7 0.27 11 - -	> > > > >	A 4.7	B 12.7 0.39	
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 34.1 0.50 55 125 71	C 26.0 0.15 23 - -	D 35.7 0.69 74 250 176	C 33.9	D 42.0 0.24 288 65 -223		F 212.5 1.32 234 - -	F 180.1		C 31.1 0.68 76 - -	> > > > >	C 31.1	F 197.2 1.30 71 35 -36	C 23.4 0.34 95 - -	F 85.7	E 71.2 1.05	
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	< < < < <	F 84.1 0.68 28 - -	> > > > >	F 84.1	D 43.7 0.16 19 35 16	D 43.4 0.14 31 - -	> > > > >	D 43.5	A 3.9 0.00 2 90 88	A 8.0 0.54 86 - -	> > > > >	A 8.0	A 4.4 0.07 13 90 77	A 4.9 0.52 76 - -	A 4.9	B 13.0 0.54	
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available		A 2.2 0.29 47 - -	> > > > >	A 2.2	< < < < <	A 1.8 0.15 74 - -		A 1.8	C 30.5 0.21 26 - -	> > > > >	C 30.5					A 2.5 0.28	
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.24 12 - -	> > > > >	A 0.0	< < < < <	A 0.0 0.10 6 - -		A 0.0	D 28.9 0.58 28 - -	> > > > >	D 28.9						
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	B 12.1 0.59 70 - -		A 6.4 0.01 5 - -	B 11.9					< < < < <	B 19.5 0.51 54 - -		B 19.5				B 14.5 0.56	
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	B 14.6 0.06 7 45 38	B 18.5 0.47 74 - -	> > > > >	B 18.4	D 51.7 0.96 128 80 -48	C 28.4 0.80 304 - -	B 13.9 0.08 53 40 -13	D 36.2	< < < < <	C 29.9 0.67 95 - -	> > > > >	C 29.9	< < < < <	B 19.4 0.04 22 - -	B 18.3 0.00 8 25 18	B 19.2	C 31.1 0.81
	King Rd & Hydro Ln	TWSC	LOS Delay V/C 95th Storage Available					B 13.3 0.04 16 15 -1		B 11.0 0.01 6 - -	B 12.8		A 0.0 0.27 0 - -	> > > > >	A 0.0	< < < < <	A 0.0 0.00 90 - -	A 0.0		
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	C 29.3 0.61 46 35 -11	C 21.9 0.58 207 - -	B 15.4 0.09 46 35 -11	C 22.1	B 15.7 0.38 51 30 -21	C 33.5 0.89 234 - -	> > > > >	C 32.4	F 177.5 1.25 81 45 -36	D 52.4 0.70 153 - -	> > > > >	F 129.5	F 233.9 1.38 70 35 -35	D 45.3 0.53 553 - -	D 40.0 0.06 31 35 4	F 150.7	E 60.3 0.99

MOE - Measure of Effectiveness
TCS - Traffic Control Signal
AWSC - All-Way Stop Control

TWSC - Two-Way Stop Control
LOS - Level of Service
V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane
< - Shared Left-Turn Lane
Q - Queue Length

95th - 95th Percentile Queue Length (m)
Ex - Existing Storage (m)
Avail. - Available Storage (m)



3.0 DEVELOPMENT CONCEPT

3.1 Description of Site Plan

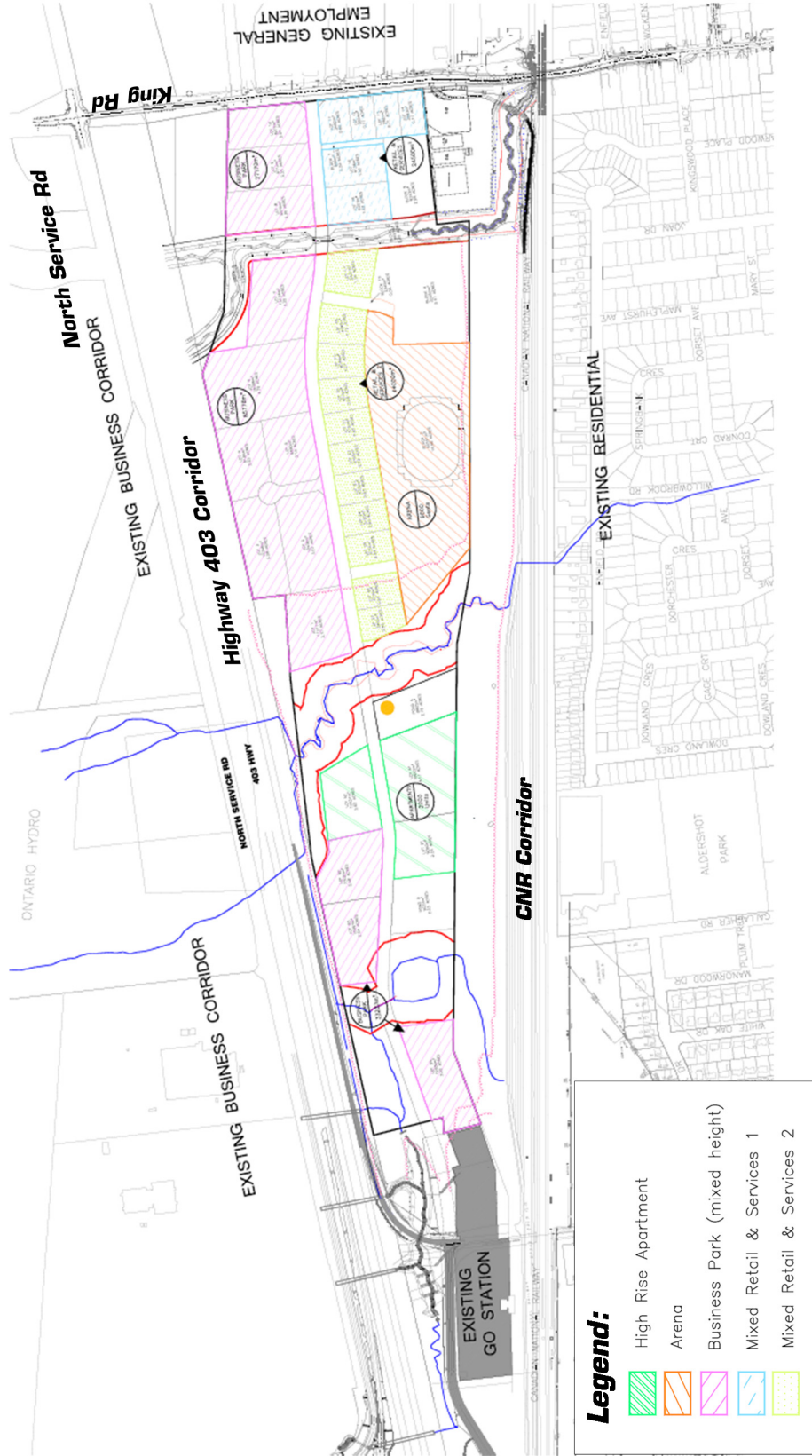
The proposed development is located at 1200 King Road in the City of Burlington. Penta Properties Inc. is proposing to develop the approximately 50 hectare parcel of land generally bound by King Road to the east, the Aldershot Go Station to the west, Highway 403 to the north and the CNR tracks to the south.

The development is planned to consist of mixed use, business corridor, and employment commercial lots totaling 1,164,830 square feet of GFA as well as a recreation facility (Arena) with seating for up to 9,000 people and approximately 2,000 high-rise apartment units. At this time there is no concept plan for the size and scale of buildings on the lands nor is the anchor tenant of the Arena facility known. The conceptual layout of the development is illustrated in **Figure 3.1**.

The site is anticipated to be built-out over a twenty year period at a rate of approximately 5 percent per year. The business park lands east of Falcon Creek will be constructed first. It is estimated that the Arena will be completed during Year 8 and the initiation of the construction of the residential lands beginning during Year 10. Market conditions could hasten or delay build-out. The anticipated phasing of development is illustrated in **Figure 3.2**. For the purposes of this traffic study and in order to estimate reasonable future forecasts we have assumed the lands would be built out over 5 Phases.

Vehicular access to the subject site will be provided primarily by the extension of the South Service Road from the GO Station lands in the west to King Road in the east. The South Service Road is proposed to be constructed as part of the first phase of development. A portion of this road has already been constructed through the GO Station lands. The remainder of the road is planned to have a two lane cross-section with a centre turn lane and on-street bicycle lanes within a 20 metre road allowance. Private driveway connections to King Road will provide vehicular access to the Mixed Retail/Service lands with frontage to King Road. All other access will be provided via local roads or the new South Service Road extension.

The anticipated opening date of Phase 1 of the subject site is Year 2020. The ultimate timing and phasing may change to reflect market conditions and engineering restraints. By the Year 2025 it is anticipated that Phase 1 through 4 will be constructed with Phase 5 coming online Year 2030.

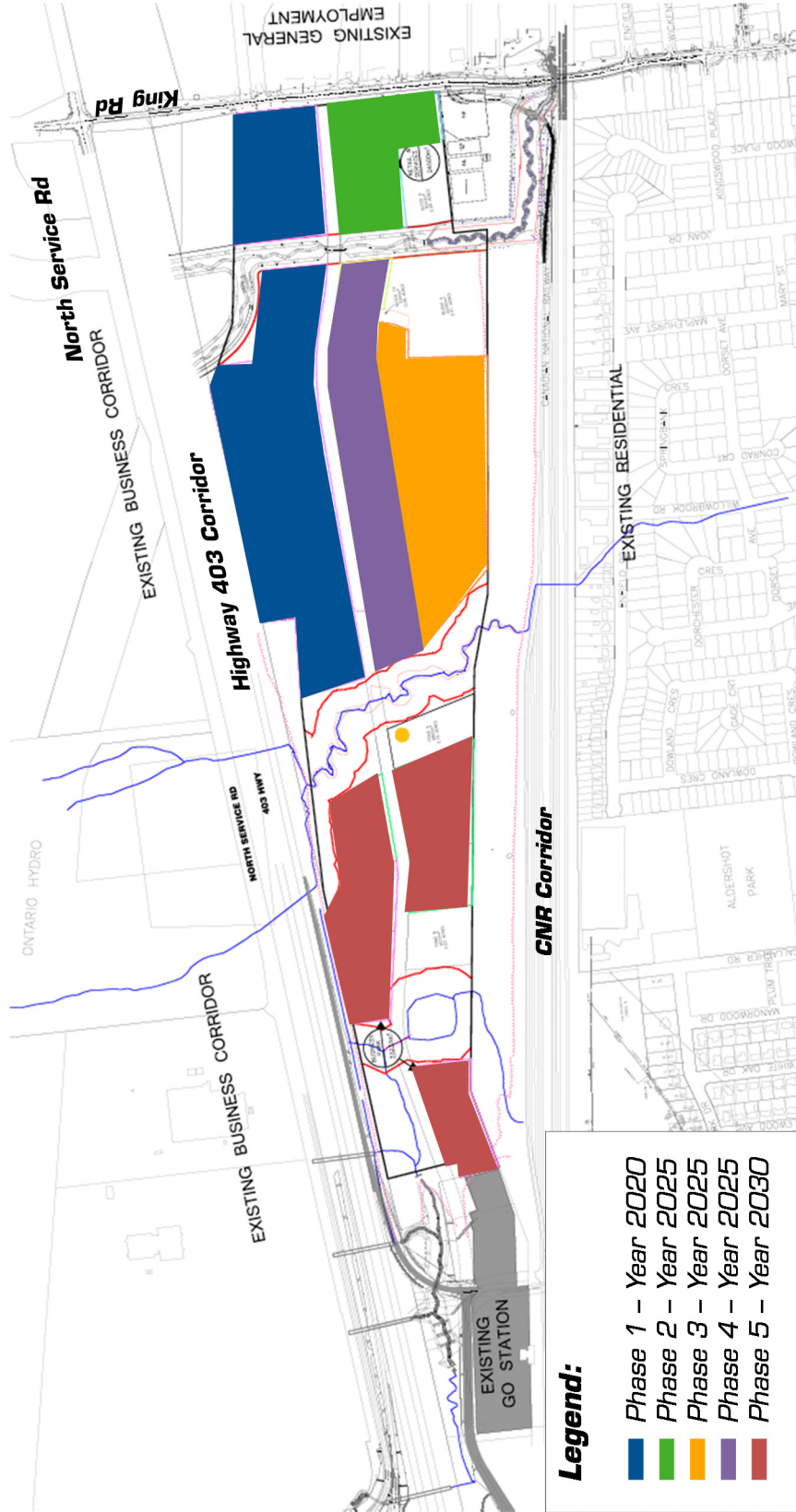


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Figure 3.1
Preliminary Site
Concept Plan



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Figure 3.2
Estimated
Development Phasing



3.2 Estimated Site Trip Generation

The vehicle trips anticipated to be generated by the subject site have been estimated for three design hours. The design hours assessed include the weekday AM and PM peak hours of the adjacent roadways and the peak hour the Arena site (22:00). The trips estimated to be generated by the subject site for the AM and PM peak hours have been developed using the Institute of Transportation Engineers (ITE) Trip Generation Manual¹. The average rates for Land Use Code (LUC) 222– High-Rise Apartment, LUC 770 – Business Park, LUC 820 – Shopping Centre were used to estimate the site generated traffic.

The trips estimated to be generated by the proposed Arena site have been forecast using data collected by Paradigm at the Brampton Powerade Centre during an event condition during October 2014. The data collected suggests a trip rate of 0.13 vehicle trips per seat. The AM and PM peak hour generation was determined to be 0.01 vehicle trips per seat and 0.04 vehicle trips per seat respectively. The data collected at the Powerade Centre can be found in **Appendix D**.

The trip generation rates for the above noted land use codes (222, 770 and 820) have been adjusted for the Arena peak hour using the PM peak hour to Arena peak hour ratio based on data collected at the King Road intersection with the North Service Road. The Arena peak hour assessed within this report will generally only dictate the design of the proposed Block 1 Access A and Block 1 Access B connections to the South Service Road.

The trip generation is comprised of three components; new vehicle trips (net generation), trips made by non-automotive forms of transport and pass-by trips. Pass-by trips are already included in the existing traffic stream and do not load additional traffic onto the road network. These trips are a component of the commercial trip generation and are consistent with the ITE rate for LUC 820.

The modal split estimate for Phase 1 of the subject site has been calculated using modal split data from the 2011 Transportation Tomorrow Survey (TTS) for zones along the GO Transit Lakeshore West Line. The current modal split within these zones is noted to be approximately 22 percent. As build-out of the subject site progresses it is anticipated that the modal split will increase. An ambitious target of 30 percent is assumed as the area intensifies and transforms into a mobility hub. Accelerated mobility hubs should set a modal split ambition of at least 50 per cent and a jobs/people target between 200 and 400 per hectare. Other mobility hubs should aim to achieve the Places to Grow intensification target of 200 people/jobs/hectare and a modal split of 30 per cent². To remain conservative the modal split rates have not been applied to the commercial land uses. To achieve the modal split target it is imperative that transit services be provided along the South Service Road and King Road and that pedestrian facilities be developed within the subject lands.

Table 3.1A indicates that Phase 1 of the subject site is estimated to have a total trip generation of approximately 974 vehicle trips during the AM peak hour and 897 vehicle trips during the PM peak hour. Non-automotive trips are estimated to be 274 during the AM peak hour and 253 trips during the PM peak hour.

The trip generation estimated following the completion of Phase 4 is summarized in **Table 3.1B** and indicates a total trip generation of approximately 1,515 vehicle trips during the AM peak hour and 2,194

¹ Trip Generation Manual Ninth Edition, Institute of Transportation Engineers, Washington D.C., 2012

² Mobility Hubs Development of a Regional Transportation Plan for the Greater Toronto and Hamilton Area Green Paper #2 | Metrolinx | February 2008



vehicle trips during the PM peak hour. Non-automotive trips and pass-by trips will reduce the site's trip generation to approximately 1167 AM peak hour vehicle trips and 1,570 PM peak hour vehicle trips.

During the Arena peak hour, the site's total trip generation is noted to be 1,444 vehicle trips with the Arena accounting for 1,170 vehicle trips or about 80 percent of the total trip generation. Non-automotive trips and pass-by trips will reduce the site's trip generation to approximately 1,078 new vehicle trips.

The trip generation estimated following the full build-out of the subject site is summarized in **Table 3.1C** and indicates a total trip generation of approximately 2,240 vehicle trips during the AM peak hour and 3,009 vehicle trips during the PM peak hour. Non-automotive trips and pass-by trips will reduce the site's trip generation to approximately 1,621 AM peak hour vehicle trips and 2,079 PM peak hour vehicle trips.

During the Arena peak hour, the site's total trip generation is noted to be 1,588 vehicle trips with the Arena accounting for 1,170 vehicle trips or about 73 percent of the total trip generation. Non-automotive trips and pass-by trips will reduce the site's trip generation to approximately 1,121 new vehicle trips.

TABLE 3.1A: ESTIMATED TRIP GENERATION – PHASE 1

Phase	Land Use	Units of Measure	Number of Units	AM Peak Hour				PM Peak Hour			
				Rate	In	Out	Total	Rate	In	Out	Total
Phase 1	770 - Business Park	GFA	891,090	1.40	1,061	187	1,248	1.29	299	851	1,150
Total Generation					1,061	187	1,248		299	851	1,150
Modal Split				22%	233	41	274	22%	66	187	253
Net Generation					828	146	974		233	664	897

TABLE 3.1B: ESTIMATED TRIP GENERATION – PHASE 1 TO PHASE 4

Phase	Land Use	Units of Measure	Number of Units	AM Peak Hour				PM Peak Hour				Arena Peak Hour			
				Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
Phase 1 To Phase 4	770 - Business Park	GFA	891,090	1.40	1,061	187	1,248	1.29	299	851	1,150	0.27	63	178	241
	820 - Shopping Centre	GFA	184,290	0.96	67	110	177	3.71	328	356	684	0.18	16	17	33
	PTSL - Arena	Seats	9,000	0.01	43	47	90	0.04	270	90	360	0.13	138	1,032	1,170
Total Generation					1,171	344	1,515		897	1,297	2,194		217	1,227	1,444
Modal Split				26%	287	61	348	26%	148	244	392	26%	52	314	366
Pass-By Trips				0%	0	0	0	34%	116	116	232	0%	0	0	0
Net Generation					884	283	1,167		633	937	1,570		165	913	1,078

TABLE 3.1C: ESTIMATED TRIP GENERATION – PHASE 1 TO PHASE 5

Phase	Land Use	Units of Measure	Number of Units	AM Peak Hour				PM Peak Hour				Arena Peak Hour			
				Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
Phase 1 To Phase 5	770 - Business Park	GFA	980,540	1.40	1,167	206	1,373	1.29	329	936	1,265	0.27	69	196	265
	820 - Shopping Centre	GFA	184,290	0.96	110	67	177	3.71	328	356	684	0.18	16	17	33
	222 - High-Rise Apartment	Units	2,000	0.30	150	450	600	0.35	427	273	700	0.06	73	47	120
	PTSL - Arena	Seats	9,000	0.01	43	47	90	0.04	270	90	360	0.13	138	1,032	1,170
Total Generation					1,470	770	2,240		1,354	1,655	3,009		296	1,292	1,588
Modal Split				30%	408	211	619	30%	308	390	698	30%	84	383	467
Pass-By Trips				0%	0	0	0	34%	116	116	232	0%	0	0	0
Net Generation					1,062	559	1,621		930	1,149	2,079		212	909	1,121



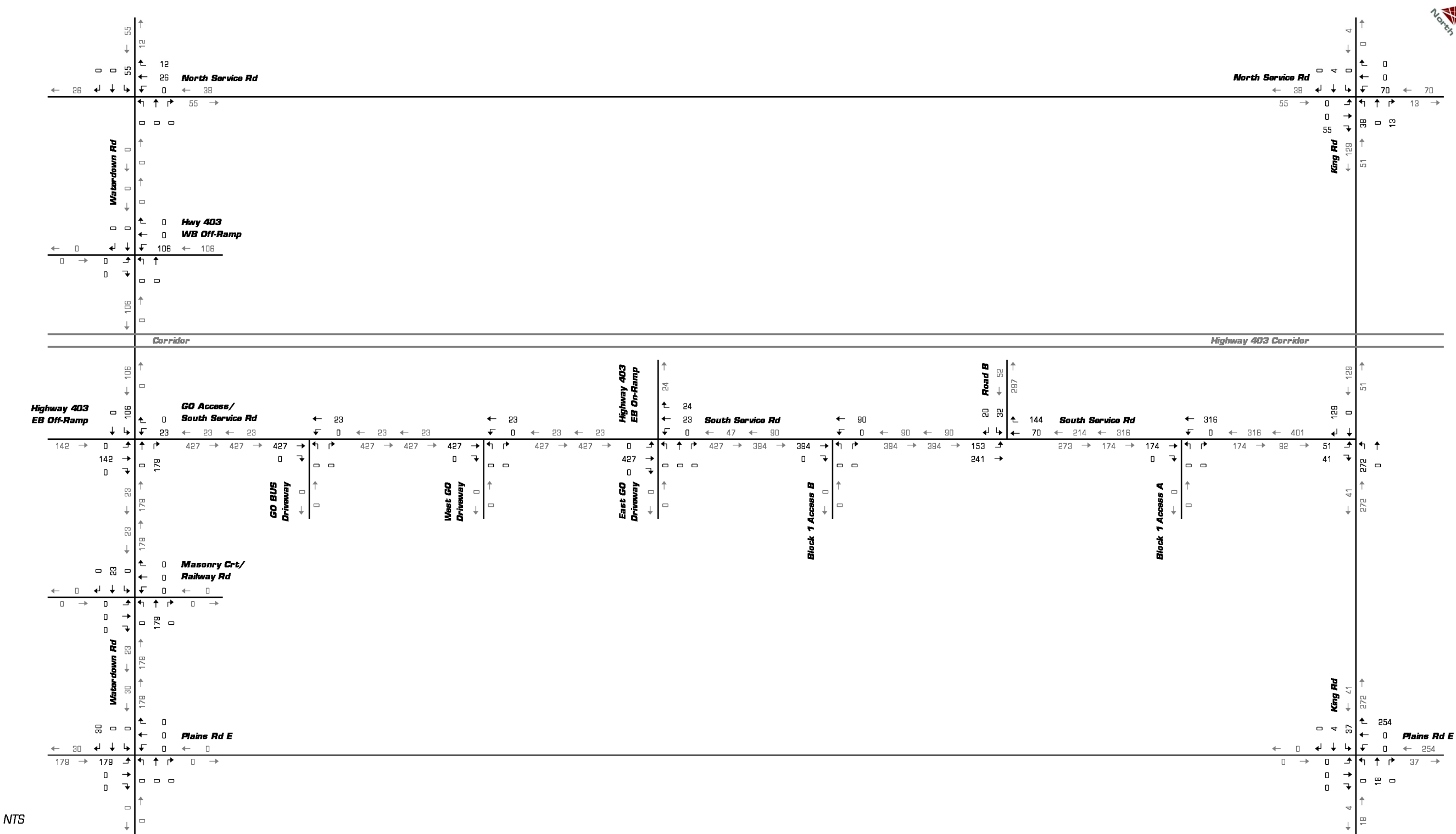
The trips estimated to be generated by the subject site were assigned to the road network based on the travel patterns documented in the TTS data. The TTS data has been used to assign the residential trip components of the site. The residential trips are focused towards the Highway 403 corridor, while the Business Park and Shopping Centre trips are anticipated to be more local in nature with a greater attraction to the City arterial road network. The trips associated with the Arena site are assumed to be inter-regional in nature with a high dependence upon the Highway 403 corridor. The estimated trip distribution is contained in **Table 3.2**.

TABLE 3.2: ESTIMATED TRIP DISTRIBUTION

Origin/Destination/Route	Business Park		Shopping Centre		High-Rise Apartment		Arena Site	
	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound	Inbound	Outbound
North via Waterdown Rd	7%	8%	7%	8%	7%	8%	4%	4%
North via King Rd	1%	0%	1%	0%	1%	0%	0%	0%
East via North Service Rd	8%	9%	8%	9%	8%	9%	4%	4%
East via Highway 403	13%	17%	13%	17%	31%	26%	50%	50%
East via Plains Rd	31%	26%	31%	26%	13%	17%	4%	4%
West via Highway 403	17%	18%	17%	18%	22%	21%	30%	30%
West via Plains Rd	22%	21%	22%	21%	17%	18%	4%	4%
South via King Rd	2%	2%	2%	2%	2%	2%	4%	4%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Using the trip generation data described in **Table 3.1A**, **Table 3.1B** and **Table 3.1C** and the trip distribution described in **Table 3.2**, the site traffic was assigned to the adjacent road network. The trip assignment utilized 14 traffic assignment zones to account for the various land uses and proposed block patterns of the subject lands.

The AM and PM peak hour vehicle trips estimated to be generated following the build-out of Phase 1 (Year 2020) of the subject site are illustrated in **Figure 3.3A** and **Figure 3.3B**. The AM peak hour, PM peak hour and Arena peak hour vehicle trips estimated to be generated following the build-out of Phase 4 (Year 2025) of the subject site are illustrated in **Figure 3.4A**, **Figure 3.4B** and **Figure 3.4B**. The AM peak hour, PM peak hour and Arena peak hour vehicle trips estimated to be generated following the build-out of Phase 5 (Year 2030) of the subject site are illustrated in **Figure 3.5A**, **Figure 3.5B** and **Figure 3.5B**.

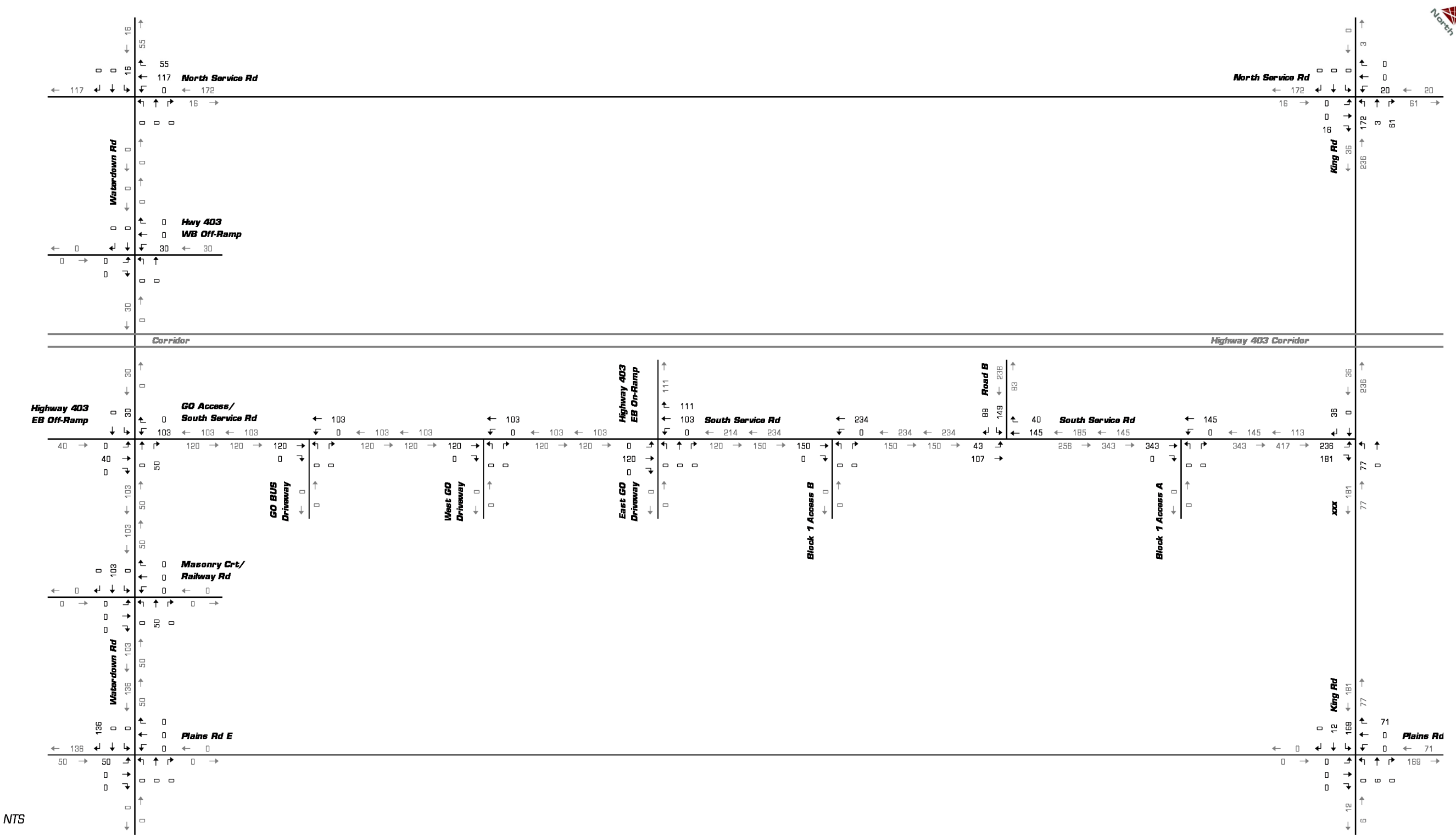


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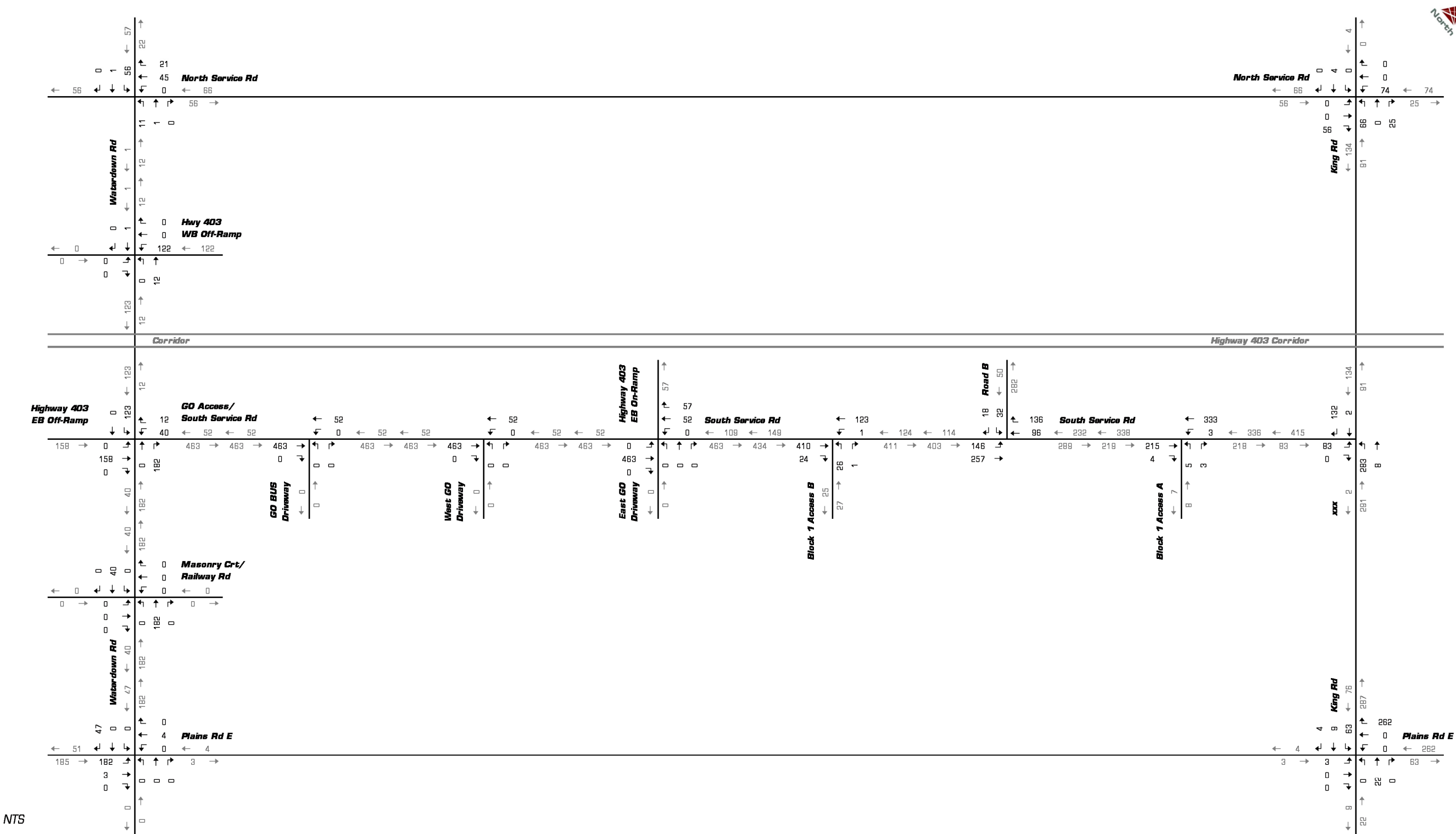
Figure 3.3A
Estimated Site Generated Traffic
Phase 1 - AM Peak Hour



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Figure 3.3B
Estimated Site Generated Traffic
Phase 1 - PM Peak Hour



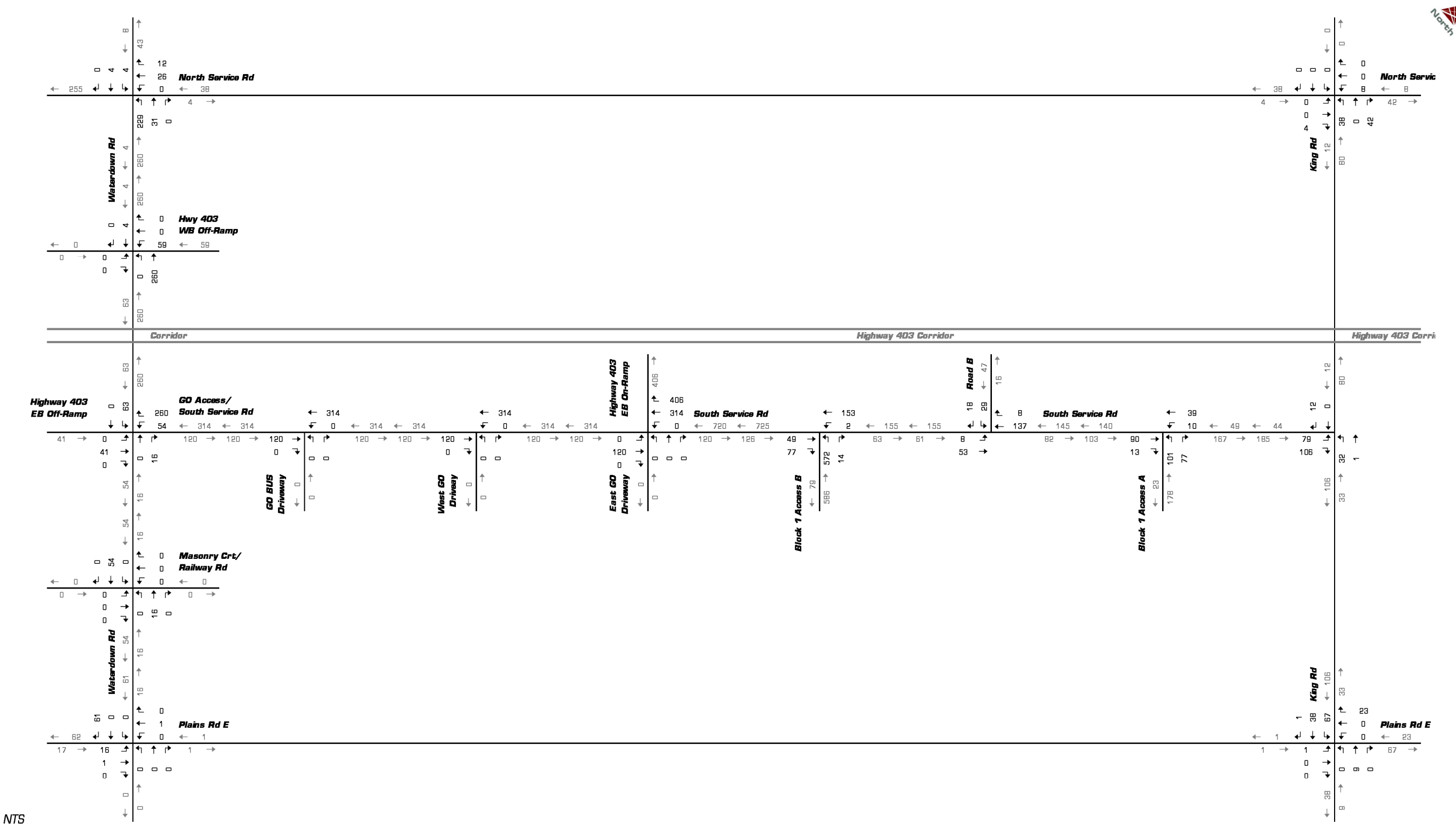
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Figure 3.4A
Estimated Site Generated Traffic
Phase 4 - AM Peak Hour


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Estimated Site Generated Traffic Phase 4 – PM Peak Hour



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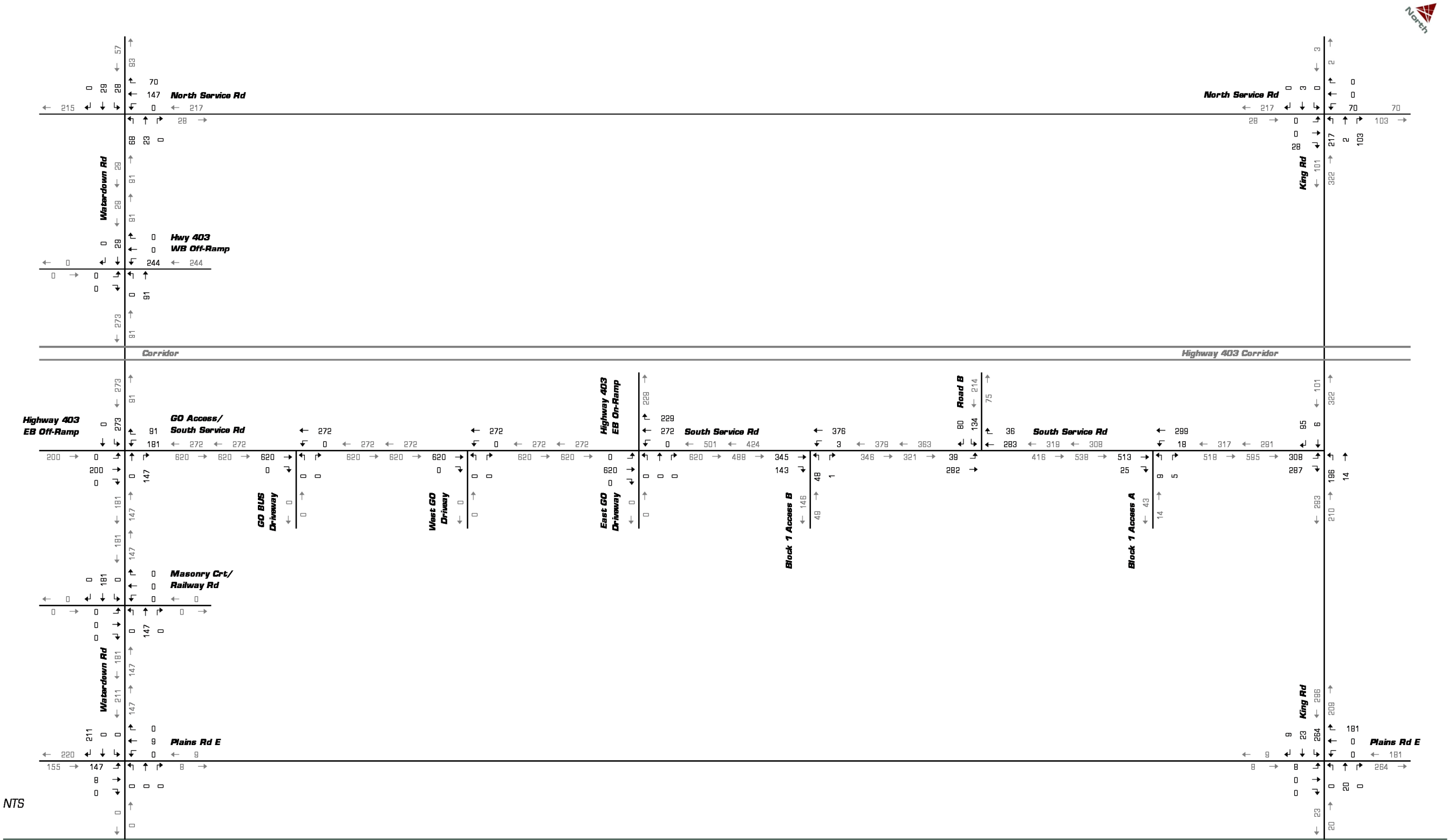
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Figure 3.4C
Estimated Site Generated Traffic
Phase 4 - Arena Peak Hour



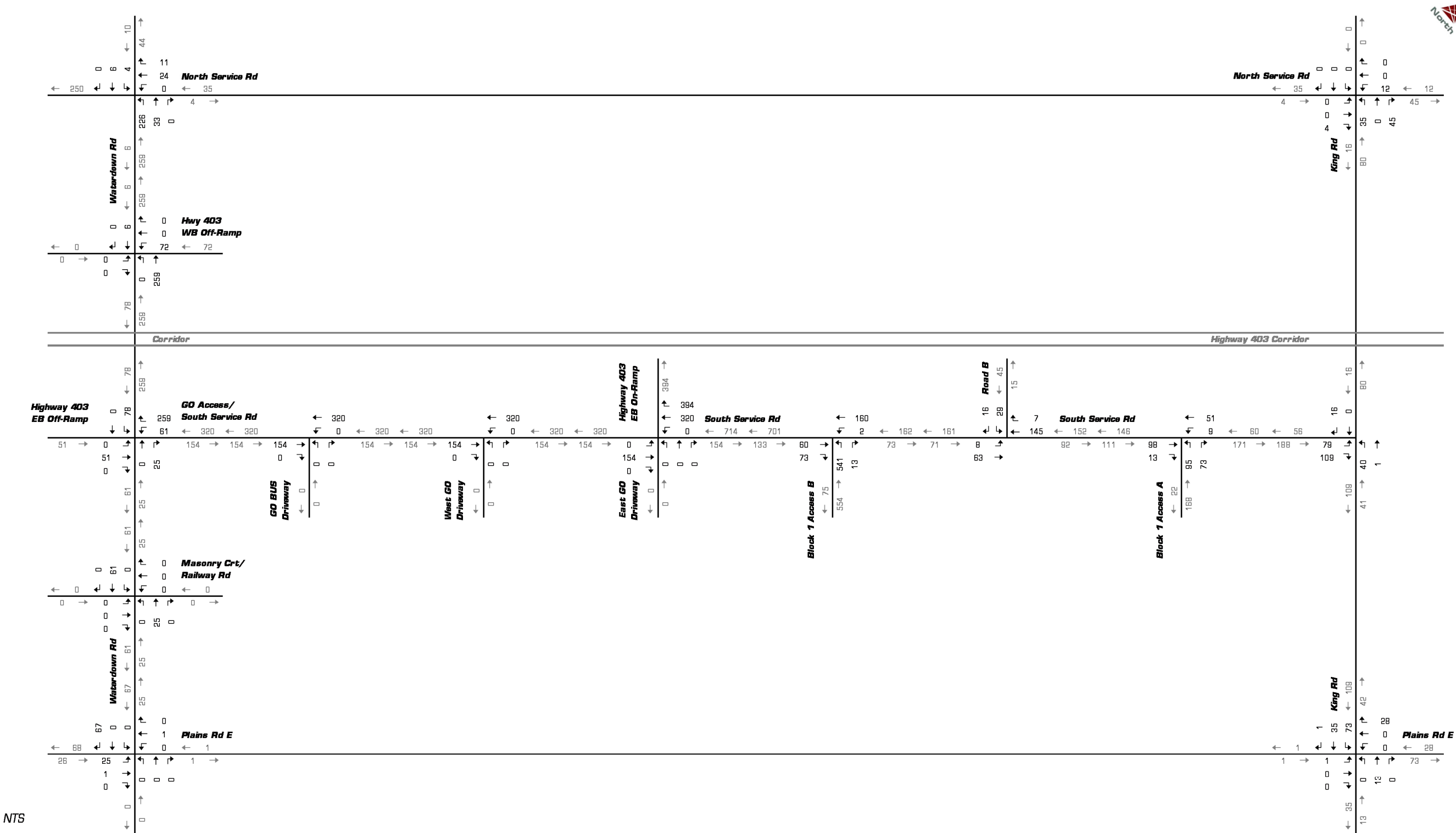
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Figure 3.5B
Estimated Site Generated Traffic
Phase 5 - PM Peak Hour



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Figure 3.5C
Estimated Site Generated Traffic
Phase 5 - Arena Peak Hour



4.0 FUTURE CONDITIONS

The assessment of the future traffic conditions contained in this section includes the future background traffic forecasts as well as the level of service analysis.

4.1 Background Traffic Forecast

For analysis purposes, three horizon years have been assessed in order to determine the impact of the subject site, namely the anticipated opening date of Phase 1 (Year 2020) and five-years (Year 2025) and ten-years (Year 2030) following the opening date. The ultimate timing and phasing may change to reflect market conditions and engineering constraints.

The likely future traffic volumes in the vicinity of the subject site are estimated to consist of traffic generated by the subject site (**Section 3.2**) and traffic generated by the anticipated build-out of four adjacent developments within the study area. The adjacent developments that are anticipated to be build-out include:

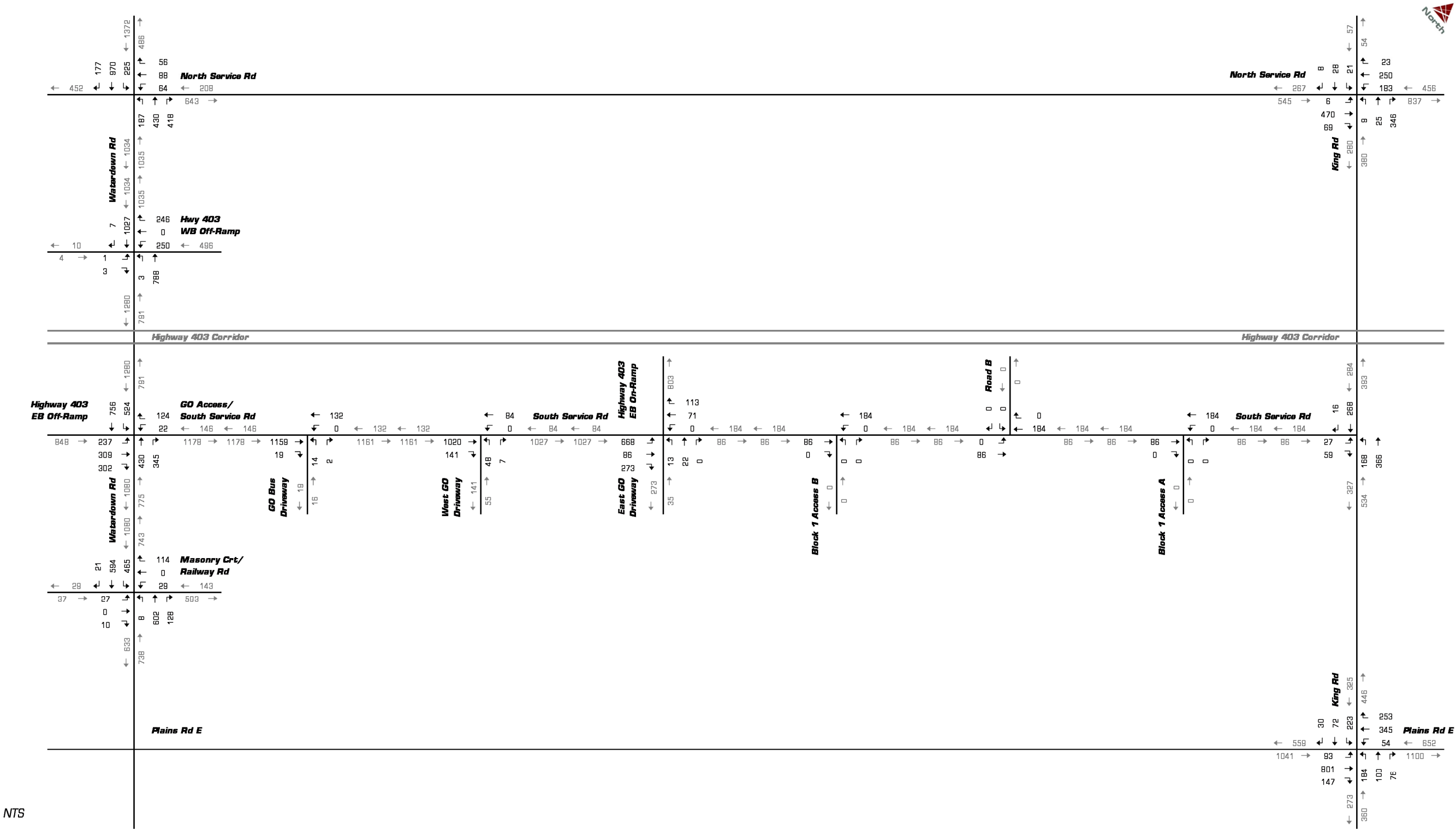
1. Eagle Heights Subdivision;
2. Grindstone Holding Lands on Flatt Road;
3. 101 Masonry Court Townhouse/Condominium Development; &
4. Future expansion of the GO Transit Aldershot Station parking area.

The Eagle Heights Subdivision is located in the Central Settlement Area of the North Aldershot Planning Area and could ultimately consist of 870 residential units. The Grindstone Holding Lands on Flatt Road are also located in the Central Settlement Area of the North Aldershot Planning Area and could ultimately consist of 48 residential units.

The Masonry Court development and the GO Transit Aldershot Station are located south of the CNR corridor and east of Waterdown Road. The Masonry Court site is estimated to consist of 364 townhouse units, 356 apartment units with a mix of ground commercial land uses estimated to be approximately 13,585 square feet. This site will rely heavily upon the proximity to Aldershot GO Station with respect to the future trip generation from this site.

The expansion to the GO Transit Aldershot Station is anticipated to result in 1,585 new parking spaces south of the CNR corridor on the GO Transit lands.

The estimated trip generation and assignment of this traffic to the study area intersections can be found attached in **Appendix E**. The background traffic volumes are illustrated in **Figure 4.1A**, **Figure 4.1B** and **Figure 4.1C**. The forecast background traffic volumes for the Five-Year (Year 2025) and Ten-Year (Year 2030) are anticipated to remain consistent.

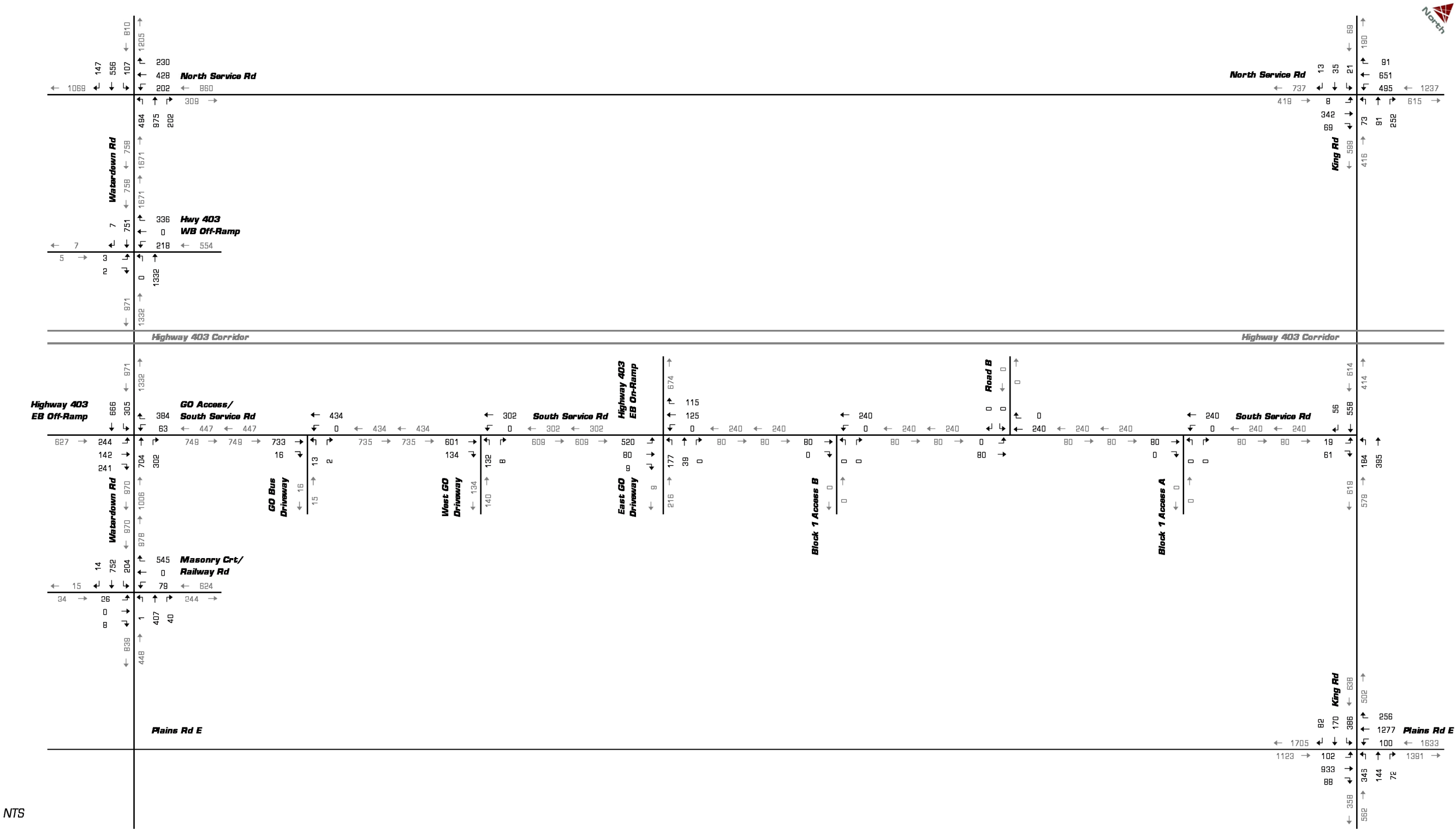


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Figure 4.1A
Background Traffic Forecast
- AM Peak Hour

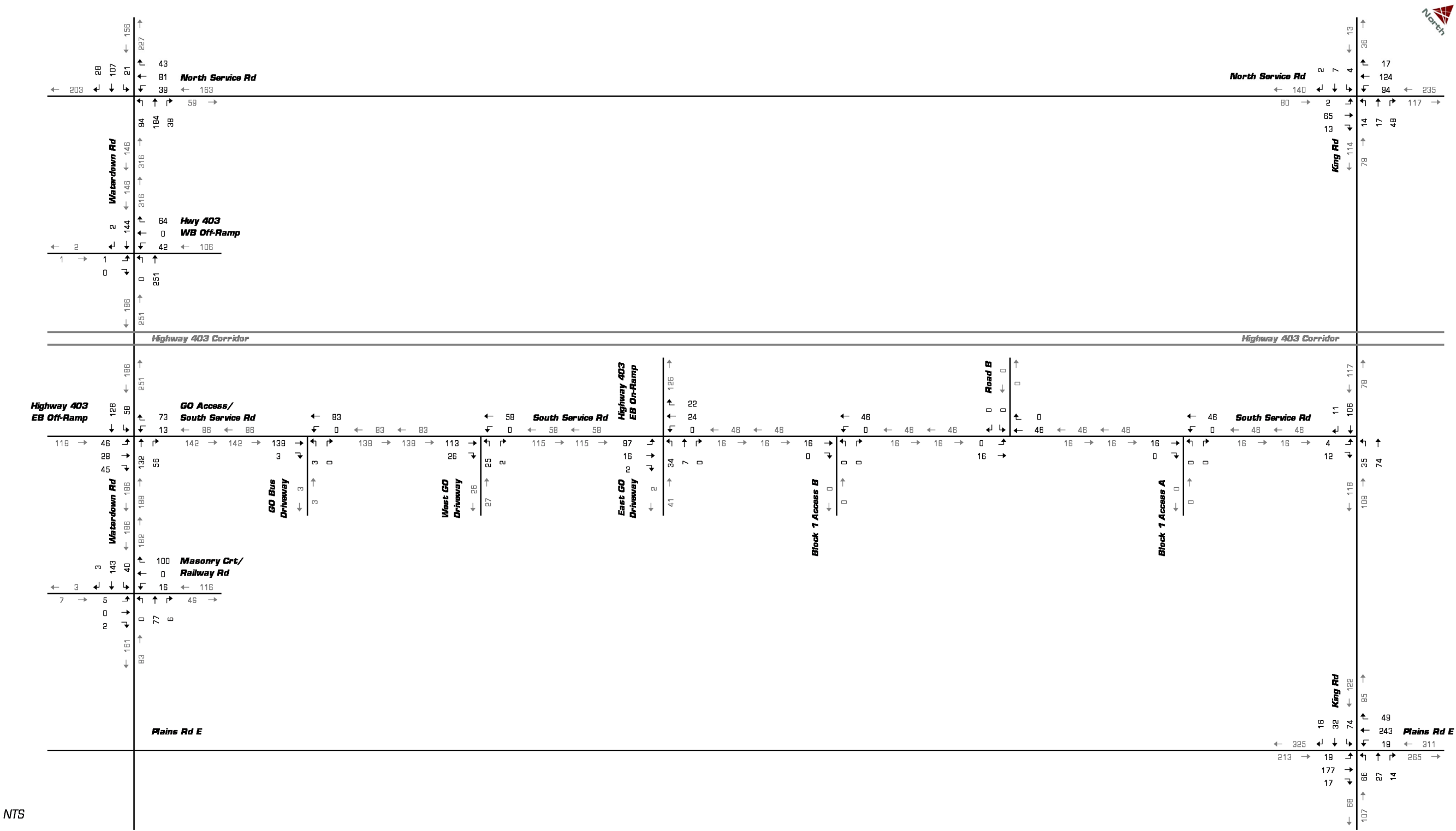


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Figure 4.1B
Background Traffic Forecast
- PM Peak Hour



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Figure 4.1C
Background Traffic Forecast
- Arena Peak Hour



4.2 Future Road Network Improvements

The future road network that is anticipated to be in place prior to the build-out and occupancy of the subject site is anticipated to consist of expanded road geometry along the Waterdown Road and King Road corridors. The expanded road geometry along Waterdown Road is part of a completed Class Environmental Assessment Study.

The Waterdown Road design consists of four 3.3 metre through lanes, one 3.5 metre centre two-way left-turn Lane and 1.5 metre on-street bicycle lanes with a 0.5 metre buffer within a 30 metres Right-of-Way. The cross section is illustrated in **Figure 4.2A**. Initially, the roadway will be widened and delineated with a single travel lane in both directions. When additional capacity is required the pavement markings will be revised to include two travel lanes in both directions. Additionally, it is anticipated that the northbound left-turn lane at Waterdown Road and the North Service Road will be repainted to provide dual left-turn lanes. No widening at this location is required as the expanded lane geometry is currently in place. North of the study area, Waterdown Road will be widened from two-lanes to four-lanes from Craven Avenue to Mountain Brow Road.

Improvements to the King Road corridor include expanded road geometry and the future signalized intersection of the South Service Road. The expanded road geometry will widen King Road from north of the South Service Road to north of the North Service Road from two-lanes to four-lanes with auxiliary northbound and southbound left-turn lanes at the North Service Road. The expanded geometry over the Highway 403 corridor will result in a bridge structure capable of supporting a 5-6 lane cross section. The future Highway 403 bridge crossing and South Service Road design is illustrated in **Figure 4.2B**.

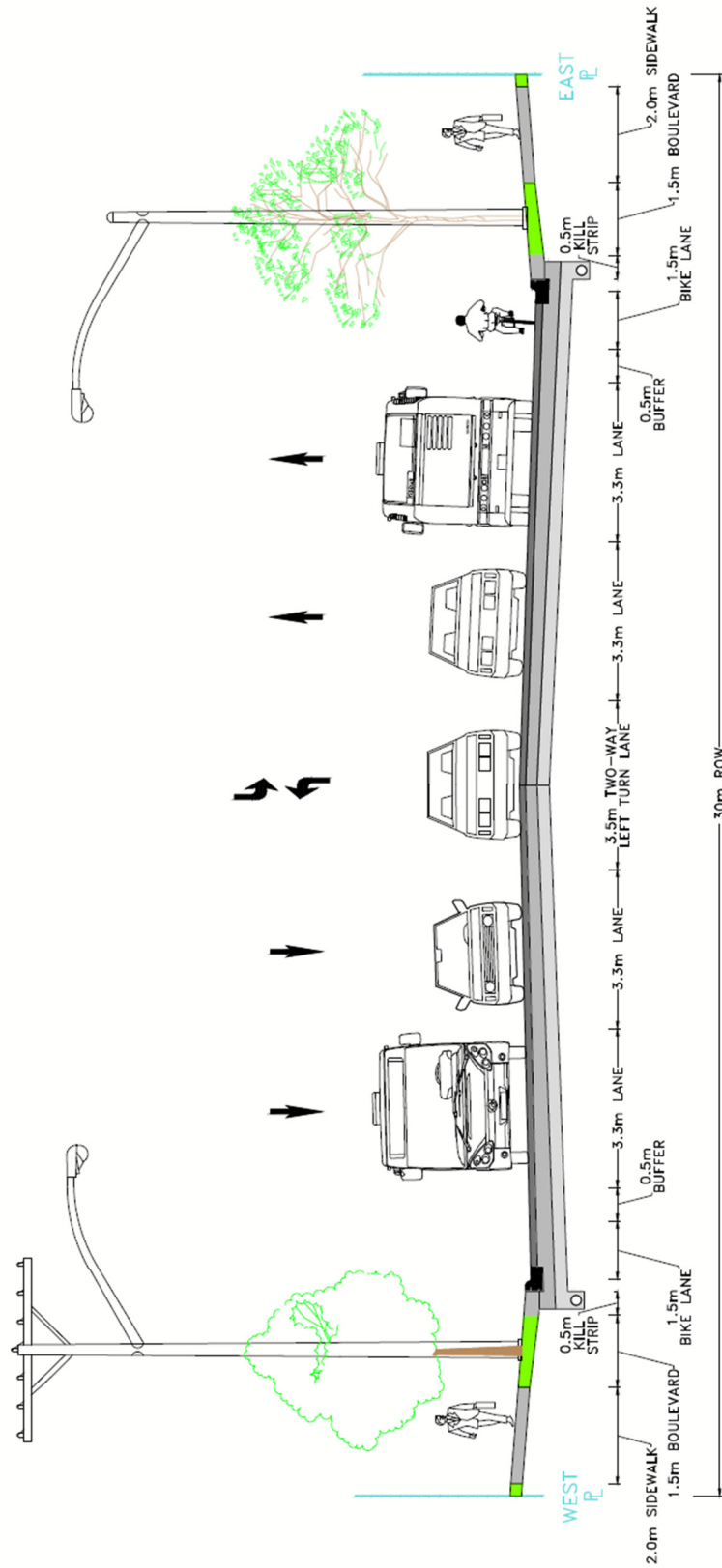
The South Service Road is proposed to provide a connection between Waterdown Road and King Road. The construction of this roadway will be completed as part of the first phase of development of the subject site. A portion of this road has already been constructed through the GO Station lands. The remainder of the road is planned to have a two lane cross-section with a centre turn lane and on-street bicycle lanes within a 20 metre road allowance. The intersection with King Road will operate with a traffic signal and auxiliary turn lanes on all approaches.

These capital improvements are planned for Year 2019 and are expected to be in place prior to the assumed build-out of Phase 1 (Year 2020).

Beyond the planned capital improvements additional geometric improvements are expected to be necessary to support the future capacity demands. This is evident under the existing conditions where high levels of delay and capacity issues are occurring at the Waterdown Road intersection with the South Service Road and at the King Road intersection with Plains Road.

To support the high volume of existing southbound left-turning vehicles from Waterdown Road to the South Service Road dual left-turn lanes will likely be required. In addition a northbound right-turn lane from Waterdown Road to the South Service Road will likely be required. These improvements may impact the current bridge structures over the Highway 403 and the CNR corridors. A detailed design will be required to confirm any potential impact to the bridge structures.

To support the high volume of existing southbound left-turning vehicles from King Road to Plains Road East dual left-turn lanes will likely be required to support the future capacity demands. Additionally the intersection would benefit with the introduction of a westbound right-turn lane. These improvements will increase the road network's capacity to better support the forecast traffic demands.

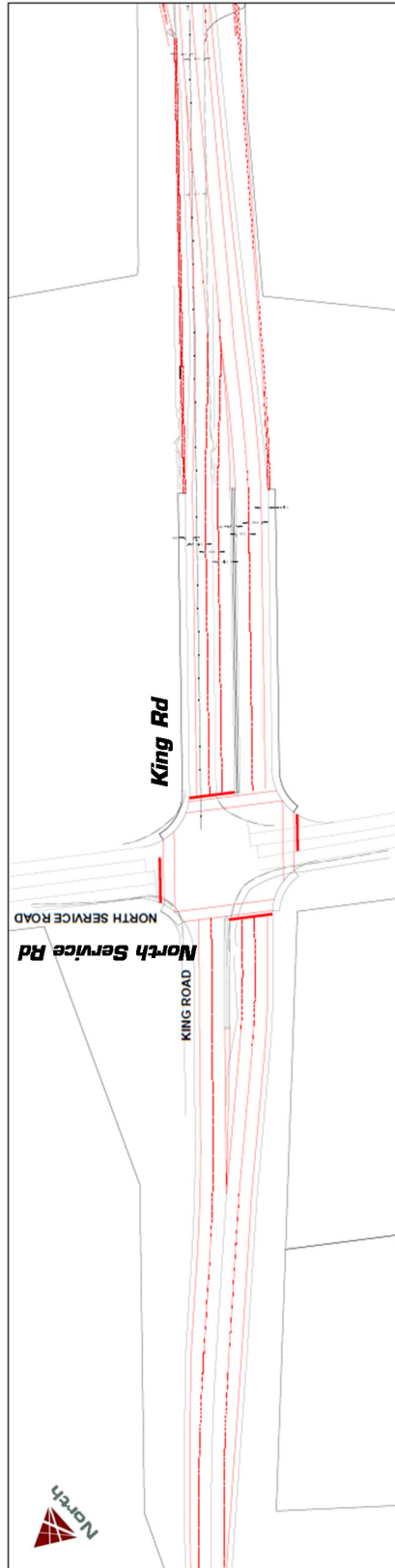


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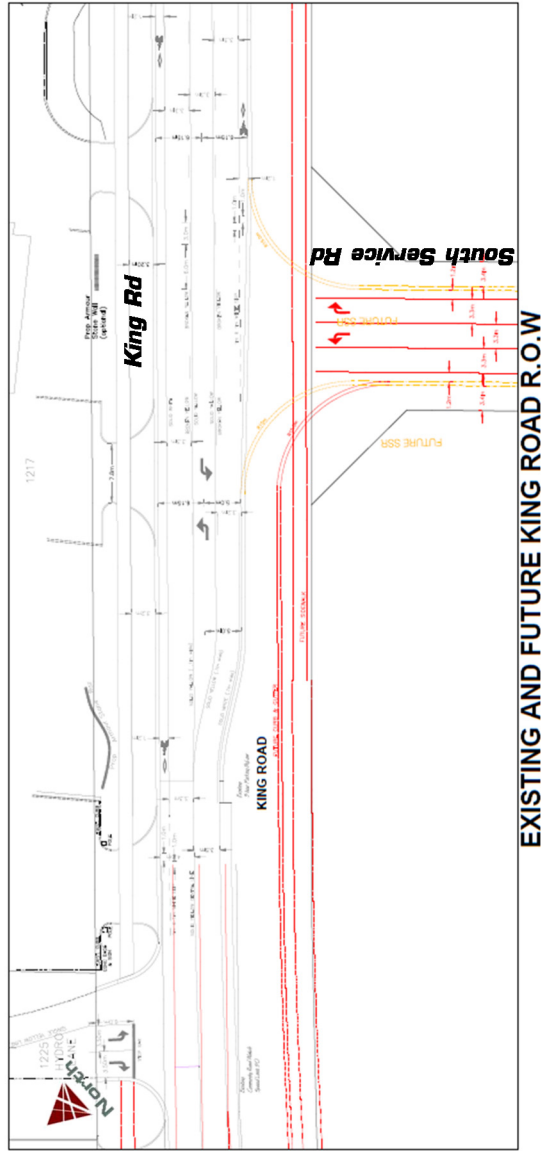
1200 King Road
Traffic Impact Study



Figure 4.2A
Waterdown Road
Cross-Section



**FUTURE 403 BRIDGE CROSSING AND
INTERSECTION AT NORTH SERVICE ROAD
(AMEC)**



EXISTING AND FUTURE KING ROAD R.O.W

IVIS

1200 King Road
Traffic Impact Study



Figure 4.2B
King Road Improvements
- North Service Road to South Service Road



4.3 Background Traffic Operations

The operations of the study area intersections were evaluated using the same analytical approach that was used for the base year traffic operations along with the future background traffic volumes (**Figure 4.1A** and **Figure 4.1B**). The signal timings and offsets have been optimized. The resulting level of service conditions for the Opening Date Background traffic horizon are summarized in **Table 4.1A**, **Table 4.1B** and **Table 4.1C**, the following is noted:

AM Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs within the study area.

PM Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs at the intersections within the study area. Overall, the study area intersections are forecast to operate with acceptable levels of service. Localized capacity deficiencies and extensive queueing conditions are likely to occur at the Waterdown Road intersections with the South Service Road and Masonry Court. Similarly, localized capacity deficiencies and extensive queueing conditions are also likely to occur at the King Road intersections with the North Service Road and Plains Road East.

Arena Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs within the study area. No movements are considered critical.

Detailed Synchro 7.0 output is provided in **Appendix F**.

**TABLE 4.1A: BACKGROUND TRAFFIC OPERATIONAL CONDITIONS – AM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
AM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					26.0 0.14 24 165 141	27.0 0.18 33 126 109	25.3 0.04 16 125 109	26.3	49.9 0.43 33 60 27	6.3 0.39 53 -	> > > >	14.2	12.0 0.54 50 70 20	18.8 0.64 104 -	> > > >	17.7	17.0 0.48
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	< < < <	D 41.1 0.00 6 -	> > > >	D 41.1	C 34.6 0.44 41 140 99	C 27.5 0.27 38 -	> > > >	C 31.1	< < < <	A 8.1 0.34 36 -		8.1		A 1.9 0.42 21 -	> > > >	A 1.9	B 10.3 0.42
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 28.3 0.49 57 125 68	C 30.7 0.61 76 250 -	C 34.6 0.70 72 250 178	C 31.4	D 42.3 0.16 11 65 54		C 32.2 0.39 33 -	C 33.7		B 16.6 0.36 49 -	A 8.2 0.34 47 50 3	B 12.8	C 34.6 0.80 67 35 -32	A 5.3 0.37 38 -		B 17.3	C 20.9 0.58
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	< < < <	D 35.9 0.03 20 -	> > > >	D 35.9	D 36.8 0.17 19 35 17	D 36.1 0.07 22 -	> > > >	D 36.2	A 7.8 0.02 6 90 84	A 10.0 0.34 72 -	> > > >	A 10.0	B 16.5 0.71 74 90 16	A 1.9 0.21 30 -	> > > >	A 8.2	B 11.4 0.64
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available		A 1.8 0.38 38 -	> > > >	A 1.8	< < < <	A 1.0 0.04 10 -		A 1.0	D 36.5 0.14 12 -	> > > >		D 36.5					A 2.1 0.36
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.40 9 -	> > > >	A 0.0	< < < <	A 0.0 0.03 0 -		A 0.0	C 23.6 0.22 20 -	> > > >		C 23.6					
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 5.1 0.63 78 -	A 1.3 0.23 26 -	> > > >	A 3.8	A 0.0 0.00 0 50 50	A 1.7 0.05 9 -	A 1.8 0.07 14 50 36	A 1.7	< < < <	C 34.4 0.20 16 -	> > > >	C 34.4					A 4.3 0.58
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	B 10.1 0.01 12 45 33	B 17.7 0.63 79 -	> > > >	B 17.6	A 9.8 0.45 33 80 47	A 6.0 0.21 31 40 32	A 4.9 0.01 8 40 32	A 7.5	B 17.2 0.03 7 100 93	B 11.1 0.15 52 -	> > > >	B 11.2	B 20.0 0.10 13 30 17	B 19.5 0.03 10 -	> > > >	B 19.7	B 12.8 0.46
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	B 12.7 0.20 24 35 11	B 15.9 0.47 60 -	B 12.6 0.10 15 35 20	B 15.1	B 14.1 0.21 20 30 10	B 13.8 0.28 21 38 -	B 13.8 0.16 29 30 1	B 13.8	C 23.2 0.44 42 45 3	C 28.3 0.40 46 -	> > > >	C 25.7	D 35.9 0.58 34 35 1	C 28.3 0.21 25 -	C 27.0 0.02 11 24	C 33.4	B 18.9 0.47
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 29.7 0.16 15 -		C 29.0 0.04 18 -	C 29.2					A 2.7 0.21 21 30 9	A 2.3 0.25 25 -	> > > >	A 2.4		A 2.6 0.24 21 -	> > > >	A 2.6	A 5.0 0.26
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.05 0 -	> > > >	A 0.0	< < < <	A 0.0 0.00 0 -		A 0.0	A 0.0 0.00 0 -	> > > >		A 0.0					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	< < < <	A 0.0 0.00 0 -	> > > >	A 0.0		A 0.0 0.11 0 -	> > > >	A 0.0					A 0.0 0.00 0 -		> > > >	A 0.0	
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.05 0 -	> > > >	A 0.0	< < < <	A 0.0 0.00 0 -		A 0.0	A 0.0 0.00 0 -	> > > >		A 0.0					

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

G - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)

**TABLE 4.1B: BACKGROUND TRAFFIC OPERATIONAL CONDITIONS – PM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL	
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH		
PM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					B 16.7 0.35 80 165 85	C 26.0 0.71 131 65 60	A 9.2 0.15 125 60	B 19.3	D 42.1 0.75 58 60 2	B 11.1 0.69 67	>	C 20.2	B 19.5 0.50 33 70 37	C 23.4 0.55 86	>	C 22.8	C 20.6 0.73	
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	<	D 35.4 0.00 7	>	D 35.4	C 24.5 0.25 39 140 101	C 21.9 0.55 64	>	C 23.0	<	A 8.7 0.65 38		A 8.7		A 9.9 0.37 62	>	A 9.9	B 12.1 0.65	
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 32.3 0.64 61 125 64	C 27.2 0.35 41 63 250 187	D 36.7 0.72 63	C 32.8	D 36.3 0.27 18 65 47	E 68.6 1.00 85	E 64.1		C 22.8 0.62 66	B 13.4 0.26 51 50 -1	B 20.0	C 20.9 0.41 34 35 1	A 6.1 0.31 41		B 10.7	C 26.1 0.73		
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	<	C 26.4 0.09 16	>	C 26.4	C 27.7 0.29 35 35 0	C 29.6 0.50 66	>	C 29.3	A 8.0 0.00 1 90 89	A 9.3 0.22 38	>	A 9.3	A 2.3 0.32 32 90 58	A 1.4 0.29 42	>	A 1.6	B 12.0 0.36	
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available	A 1.0 0.24 12	>	A 1.0	<	A 0.7 0.14 10	D 36.4 0.13 10	>	A 0.7	D 36.4 0.13 10	>	D 36.4						A 1.4 0.23	
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available	A 0.0 0.24 0	>	A 0.0	<	A 0.0 0.12 0	C 22.5 0.41 25	>	A 0.0	C 22.5 0.41 25	>	C 22.5							
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 7.9 0.59 73	A 2.3 0.07 17	>	A 7.1	A 0.0 0.10 20 50 50	A 1.9 0.07 21 50 29	A 1.9	C 32.6 0.59 61	>	C 32.6		C 32.6					B 11.1 0.59	
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 7.4 0.03 13 45 32	B 12.7 0.58 87	>	B 12.6	B 16.1 0.78 82 80 -2	A 8.0 0.52 76 40 13	A 4.5 0.06 27 40 13	B 11.0	C 23.5 0.24 25 100 75	B 19.5 0.21 47	>	C 20.2	C 24.9 0.11 13 30 17	C 24.3 0.05 14	>	C 24.5	B 13.5 0.64	
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	C 26.7 0.65 50 35 -15	B 19.8 0.60 84	B 14.1 0.06 15 35 20	B 20.0	B 17.6 0.51 73 30 -43	C 25.7 0.82 237	B 15.9 0.24 79 30 -49	C 23.7	D 44.8 0.88 85 45 -40	C 29.8 0.54 131	>	D 39.0	D 42.9 0.81 157 35 -122	C 28.1 0.43 493	C 25.2 0.05 35 0	D 36.7	C 26.9 0.78	
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	B 19.3 0.12 15	C 21.3 0.04 17	C 20.8						A 4.2 0.33 26 30 4	A 2.3 0.26 24	>	A 2.9	A 3.4 0.49 48	>	A 3.4	A 4.3 0.45		
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.05 0	>	A 0.0	<	A 0.0 0.00 0	>	A 0.0	A 0.0 0.00 0	>	A 0.0		A 0.0					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	<	A 0.0 0.00 0	>	A 0.0	A 0.0 0.14 0	>	A 0.0	>	A 0.0					A 0.0 0.00 0	>	A 0.0		
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.05 0	>	A 0.0	<	A 0.0 0.00 0	>		A 0.0	A 0.0 0.00 0	>	A 0.0						

MOE - Measure of Effectiveness
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control

LOS - Level of Service
V/C - Volume to Capacity Ratio
> - Shared Right-Turn Lane

< - Shared Left-Turn Lane
G - Queue Length
95th - 95th Percentile Queue Length (m)

Ex. - Existing Storage (m)
Avail. - Available Storage (m)

**TABLE 4.1C: BACKGROUND TRAFFIC OPERATIONAL CONDITIONS – ARENA PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
Arena Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					B 16.2 0.07 16 165 149	B 16.9 0.13 25 125 110	B 16.0 0.03 15 125 110	B 16.5	C 23.4 0.21 20 60 40	A 5.7 0.11 21	>	B 10.9	B 15.8 0.05 12 70 58	B 14.4 0.09 22	>	B 14.6	B 13.3 0.14
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	<	C 31.0 0.01 3	>	C 31.0	C 28.7 0.12 15 140 125	C 21.6 0.04 15	>	C 24.4	<	A 3.5 0.10 5		A 3.5		A 3.2 0.06 14	>	A 3.2	A 7.9 0.10
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 26.8 0.18 22 125 103	C 26.4 0.11 16 250	C 27.0 0.20 20 250 230	C 26.8	C 32.7 0.09 9 65 56		D 35.9 0.56 27	D 35.4		A 8.9 0.07 15 11 39	A 8.7 0.04 15	A 8.8	C 25.4 0.20 12 35 23	A 2.7 0.05 4		A 9.7	B 16.8 0.15
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	<	A 6.5 0.01 6	>	A 6.5	A 6.6 0.04 11 35 24	A 6.6 0.06 17	>	A 6.6	A 0.0 0.00 90 90	A 7.4 0.09 13	>	A 7.4	A 6.9 0.13 11 90 79	A 4.7 0.10 11	>	A 5.2	A 6.1 0.11
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available	A 1.1 0.05 1	>	A 1.1	A 1.1	<	A 1.3 0.03 0		A 1.3	D 35.7 0.03 4	>	D 35.7						A 1.6 0.04
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.04 0	>	A 0.0	<	A 0.0 0.02 0		A 0.0	A 9.5 0.03 14	>	A 9.5						
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 2.2 0.09 17	A 1.9 0.01 6	>	A 2.1	A 0.0 0.00 50 50	A 1.9 0.02 5 44	A 1.9	<	C 33.1 0.20 17	>	C 33.1						A 8.4 0.10
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 6.1 0.00 2 45 43	A 6.4 0.07 16	>	A 6.4	A 4.8 0.13 16 80 64	A 3.7 0.10 18 40 34	A 3.3 0.01 6 40 34	A 4.1	B 19.1 0.05 9 100 91	B 19.0 0.04 8 14	>	B 19.0	B 18.9 0.02 4 30 26	B 18.8 0.01 5	>	B 18.9	A 7.9 0.11
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	A 7.9 0.03 9 35 26	A 6.8 0.08 21 35 31	A 6.5 0.01 4	A 6.9	A 7.9 0.03 10 30 20	A 7.0 0.11 28 30 17	A 6.6 0.03 13 30 17	A 7.0	C 38.5 0.57 20 45 25	C 31.0 0.20 15	>	D 35.6	C 28.3 0.18 19 35 17	C 25.3 0.10 13 35 28	C 24.8 0.01 7 35 28	C 27.0	B 14.3 0.15
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 25.3 0.04 5		C 25.1 0.01 9	C 25.1					A 2.0 0.04 9 30 21	A 1.2 0.05 8	>	A 1.5		A 2.8 0.09 9	>	A 2.8	A 3.7 0.09
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.01 0	>	A 0.0	<	A 0.0 0.00 0		A 0.0	A 0.0 0.00 0	>	>	A 0.0					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	<	A 0.0 0.00 0	>	A 0.0	A 0.0 0.03 0	>	A 0.0	A 0.0			>		A 0.0 0.00 0	>	>	A 0.0	
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.01 0	>	A 0.0	<	A 0.0 0.00 0		A 0.0	A 0.0 0.00 0	>	>	A 0.0					

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

G - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)



4.4 Future Total Traffic

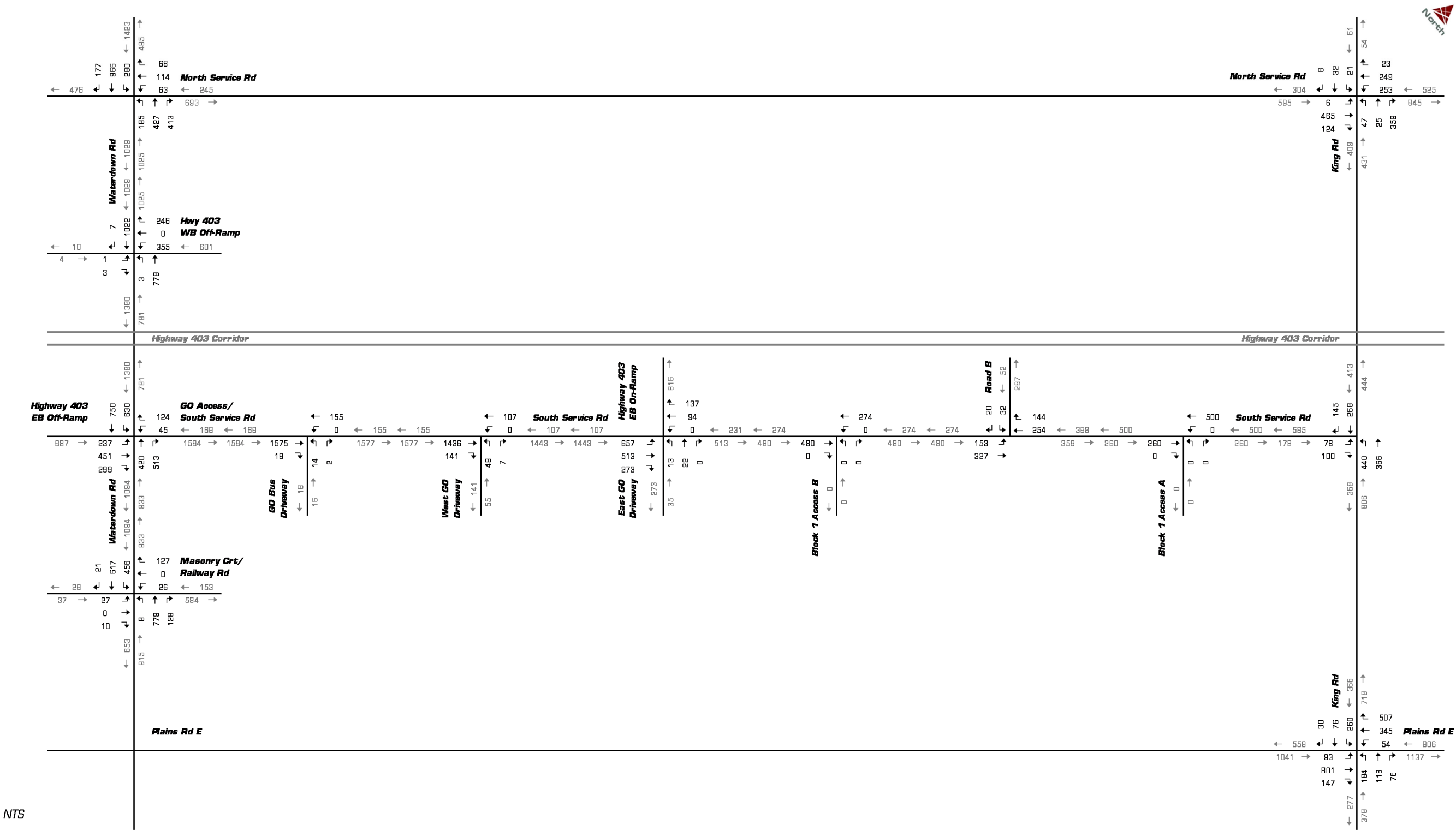
The future total traffic forecast scenarios contained in this section include the following:

1. Build-out of Phase 1 of the subject site (Year 2020);
2. Build-out of Phase 4 of the subject site (Year 2025); &
3. Build-out of Phase 5 of the subject site (Year 2030).

The Phase 1 build-out traffic volumes are a combination of the background traffic volumes (**Figure 4.1A** and **Figure 4.1B**) and the site generated traffic (**Figure 3.3A** and **Figure 3.3B**) and are illustrated in **Figure 4.3A** and **Figure 4.3B**.

The Phase 4 build-out traffic volumes are a combination of the background traffic volumes (**Figure 4.1A**, **Figure 4.1B** and **Figure 4.1C**) and the site generated traffic (**Figure 3.4A**, **Figure 3.4B** and **Figure 3.4C**) and are illustrated in **Figure 4.4A**, **Figure 4.4B** and **Figure 4.4C**.

The Phase 5 build-out traffic volumes are a combination of the background traffic volumes (**Figure 4.1A**, **Figure 4.1B** and **Figure 4.1C**) and the site generated traffic (**Figure 3.5A**, **Figure 3.5B** and **Figure 3.5C**) and are illustrated in **Figure 4.5A**, **Figure 4.5B** and **Figure 4.5C**.



NTS

1200 King Road
Traffic Impact Study

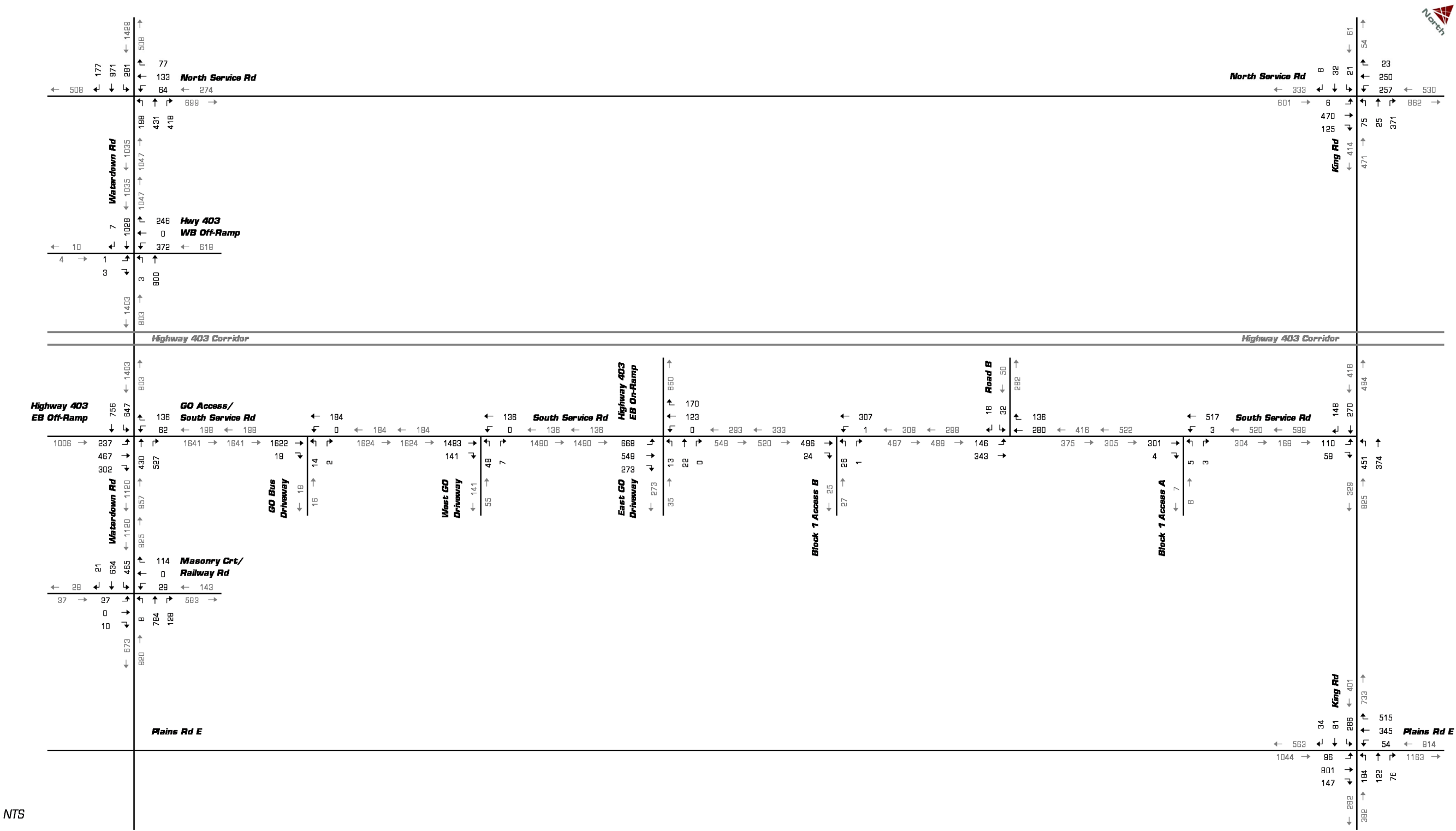


Figure 4.3A
Total Traffic Phase 1
- AM Peak Hour



Paradigm
www.ptsl.com

Figure 4.3B
Total Traffic Phase 1
- PM Peak Hour



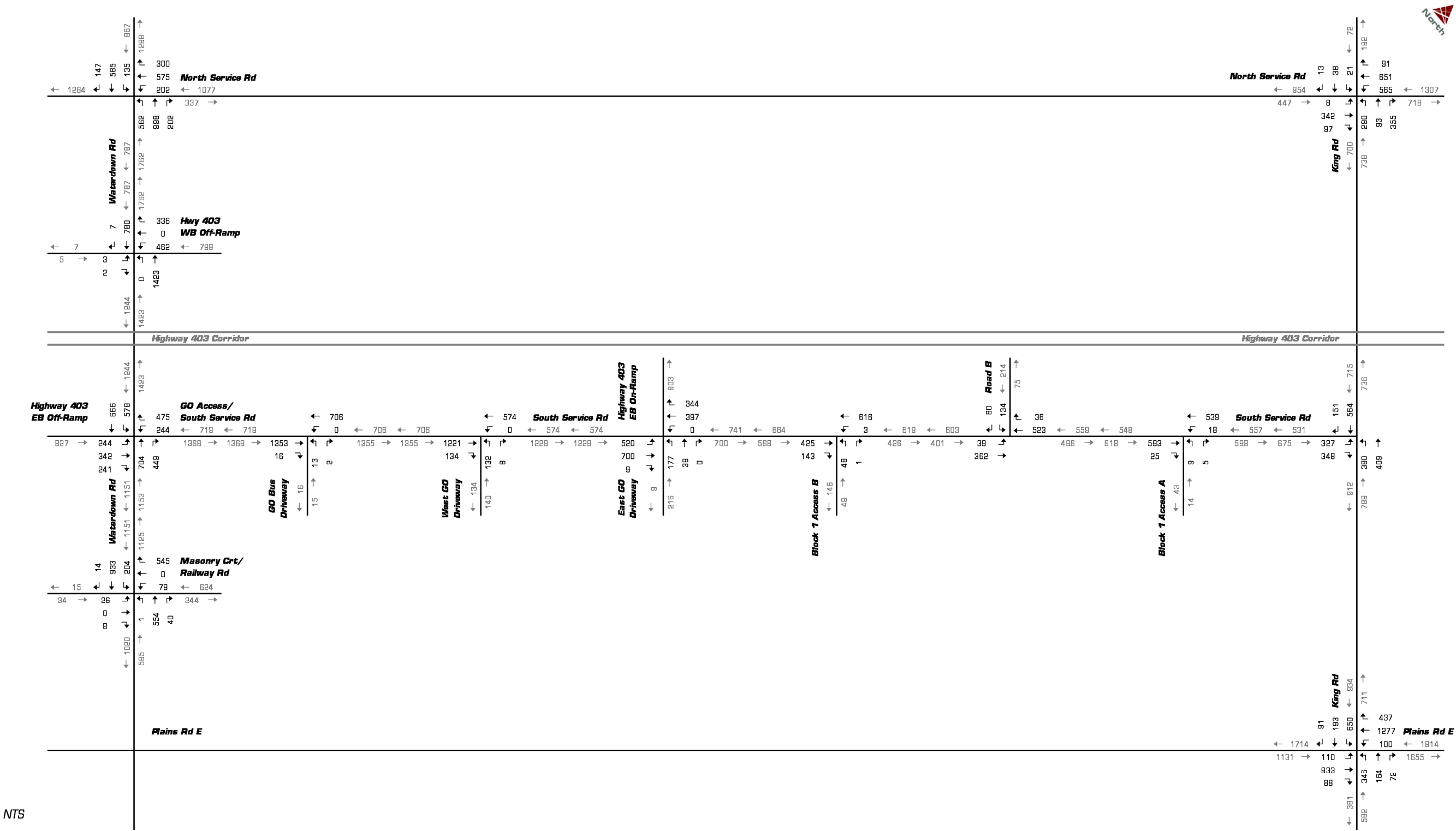
1200 King Road
Traffic Impact Study



Figure 4.4A
Total Traffic Phase 4
- AM Peak Hour


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NTS

1200 King Road
Traffic Impact Study



Figure 4.5B
Total Traffic Phase 5
- PM Peak Hour

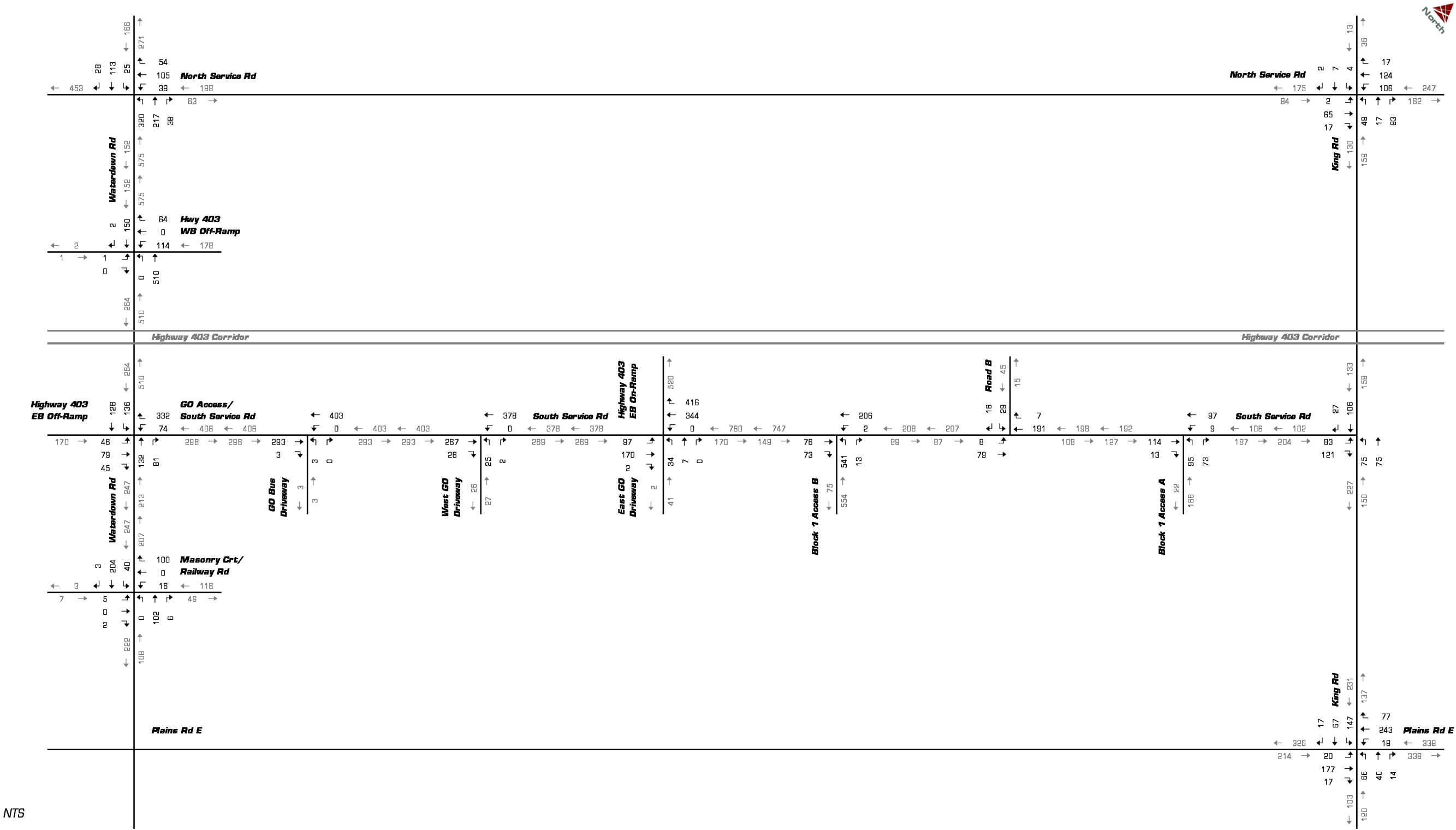


Figure 4.5C
Total Traffic Phase 5
- Arena Peak Hour



4.5 Future Total Traffic Operations

4.5.1 Phase 1 Total Traffic Operations

The operations of the study area intersections were evaluated using the same analytical approach that was used for the opening date background traffic operations along with the future total traffic volumes (**Figure 4.3A** and **Figure 4.3B**). The signal timings and offsets have been optimized. The resulting level of service conditions for the Phase 1 build-out condition are summarized in **Table 4.3A** and **Table 4.3B** and the following is noted:

AM Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs at the intersections within the study area. Overall, the study area intersections are forecast to operate with acceptable levels of service. Localized capacity and extensive queueing conditions are likely to occur at the Waterdown Road intersection with the South Service Road. Extensive queueing conditions are also likely to occur at the King Road intersections with Plains Road East and the South Service Road.
- ▶ The design of the proposed South Service Road intersection with King Road is discussed in **Section 5.0**.

PM Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs at the intersections within the study area. Overall, the study area intersections are forecast to operate with acceptable levels of service. Localized capacity and extensive queueing conditions are likely to occur at the Waterdown Road intersection with the South Service Road. Extensive queueing conditions are also likely to occur at the King Road intersections with the North Service Road, Plains Road East and the South Service Road.

Detailed Synchro 7.0 output is provided in **Appendix G**.

**TABLE 4.2A: TOTAL TRAFFIC PHASE 1 OPERATIONAL CONDITIONS – AM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
AM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					21.2 0.12 24 165 141	22.5 0.21 36 18 -	20.7 0.04 18 125 107	21.7	46.4 0.46 32 60 28	8.1 0.43 67 -> ->	> -> -> -> ->	15.0	15.7 0.68 53 70 18	19.9 0.69 99 -> ->	> -> -> -> ->	19.1	17.7 0.54
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	< -> -> -> ->	D 36.3 0.00 5 ->	> -> -> -> ->	D 36.3	C 29.6 0.52 54 140 86	C 22.2 0.28 37 -> ->	> -> -> -> ->	C 26.5	< -> -> -> ->	A 8.5 0.36 34 ->		A 8.5	A 2.8 0.45 31 -> ->	> -> -> -> ->	A 2.8	B 10.6 0.47	
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 24.5 0.47 111 125 14	D 40.2 0.86 177 -> ->	C 29.2 0.67 74 250 176	C 33.1	C 34.3 0.23 16 65 50	C 24.7 0.35 33 -> ->	C 27.3		B 12.5 0.44 74 -> ->	D 44.1 0.93 66 50 -16	C 29.8	C 29.8	D 40.4 0.90 85 35 -50	A 5.3 0.39 49 -> ->		C 21.3	C 27.2 0.85
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	< -> -> -> ->	C 31.1 0.03 16 ->	> -> -> -> ->	C 31.1	C 31.9 0.16 18 35 17	C 31.4 0.08 24 -> ->	> -> -> -> ->	C 31.5	B 11.5 0.02 10 90 80	B 16.0 0.52 108 -> ->	> -> -> -> ->	B 16.0	B 13.9 0.71 74 90 16	A 3.3 0.22 35 -> ->	> -> -> -> ->	A 7.7	B 13.2 0.63
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available		A 0.7 0.51 28 -> ->	> -> -> -> ->	A 0.7	< -> -> -> ->	A 1.0 0.05 10 -> ->		A 1.0	D 36.5 0.14 12 -> ->	> -> -> -> ->	> -> -> -> ->	D 36.5					A 1.1 0.49
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.56 77 -> ->	> -> -> -> ->	A 0.0	< -> -> -> ->	A 0.0 0.04 17 -> ->		A 0.0	E 46.3 0.39 17 -> ->	> -> -> -> ->	> -> -> -> ->	E 46.3					
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 3.6 0.63 77 -> ->	A 1.8 0.55 65 -> ->	> -> -> -> ->	A 2.6	A 0.0 0.00 0 50 50	A 1.7 0.06 13 -> ->	A 1.8 0.09 17 33	A 1.8	< -> -> -> ->	C 34.4 0.20 17 -> ->	> -> -> -> ->	C 34.4					A 3.1 0.58
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 6.4 0.01 12 45 33	B 10.7 0.48 89 -> ->	> -> -> -> ->	B 10.7	A 6.9 0.45 43 80 37	A 3.5 0.17 28 40 34	A 2.9 0.01 6 -> ->	A 5.1	D 38.1 0.23 19 100 81	B 18.4 0.17 57 -> ->	> -> -> -> ->	C 20.6	D 47.3 0.28 14 30 16	D 43.7 0.06 15 -> ->	> -> -> -> ->	D 45.0	B 12.8 0.45
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	B 13.7 0.20 28 35 7	B 17.2 0.49 65 -> ->	B 13.6 0.10 14 35 21	B 16.3	B 15.2 0.23 19 30 11	B 14.9 0.22 43 -> ->	B 16.7 0.33 57 30 -27	B 15.9	C 22.5 0.42 44 45 1	C 28.5 0.45 29 -> ->	> -> -> -> ->	C 25.6	D 36.4 0.61 43 35 -8	C 27.4 0.21 25 -> ->	C 26.2 0.02 11 35 24	C 33.7	B 19.9 0.49
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	D 51.8 0.42 37 ->		D 48.5 0.06 24 ->	D 50.0					A 4.9 0.56 52 30 -22	A 2.5 0.23 41 ->	> -> -> -> ->	A 3.8		A 8.9 0.32 61 -> ->	> -> -> -> ->	A 8.9	B 11.3 0.56
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.28 0 ->	> -> -> -> ->	A 0.0	< -> -> -> ->	A 0.0 0.00 0 -> ->		A 0.0	A 0.0 0.00 0 -> ->	> -> -> -> ->	> -> -> -> ->	A 0.0					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	< -> -> -> ->	A 3.7 0.13 40 ->	> -> -> -> ->	A 3.7		A 0.0 0.23 4 -> ->	> -> -> -> ->	A 0.0					B 13.0 0.10 17 -> ->		> -> -> -> ->	B 13.0	
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.15 0 ->	> -> -> -> ->	A 0.0	< -> -> -> ->	A 0.0 0.00 0 -> ->		A 0.0	A 0.0 0.00 0 -> ->	> -> -> -> ->	> -> -> -> ->	A 0.0					

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

D - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)

**TABLE 4.2B: TOTAL TRAFFIC PHASE 1 OPERATIONAL CONDITIONS – PM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	
PM Peak Hour	Waterdown Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available					B 15.7 0.32 156 165 9	C 31.5 0.84 284	B 10.3 0.18 161 125 -36	C 22.6 47.3 0.79 67 60 -7	B 12.0 0.72 80			C 22.4	C 23.1 0.59 32 70 38	C 24.4 0.57 83		C 24.2	C 22.9 0.81
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	<	D 35.2 0.00 7	>	D 35.2	C 24.7 0.28 41 140 99	C 21.6 0.55 71	>	C 22.9	<	A 9.8 0.65 40		A 9.8		A 9.7 0.37 51	>	A 9.7	B 12.7 0.65
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 32.4 0.65 72 125 53	C 28.2 0.46 53	D 36.4 0.72 84 250 166	C 32.7	D 39.1 0.62 32 65 33		F 81.3 1.03 67	E 68.6		C 21.4 0.59 63	B 12.4 0.28 52 50 -2	B 18.4	C 22.1 0.49 35 35 0	A 6.9 0.31 34		B 12.0	C 27.9 0.73
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	<	C 25.1 0.08	>	C 25.1	C 26.1 0.25 42 35 -7	C 30.4 0.59 89	>	C 29.9	A 8.8 0.00 2	B 10.4 0.25 42		B 10.4	A 2.7 0.32 32 90 58	A 2.1 0.34 43	>	A 2.2	B 12.2 0.43
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available	A 1.1 0.27 13	>	A 1.1		A 0.9	D 36.4 0.13 10	>	A 0.9		C 32.6 0.59 61		D 36.4					A 1.4 0.27
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available	A 0.0 0.28 10	>	A 0.0		A 0.0	D 30.4 0.50 27	>	A 0.0		C 32.6		D 30.4					
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 8.3 0.64 80	A 2.5 0.16 26	>	A 6.6	A 0.0 0.00 50 50	A 1.6 0.18 28	A 0.4 0.14 24 26	A 1.0	C 32.6 0.59 61			C 32.6					A 8.8 0.63
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 7.4 0.03 31 45 14	B 14.4 0.64 157	>	B 14.3	C 27.2 0.87 141 80 -61	A 9.3 0.54 450 21 40 19	A 5.2 0.06	B 16.4	C 29.9 0.72 113 100 -13	B 17.8 0.22 88		C 22.3	C 23.3 0.11 14 30 16	C 22.7 0.04 32	>	C 22.9	B 17.8 0.83
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	C 26.8 0.65 48 35 -13	B 20.0 0.60 83	B 14.2 0.06 26 35 9	C 20.1	B 17.7 0.51 73 30 -43	C 25.9 0.83 229	B 17.5 0.35 77 30 -47	C 23.8	D 47.7 0.89 78 45 -33	C 30.1 0.55 90		D 40.8	F 129.9 1.17 130 35 -95	C 28.3 0.46 471	C 25.1 0.05 23 35 12	F 96.8	D 39.3 0.84
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 28.7 0.66 86		B 17.4 0.15 168	C 23.2					B 13.3 0.63 43 30 -13	A 5.8 0.31 52		A 8.8		B 10.8 0.67 164	>	B 10.8	B 13.5 0.68
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.14 0	>	A 0.0	<	A 0.0 0.00 0		A 0.0	A 0.0 0.00 0			A 0.0					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	<	A 1.8 0.04 15		A 1.8		A 0.0 0.25 1	>	A 0.0					B 14.7 0.39 33		>	B 14.7	
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.25 18	>	A 0.0	<	A 0.0 0.00 0		A 0.0	A 0.0 0.00 0			A 0.0					

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

G - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)



4.5.2 Total Traffic Operations - Phase 4

The operations of the study area intersections were evaluated using the same analytical approach that was used for the opening date background traffic operations along with the future total traffic volumes (**Figure 4.3A**, **Figure 4.3B** and **Figure 4.3C**). The signal timings and offsets have been optimized. The resulting level of service conditions for the Phase 4 build-out condition are summarized in **Table 4.4A**, **Table 4.4B** and **Table 4.4C** the following is noted:

AM Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs at the intersections within the study area. Overall, the study area intersections are forecast to operate with acceptable levels of service. Localized capacity and extensive queueing conditions are likely to occur at the Waterdown Road intersections with the South Service Road and Masonry Court. The South Service Road intersection is beginning to approach capacity. Extensive queueing conditions are also likely to occur at the King Road intersections with Plains Road East and the South Service Road.

PM Peak Hour

- ▶ The planned and assumed capital works projects partially manage the future capacity needs at the majority of the intersections within the study area. Capacity and extensive queueing conditions are likely to occur along the Waterdown Road corridor. The King Road intersections are beginning to approach capacity.

Arena Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs within the study area. Some minor capacity issues are anticipated to occur at the Waterdown Road intersection with the South Service Road where the westbound right-turn will experience a v/c ratio of 0.85. As the peaking of traffic associated with the Arena is short lived this condition is likely to last several cycle lengths within the peak hour for the Arena.

Detailed Synchro 7.0 output is provided in **Appendix H**.

**TABLE 4.3A: TOTAL TRAFFIC PHASE 4 OPERATIONAL CONDITIONS – AM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
AM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					21.2 0.13 24 165 141	23.0 0.25 36 125 106	20.8 0.05 19	21.9	43.4 0.50 30 60 30	11.1 0.45 67	>	17.2	15.9 0.68 51 70 19	20.0 0.69 92	>	19.2	18.7 0.56
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	<	D 36.3 0.00 4	>	D 36.3	C 29.7 0.54 50 140 90	C 22.1 0.29 38	>	C 26.7	<	A 5.1 0.37 12		A 5.1		A 2.1 0.46 21	>	A 2.1	A 9.3 0.48
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 25.4 0.50 211 125 -86	D 51.9 0.93 389 -	C 31.6 0.71 330 250 -80	D 39.6	C 33.7 0.27 18 65 47	C 24.1 0.39 34	>	C 27.1	B 11.6 0.42 73	D 39.6 0.92 66 50 -16	>	C 27.0	D 48.4 0.95 98 35 -63	A 8.3 0.39 42	>	C 26.8	C 30.5 0.88
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	<	C 31.0 0.03 20	>	C 31.0	C 32.0 0.17 18 35 17	C 31.2 0.07 25	>	C 31.4	B 12.1 0.02 6 90 84	B 17.0 0.54 111	>	B 17.0	B 13.9 0.71 93 90 -3	A 3.6 0.23 38	>	A 7.9	B 13.6 0.63
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available	A 0.9 0.52 28	>	>	A 0.9	<	A 1.0 0.06 9	>	A 1.0	D 36.5 0.14 13	>	>	D 36.5					A 1.3 0.50
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available	A 0.0 0.58 11	>	>	A 0.0	<	A 0.0 0.05 0	>	A 0.0	F 52.6 0.43 28	>	>	F 52.6					
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 4.1 0.66 83	A 2.0 0.57 64	>	A 2.9	A 0.0 0.00 0 50 50	A 1.8 0.11 19 31	>	A 1.8	C 34.4 0.20 17	>	>	C 34.4					A 3.4 0.61
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 6.6 0.01 5 45 40	B 11.2 0.49 91	>	B 11.2	A 7.2 0.46 46 80 34	B 3.7 0.17 33 40 32	>	A 5.4	D 37.0 0.36 30 100 70	B 16.5 0.17 69	>	B 19.8	D 46.3 0.26 16 30 14	D 43.3 0.06 17	>	D 44.3	B 13.0 0.47
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	B 14.4 0.22 35 35 0	B 18.0 0.50 65	B 14.2 0.11 20 35 15	B 17.1	B 15.9 0.24 20 30 11	B 15.6 0.22 44 -	B 17.5 0.34 58 30 -28	B 16.7	C 22.4 0.40 43 45 2	C 28.7 0.46 51	>	C 25.7	C 34.9 0.59 47 35 -12	C 26.8 0.21 25	C 25.5 0.02 11 35 24	C 32.4	C 20.4 0.50
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	D 51.0 0.50 42		D 46.8 0.08 26	D 48.7					A 6.0 0.59 53 30 -23	A 3.0 0.24 44	>	A 4.7		B 11.1 0.34 58	>	B 11.1	B 13.7 0.59
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.31 0	>	A 0.0	<	A 0.0 0.00 0	>	A 0.0	B 12.0 0.05 14	>	>	B 12.0					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	<	A 3.5 0.13 40	>	A 3.5	A 0.0 0.24 3	>	A 0.0				>		B 13.2 0.10 17	>	>	B 13.2	
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.18 2	>	A 0.0	<	A 0.1 0.00 0	>	A 0.1	B 11.1 0.01 8	>	>	B 11.1					

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

D - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)

**TABLE 4.3B: TOTAL TRAFFIC PHASE 4 OPERATIONAL CONDITIONS – PM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
PM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					B 14.9 0.32 134 165 31	C 32.0 0.86 259 126 -	B 11.0 0.19 125 -1	C 23.0	E 56.6 0.89 100 60 -40	B 15.2 0.79 143 -	>	C 27.8	C 21.4 0.56 37 70 33	C 24.5 0.58 79 -	>	C 24.0	C 25.5 0.87
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	< 35.8 0.00 7 -	D 35.8	>	D 35.8	C 25.6 0.42 52 140 88	C 22.0 0.55 76 -	>	C 23.9	< 9.5 0.67 122 -	A 9.5		A 9.5	A 9.2 0.38 45 -	>	A 9.2	B 13.1 0.66	
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 32.3 0.64 74 125 51	C 34.1 0.69 74 -	D 36.7 0.72 70 250 180	C 34.3	D 38.0 0.66 35 65 30		F 89.8 1.06 81 -	E 72.5	C 22.1 0.62 106 -	B 16.4 0.46 64 50 -14	>	C 20.1	C 24.0 0.68 45 35 -10	A 6.3 0.33 32 -		B 13.6	C 29.9 0.76
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	< 24.9 0.08 16 -	C 24.9	>	C 24.9	C 26.0 0.26 47 35 -12	C 31.4 0.62 101 -	>	C 30.7	A 9.0 0.00 2 90 88	B 10.8 0.27 45 -	>	B 10.8	A 3.6 0.36 37 90 53	A 2.6 0.36 42 -	>	A 2.8	B 12.5 0.45
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available		A 1.2 0.36 26 -	>	A 1.2	< 0.9 0.19 19 -	A 0.9		A 0.9	D 36.4 0.13 11 -	>	>	D 36.4					A 1.4 0.35
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.39 51 -	>	A 0.0	< 0.0 0.18 0 -			A 0.0	F 69.5 0.76 52 -	>	>	F 69.5					
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 9.1 0.68 101 -	A 3.2 0.36 55 -	>	A 6.2	A 0.0 0.22 0 50 50	A 1.4 0.19 26 -	A 0.3 0.19 26 24	A 0.9	D 36.0 0.65 64 -	>	D 36.0						A 8.1 0.67
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 8.8 0.03 39 45 6	B 19.4 0.74 386 -	>	B 19.2	D 43.8 0.94 133 80 -53	B 10.1 0.55 464 40 19	A 5.7 0.06 21 -	C 24.0	D 36.4 0.83 151 100 -51	B 18.6 0.21 223 -	>	C 25.9	C 22.3 0.10 21 30 9	C 21.8 0.04 53 -	>	C 22.0	C 23.6 0.90
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	C 33.0 0.71 52 35 -17	C 20.3 0.61 87 -	B 14.4 0.06 12 35 23	C 21.1	C 18.3 0.52 72 30 -42	C 26.5 0.83 232 -	B 19.2 0.44 75 30 -45	C 24.4	D 48.2 0.90 78 45 -33	C 30.5 0.58 101 -	>	D 41.0	F 162.7 1.25 137 35 -102	C 28.4 0.48 528 -	C 25.0 0.06 17 35 18	F 119.6	D 45.2 0.86
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 31.7 0.76 96 -		B 17.5 0.19 353 -	C 24.7					D 42.0 0.89 55 30 -25	A 6.4 0.33 90 -	>	C 22.6		B 17.5 0.81 148 -	>	B 17.5	C 21.5 0.88
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.30 0 -	>	A 0.0	< 0.1 0.00 11 -	A 0.1		A 0.1	B 13.3 0.11 18 -	>	>	B 13.3					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	< 1.4 0.04 18 -		A 1.4	>	A 1.4	A 0.0 0.29 0 -	>	A 0.0					C 16.1 0.41 36 -		>	C 16.1	
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.33 139 -	>	A 0.0	< 0.6 0.02 15 -	A 0.6		A 0.6	B 12.6 0.03 11 -	>	>	B 12.6					

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

D - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail. - Available Storage (m)

**TABLE 4.3C: TOTAL TRAFFIC PHASE 4 OPERATIONAL CONDITIONS – ARENA PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
Arena Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					B 16.2 0.07 19 165 146	B 17.4 0.17 30 17 108	B 16.1 0.03 17 125 108	B 16.8 30.7 0.71 31 60 29	C 8.1 0.14 27 > > >	C 20.7	B 14.9 0.06 11 70 59	B 14.4 0.09 17 > > >	> > > > >	B 14.5	B 18.8 0.25		
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	< < < < <	C 31.0 0.01 4 > > >	> > > > >	C 31.0	C 27.4 0.22 22 140 118	C 20.1 0.05 17 > > >	> > > > >	C 24.5	< < < < <	A 3.8		A 6.1 0.06 15 > > >	> > > > >	A 6.1	A 8.5 0.21		
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 26.6 0.18 21 125 104	C 27.0 0.25 24 > > >	C 26.7 0.20 19 250 231	C 26.8	C 32.1 0.30 19 65 46		D 40.5 0.85 71 > > >	D 39.1		B 16.3 0.11 22 > > >	B 15.9 0.05 11 50 39	B 16.1	B 16.6 0.15 21 35 > > >	A 4.4 0.06 5 > > >	B 10.4	C 25.5 0.37	
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	< < < < <	A 7.7 0.01 5 > > >	> > > > >	A 7.7	A 7.8 0.05 9 35 26	A 7.9 0.06 17 > > >	> > > > >	A 7.9	A 0.0 0.00 0 90 90	A 6.8 0.08 10 > > >	A 6.8	A 8.6 0.14 11 90 79	A 4.3 0.12 13 > > >	> > > > >	A 5.0	A 6.2 0.12	
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available		A 1.1 0.08 6 > > >	> > > > >	A 1.1	< < < < <	A 1.1 0.13 12 > > >		A 1.1	D 35.7 0.03 5 > > >	> > > > >	D 35.7					A 1.3 0.12	
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.09 0 > > >	> > > > >	A 0.0	< < < < <	A 0.0 0.15 0 > > >		A 0.0	B 11.7 0.05 14 > > >	> > > > >	B 11.7						
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 1.8 0.12 22 > > >	A 1.5 0.09 17 > > >	> > > > >	A 1.6	A 0.0 0.00 0 50 50	A 2.6 0.23 29 > > >	A 2.9 0.27 27 23	A 2.8	< < < < <	C 33.1 0.20 17 > > >	> > > > >	C 33.1					A 3.7 0.26
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 8.6 0.00 1 45 44	A 9.1 0.09 18 > > >	> > > > >	A 9.1	A 6.2 0.15 16 80 64	A 4.9 0.11 16 40 35	A 4.5 0.01 5 40 35	A 5.4	A 9.2 0.15 19 100 81	A 1.6 0.05 20 > > >	A 4.1	B 16.9 0.01 4 30 26	B 16.9 0.01 5 > > >	> > > > >	B 16.9	A 5.9 0.15	
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	A 9.6 0.04 9 35 26	A 8.4 0.09 23 > > >	A 8.0 0.01 4 35 31	A 8.4	A 9.5 0.03 11 30 20	A 8.6 0.12 12 > > >	A 8.2 0.05 14 16	A 8.5	C 32.1 0.39 18 45 27	C 29.8 0.20 17 > > >	C 31.1	C 28.1 0.29 26 35 9	C 23.8 0.18 21 > > >	C 22.8 0.01 8 35 27	C 26.4	B 16.0 0.17	
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 23.3 0.31 29 > > >		C 22.0 0.07 17 > > >	C 22.5						A 3.7 0.09 15 30 15	A 2.6 0.06 14 > > >	A 3.1		A 2.2 0.11 14 > > >	> > > > >	A 2.2	B 11.1 0.16
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.08 0 > > >	> > > > >	A 0.0	< < < < <	A 0.1 0.00 0 > > >		A 0.1	C 21.7 0.75 85 > > >	> > > > >	C 21.7						
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	< < < < <	A 0.8 0.01 4 > > >	> > > > >	A 0.8		A 0.0 0.11 0 > > >	> > > > >	A 0.0					A 9.7 0.06 14 > > >	> > > > >	A 9.7		
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.07 0 > > >	> > > > >	A 0.0	< < < < <	A 0.8 0.01 4 > > >		A 0.8	B 10.1 0.20 22 > > >	> > > > >	B 10.1						

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

G - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)



4.5.3 Total Traffic Operations - Phase 5

The operations of the study area intersections were evaluated using the same analytical approach that was used for the opening date background traffic operations along with the future total traffic volumes (**Figure 4.5A**, **Figure 4.5B** and **Figure 4.5C**). The signal timings and offsets have been optimized. The resulting level of service conditions for the Phase 5 build-out condition are summarized in **Table 4.4A**, **Table 4.4B** and **Table 4.4C** the following is noted:

AM Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs at the intersections within the study area. Overall, the study area intersections are forecast to operate with acceptable levels of service. Localized capacity and extensive queueing conditions are likely to occur at the Waterdown Road intersections with the South Service Road and Masonry Court. The South Service Road intersection is beginning to approach capacity. Extensive queueing conditions are also likely to occur at the King Road intersections with Plains Road East and the South Service Road.

PM Peak Hour

- ▶ The planned and assumed capital works projects partially manage the future capacity needs at the majority of the intersections within the study area. Capacity and extensive queueing conditions are likely to occur along the Waterdown Road corridor. The King Road intersections are beginning to approach capacity.

Arena Peak Hour

- ▶ The planned and assumed capital works projects adequately manage the future capacity needs within the study area. Some minor capacity issues are anticipated to occur at the Waterdown Road intersection with the South Service Road where the westbound right-turn will experience a v/c ratio of 0.85. As the peaking of traffic associated with the Arena is short lived this condition is likely to last several cycle lengths within the peak hour of the Arena.

Detailed Synchro 7.0 output is provided in **Appendix I**.

**TABLE 4.4A: TOTAL TRAFFIC PHASE 5 OPERATIONAL CONDITIONS – AM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
AM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					C 26.0 0.14 24 165 141	C 28.0 0.26 40 20 105	C 25.5 0.05 20 125 105	C 26.8 0.56 45 60 15	D 49.9 0.43 62 70 11	A 5.9 0.43 62 70 11	> > > > >	B 16.1 14.5 0.65 59 11	B 0.65 0.66 93 70 11	B 19.9 0.66 93 70 11	> > > > >	B 18.8 18.5 0.53	B 18.5 0.53
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	< 41.3 0.00 6 - >	D 41.3 0.57 58 140 83	> > > > >	D 33.5 0.34 42 - 83	C 25.6 0.34 42 -	> > > > >	C 30.5 10.4 0.41 54 -	< < < < <	B 10.4 0.41 54 -		A 2.3 0.45 34 -	> > > > >	A 2.3 0.45 34 -	B 12.3 0.49	B 12.3 0.49		
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 27.1 0.47 192 125 -67	E 56.2 0.94 392 250 -117	C 32.0 0.67 367 250 -117	D 42.6 0.55 24 65 41	D 44.5 0.55 24 65 41	D 35.2 0.64 49 -	D 38.3 0.64 49 -	B 14.9 0.42 104 -	E 59.6 1.02 71 50 -21	D 40.2 64.9 1.01 182 -147	E 64.9 1.01 182 35 -	A 6.1 0.39 96 -		C 34.4 38.4 0.96	D 38.4 0.96	D 38.4 0.96	
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	< D 35.9 0.03 21 - >	D 35.9 0.17 18 35 17	> D 36.1 0.07 25 - >	D 36.8 0.17 18 35 17	D 36.1 0.07 25 -	> > > > >	D 36.2 10.7 0.02 7 90 83	B 15.1 0.49 120 -	B 15.1 0.49 120 -	> > > > >	B 15.0 19.4 0.73 89 90 1	A 4.7 0.24 46 -	> > > > >	B 10.5 14.4 0.66	B 14.4 0.66	B 14.4 0.66	
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available		A 2.6 0.56 58 - >	> A 2.6 0.56 58 - >	A 2.6 0.56 58 -	< 1.1 0.10 15 - >	A 1.1 0.10 15 -		A 1.1 0.10 15 -	D 36.5 0.14 12 -	D 36.5 0.14 12 -	> > > > >	D 36.5 0.14 12 -				A 2.6 0.54	A 2.6 0.54
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.63 48 - >	> A 0.0 0.63 48 - >	A 0.0 0.63 48 -	< 0.0 0.11 0 - >	A 0.0 0.11 0 -		A 0.0 0.11 0 -	F 84.9 0.58 38 -	F 84.9 0.58 38 -	> > > > >	F 84.9 0.58 38 -					
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 8.1 0.75 106 - >	A 4.3 0.65 89 - >	> A 5.9 0.75 89 - >	A 5.9 0.75 89 -	A 0.0 0.00 0 50 50	A 2.1 0.18 25 -	A 2.0 0.15 22 28	A 2.1 0.15 22 28	C 34.4 0.20 16 -	C 34.4 0.20 16 -	> > > > >	C 34.4 0.20 16 -				A 5.4 0.69	A 5.4 0.69
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 6.6 0.01 5 45 40	B 11.2 0.49 89 - >	> B 11.2 0.49 89 - >	B 11.2 0.49 89 -	A 7.3 0.49 50 80 30	A 3.6 0.17 29 40 33	A 3.0 0.01 7 40 33	A 5.4 0.29 24 100 76	D 36.3 0.19 70 -	B 18.7 0.19 70 -	> > > > >	C 20.9 48.4 0.33 18 30 12	D 48.4 0.33 18 30 12	A 43.5 0.06 19 -	> > > > >	D 45.2 13.3 0.46	B 13.3 0.46
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	B 14.5 0.22 34 35 1	B 18.1 0.50 55 - 15	B 14.3 0.11 20 35 15	B 17.3 0.24 21 30 9	B 16.0 0.22 21 30 9	B 15.7 0.22 21 30 9	B 17.9 0.36 60 30 -30	B 17.0 0.40 44 45 1	C 22.3 0.40 54 -	C 28.8 0.48 54 -	> > > > >	C 25.7 38.3 0.70 68 35 -33	D 26.9 0.23 28 -	C 25.5 0.02 10 35 25	D 35.1 21.2 0.52	C 21.2 0.52	C 21.2 0.52
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	D 51.1 0.54 44 -		D 46.3 0.12 34 -	D 48.2 0.12 34 -				A 8.0 0.66 61 30 -31	A 3.3 0.25 64 -	A 3.3 0.25 64 -	> > > > >	A 6.0 13.7 0.38 80 -	B 13.7 0.38 80 -	> > > > >	B 13.7 16.2 0.65	B 16.2 0.65	B 16.2 0.65
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.36 0 - >	> A 0.0 0.36 0 - >	A 0.0 0.36 0 -	< 0.0 0.00 4 - >	A 0.0 0.00 4 -		A 0.0 0.00 4 -	B 12.8 0.05 14 -	B 12.8 0.05 14 -	> > > > >	B 12.8 0.05 14 -					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	< 3.2 0.12 44 - >	A 3.2 0.12 44 -	> A 3.2 0.12 44 - >	A 3.2 0.12 44 -		A 0.0 0.27 4 - >	> A 0.0 0.27 4 - >	A 0.0 0.27 4 -			> > > > >	B 13.7 0.10 15 -		> > > > >	B 13.7		
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.23 0 - >	> A 0.0 0.23 0 - >	A 0.0 0.23 0 -	< 0.0 0.00 4 - >	A 0.1 0.00 4 -		A 0.1 0.01 7 -	B 11.6 0.01 7 -	B 11.6 0.01 7 -	> > > > >	B 11.6 0.01 7 -					

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

D - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)

**TABLE 4.4B: TOTAL TRAFFIC PHASE 5 OPERATIONAL CONDITIONS – PM PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	OVERALL
PM Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					B 16.5 0.35 104 165 61	D 38.7 0.91 196 -	B 11.7 0.20 111 125 14	C 27.0	E 56.4 0.93 94 60 34	B 13.4 0.77 126 -	>	C 27.1	B 20.0 0.55 30 70 40	C 23.6 0.57 65 -	>	C 23.1	C 26.1 0.88
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	< 36.3 0.00 8 -	D 36.3	>	D 36.3	C 26.0 0.50 56 140 84	C 21.9 0.55 60 -	>	C 24.3	< 9.3 0.68 52 -	A 9.3		B 10.6 0.39 54 -	>	B 10.6	B 13.6 0.67		
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 30.8 0.62 145 125 20	D 46.2 0.86 259 -	D 35.2 0.71 188 250 62	D 38.4	D 50.2 0.86 96 65 31		F 112.9 1.11 107 -	F 91.7	C 26.8 0.72 94 -	C 29.1 0.73 70 50 20	C 27.7	C 25.2 0.76 59 35 24	A 5.8 0.34 30 -		B 14.8	D 37.5 0.89	
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	< 24.8 0.11 25 -	C 24.8	>	C 24.8	C 25.3 0.24 42 35 7	C 31.7 0.65 75 -	>	C 30.9	A 9.4 0.01 2 90 88	B 11.6 0.32 54 -	B 11.6	A 4.1 0.38 31 90 59	A 3.0 0.39 46 -	>	A 3.2	B 12.8 0.48	
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available		A 0.8 0.45 66 -	>	A 0.8	< 1.0 0.22 25 -	A 1.0	D 37.7 0.22 22 -		A 1.0	D 37.7	>	D 37.7				A 1.1 0.43	
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.48 94 -	>	A 0.0	< 0.0 0.23 0 -		A 0.0	F 186.8 1.13 51 -	>	F 186.8							
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 9.6 0.75 119 -	A 2.1 0.51 60 -	>	A 5.3	A 0.0 0.00 0 50 50	A 2.5 0.28 33 -	A 2.8 0.21 25 25	A 2.6	D 42.4 0.73 63 -	>	D 42.4					A 8.1 0.74	
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 8.9 0.03 24 45 21	B 19.9 0.74 292 -	>	B 19.7	D 45.9 0.96 137 80 57	A 9.6 0.54 464 40 19	A 5.4 0.06 21 -	C 25.0	C 35.0 0.84 156 100 56	B 12.2 0.23 255 -	>	C 21.2	C 23.1 0.12 13 30 17	C 22.4 0.05 40 -	>	C 22.6	C 22.9 0.92
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	C 33.0 0.71 51 35 16	C 20.3 0.61 84 -	B 14.4 0.06 27 35 8	C 21.1	B 18.3 0.52 71 30 41	C 26.5 0.83 239 -	B 20.0 0.48 71 30 41	C 24.5	D 48.2 0.90 78 45 33	C 30.5 0.58 97 -	>	D 41.0	F 216.1 1.37 130 35 95	C 28.4 0.48 446 -	C 25.0 0.06 21 35 14	F 158.7	D 53.9 0.88
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 33.3 0.78 96 -		C 20.3 0.22 331 -	C 26.6					E 58.9 0.96 59 30 29	A 6.6 0.33 72 -	>	C 31.8		C 26.3 0.88 138 -	>	C 26.3	C 28.4 0.93
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.33 1 -	>	A 0.0	< 0.1 0.00 14 -	A 0.1	B 14.0 0.11 16 -		A 0.1	B 14.0 0.11 16 -	>	B 14.0					
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	< 1.2 0.04 15 -	A 1.2		A 1.2		A 0.0 0.33 1 -	>	A 0.0					C 17.3 0.42 35 -		>	C 17.3	
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.36 85 -	>	A 0.0	< 0.5 0.02 21 -	A 0.5	B 13.2 0.03 14 -		A 0.5	B 13.2 0.03 14 -	>	B 13.2					

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

D - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)

**TABLE 4.4C: TOTAL TRAFFIC PHASE 5 OPERATIONAL CONDITIONS – ARENA PEAK HOUR**

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																OVERALL
				EB - LEFT	EB - THROUGH	EB - RIGHT	EB APPROACH	WB - LEFT	WB - THROUGH	WB - RIGHT	WB APPROACH	NB - LEFT	NB - THROUGH	NB - RIGHT	NB APPROACH	SB - LEFT	SB - THROUGH	SB - RIGHT	SB APPROACH	
Arena Peak Hour	Waterdown Rd & North Service Road	TCS	LOS Delay V/C 95th Storage Available					B 16.2 0.07 19 165 146	B 17.3 0.17 30 125 108	B 16.1 0.03 17 60 -	B 16.8 0.73 47 13 -	A 6.5 0.14 26 -	> > >	C 21.0	B 14.9 0.06 13 70 57	B 14.5 0.09 20 -	> > >	B 14.5	B 19.0 0.25	
	Waterdown Rd & Hwy 403 WB Off-Ramp	TCS	LOS Delay V/C 95th Storage Available	< < < <	C 31.0 0.01 3 >	> > > >	C 31.0	C 27.3 0.24 24 140 116	B 19.8 0.04 17 -	> > > >	C 24.6	< < < <	A 3.5 0.22 20 -		A 3.5	A 6.5 0.06 14 -	> > >	A 6.5	A 8.5 0.21	
	Waterdown Rd & Hwy 403 EB Off-Ramp/South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 26.4 0.18 20 125 105	C 27.1 0.29 30 250 -	C 26.5 0.19 22 250 228	C 26.7	C 31.2 0.28 20 65 45	D 48.1 0.89 62 -	D 45.0		B 15.8 0.10 22 -	B 15.5 0.05 14 50 36	B 15.7	B 18.3 0.19 22 35 13	A 4.3 0.06 5 -		B 11.5	C 27.7 0.37	
	Waterdown Rd & Masonry Crt./Railway Rd	TCS	LOS Delay V/C 95th Storage Available	< < < <	A 7.7 0.01 5 >	> > > >	A 7.7	A 7.8 0.05 11 35 24	A 7.9 0.06 17 -	> > > >	A 7.9	A 0.0 0.00 90 90 -	A 6.8 0.09 13 -	> > > >	A 6.8	A 8.6 0.14 12 90 78	A 4.3 0.12 16 -	> > >	A 5.0	A 6.2 0.13
	South Service Rd & GO Bus Driveway	TCS	LOS Delay V/C 95th Storage Available	A 1.1 0.09 5 -	> > > >	A 1.1	< < < <	A 1.1 0.13 9 -		A 1.1	D 35.7 0.03 4 -	> > > >	D 35.7							A 1.3 0.12
	South Service Rd & West GO Driveway	TWSC	LOS Delay V/C 95th Storage Available	A 0.0 0.10 0 -	> > > >	A 0.0	< < < <	A 0.0 0.15 0 -		A 0.0	B 12.0 0.05 14 -	> > > >	B 12.0							
	South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp	TCS	LOS Delay V/C 95th Storage Available	A 1.7 0.12 23 -	A 1.5 0.12 16 -	> > > >	A 1.6	A 0.0 0.00 50 50 -	A 2.6 0.24 30 -	A 2.8 0.26 26 24 -	A 2.8	< < < <	C 33.1 0.20 21 -	> > > >	C 33.1					A 3.6 0.25
	King Rd & North Service Rd	TCS	LOS Delay V/C 95th Storage Available	A 8.6 0.00 3 42	A 9.1 0.09 17 -	> > > >	A 9.1	A 6.2 0.15 17 80 63	A 4.9 0.11 17 40 36	A 4.5 0.01 4 -	A 5.5	A 9.5 0.14 18 100 82	A 2.6 0.05 16 -	> > > >	A 4.7	B 16.9 0.01 5 30 25	B 16.9 0.01 6 -	> > >	B 16.9	A 6.1 0.15
	King Rd & Plains Rd E	TCS	LOS Delay V/C 95th Storage Available	A 9.6 0.04 9 35 26	A 8.4 0.09 22 -	A 8.0 0.01 35 30	A 8.5	A 9.6 0.03 10 30 20	A 8.6 0.12 32 -	A 8.3 0.05 15 15	A 8.6	C 32.0 0.38 21 45 24	C 29.8 0.22 18 -	> > > >	C 31.0	C 28.3 0.31 25 35 10	C 23.8 0.17 23 -	C 22.8 0.01 8 35 27	C 26.6	B 16.1 0.17
	King Rd & South Service Rd	TCS	LOS Delay V/C 95th Storage Available	C 23.3 0.31 28 -		C 22.0 0.08 19	C 22.5					A 3.7 0.10 17 30 14	A 2.6 0.06 13 -		A 3.2		A 1.9 0.11 17 -	> > >	A 1.9	B 10.9 0.16
	South Service Rd & Block 1 Access B	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.09 0 -	> > > >	A 0.0	< < < <	A 0.1 0.00 3 -		A 0.1	C 20.2 0.71 70 -	> > > >	C 20.2						
	South Service Rd & Road B	TWSC	LOS Delay V/C 95th Storage Available	< < < <	A 0.7 0.01 6 -		A 0.7	A 0.0 0.12 0 -	> > > >	A 0.0						A 9.7 0.06 15 -		> > >	A 9.7	
	South Service Rd & Block 1 Access A	TWSC	LOS Delay V/C 95th Storage Available		A 0.0 0.07 3 -	> > > >	A 0.0	< < < <	A 0.7 0.01 0 -		A 0.7	B 10.1 0.19 20 -	> > > >	B 10.1						

MOE - Measure of Effectiveness

TCS - Traffic Control Signal

TWSC - Two-Way Stop Control

LOS - Level of Service

V/C - Volume to Capacity Ratio

> - Shared Right-Turn Lane

< - Shared Left-Turn Lane

G - Queue Length

95th - 95th Percentile Queue Length (m)

Ex - Existing Storage (m)

Avail - Available Storage (m)



5.0 REMEDIAL MEASURES

The level of service conditions outlined in **Section 4.0** indicate that the study area intersections are anticipated to operate with high levels of delay with extensive queuing conditions following the build-out of Phase 1, Phase 4 and ultimately the build-out of the subject site (Phase 5). The build-out of the site is estimated to occur at approximately 5 percent per year and could take up-to 20 years to fully develop. However, market conditions could hasten or delay build-out.

The following section discusses potential remedial measures that should be considered to accommodate the build-out of the subject site.

5.1 King Road Driveway Connections

The private driveway connections proposed to King Road that may service the proposed Mixed Retail & Service blocks may require additional study. When a site plan is developed for Lots 11-14 an access review should be undertaken. The proximity of Lots 13 and 14 to the CNR underpass may result in inadequate sightlines for vehicles approaching a potential driveway location or for vehicles entering the King Road right-of-way.

5.2 King Road and South Service Road Intersection

The preliminary design for the South Service Road intersection with King Road is illustrated in **Figure 4.2B**. The intersection is to be located approximately 120 metres south of Hydro Lane and will be developed as a signalized intersection. The design includes a single travel lane in the northbound and southbound directions with a centre two-way left-turn lane to accommodate turning movements. As outlined in **Table 4.4A-C** the northbound left-turn movement is anticipated to require roughly 65 metres of storage in order to accommodate the estimated 95th percentile queue length. The centre two-way left-turn lane will be able to support queue lengths of this extent. The queueing of vehicles may impact the operation of adjacent private driveways along King Road.

The eastbound approach of the South Service Road is anticipated to be developed with a separate left-turn and right-turn lane. Dedicated left-turn lanes will be provided at future driveway connections to the South Service Road. Driveway locations will be determined during the site plan approval stage of development.

5.3 Study Area Intersection Remedial Measures

To accommodate the forecast traffic volumes associated with the development of the subject site a number of remedial measures are required. **Table 5.1** summarizes the significant remedial measures necessary to reasonably maintain acceptable intersection operations. It is assumed that the City and MTO will continue to monitor the study area intersections and optimize signal timings and offsets on an on-going and as needed basis. The planned capital works projects in the area are outlined in **Section 4.2**.

The potential improvements required along the Waterdown Road corridor between the Highway 403 Westbound Off-Ramp and Masonry Court, specifically at the South Service Road intersection will require an investigation into the detailed design to confirm the ability of the existing bridge structures to accommodate the expanded lane geometry. In the longer term, Year 2030, the bridge structures over the Highway 403 and the CNR corridors may need to be expanded in order to maintain acceptable levels of service at the study area intersections.

**TABLE 5.1: POTENTIAL REMEDIAL MEASURES**

Intersection	Remedial Measure	Obligation
Waterdown Road & North Service Road	Storage lane length modifications.	On-going monitoring required to confirm future capacity needs.
Waterdown Road & Highway 403 Westbound Off-Ramp	-	On-going monitoring required to confirm future capacity needs.
Waterdown Road & Highway 403 Eastbound Off-Ramp/South Service Road	Dual southbound left-turn lanes. Impact to the Highway 403 Bridge. Detailed design required.	Outside planned Capital Work projects
	Northbound right-turn lane. Impact to CNR bridge. Detailed design required.	Outside planned Capital Work projects
	Storage lane length modifications.	Ongoing monitoring required to confirm future queueing demands.
Waterdown Road & Masonry Court/Railway Road	Storage lane length modifications.	Ongoing monitoring required to confirm future queueing demands.
	Waterdown Road geometric expansion from two to four lanes. Including reconstruction of the Highway 403 bridge structure.	Part of the planned Capital Works. Class EA study complete.
South Service Road & GO Bus Driveway	-	On-going monitoring required to confirm future capacity needs.
South Service Road & West GO Driveway	-	GO Transit responsible for maintaining reasonable access to private driveway.
South Service Road & East GO Driveway/Highway 403 Eastbound On-Ramp	New South Service Road connection on east leg. Modifications to signal timings and lane geometrics to support the new connection.	Developed as part of subject site.



King Road & North Service Rd	King Road geometric expansion from two to four lanes. Including reconstruction of the Highway 403 bridge structure.	Part of the planned Capital Works.
King Road & South Service Rd	New signalized intersection. Modifications to lane geometrics to support the new connection.	Developed as part of subject site.
King Road & Plains Road East	Dual southbound left-turn lanes.	Outside planned Capital Work projects
	Westbound right-turn lane.	Outside planned Capital Work projects



6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Based on the investigations carried out, the study findings and conclusions are summarized as follows:

- ▶ **Proposed Development:** The proposed development is located at 1200 King Road in the City of Burlington. Penta Properties Inc. is proposing to develop the approximately 50 hectare parcel of land bound by King Road to the east, the Aldershot Go Station to the west, Highway 403 to the north and the CNR tracks to the south.

The development is planned to consist of mixed use, business corridor, and employment commercial lots totaling 1,164,830 square feet of GFA as well as a recreation facility (Arena) with seating for up to 9,000 people and approximately 2,000 high-rise apartment units. At this time there is no concept plan for the size and scale of buildings on the lands nor is the anchor tenant of the Arena facility known.

- ▶ **Development Generated Traffic:** The Phase 5 full build-out of the subject site is estimated to generate approximately 2,240 total vehicle trips during the AM peak hour, 3,009 total vehicle trips during the PM peak hour and approximately 1,588 total vehicle trips during an Arena peak hour. The site's modal split is anticipated to be 30 percent and will reduce the site's net trip generation to approximately 1,621 AM peak hour trips, 2,079 PM peak hour trips, and 1,121 Arena peak hour trips.

To achieve the modal split target it is imperative that transit services be provided along the South Service Road and King Road and that sidewalk be provided within the subject lands.

- ▶ **Site Design:** The private driveway connections proposed to King Road that may service the proposed Mixed Retail & Service blocks may require additional study. When a site plan is developed for Lots 11-14 an access review should be undertaken. The proximity of Lots 13 and 14 to the CNR underpass may result in inadequate sightlines for vehicles approaching a potential driveway location or for vehicles entering the King Road right-of-way.
- ▶ **Study Area:** The study area is generally defined as the Waterdown Road corridor from the North Service Road to Masonry Court, the King Road corridor from the North Service Road to Plains Road East and the South Service Road from Waterdown Road to its existing termination and ultimately the extension to King Road.
- ▶ **Existing Traffic Conditions:** Several of the existing signalized intersections within the study area are operating with high levels of delay during the PM Peak hour. The Waterdown Road intersection with the South Service Road and the King Road intersection with Plains Road East are considered to be at or approaching capacity. A number of capital works projects are planned for Waterdown Road and King Road that will assist in managing the future capacity needs of the area.
- ▶ **Forecast Traffic:** The forecast background traffic volumes in the vicinity of the subject site have been assessed for three horizon years. Namely the anticipated completion date of Phase 1 (Year 2020), the completion of Phase 4 (Year 2025) and the Phase 5 full build-out of the subject site (Year 2030). Market conditions could hasten or delay build-out. Initial estimates suggest build-out will occur at roughly 5 percent per year with the residential lands coming online near full build-out. The likely



future traffic volumes in the vicinity of the subject site are estimated to consist of traffic generated by the future development of:

- The Eagle Heights Subdivision;
- The Grindstone Holding Lands on Flatt Road;
- 101 Masonry Court Townhouse/Condominium Development;
- The Future expansion of the GO Transit Aldershot Station parking area; &
- Traffic generated by the build-out of the subject site.

- ▶ **Future Traffic Conditions:** Remedial measures will be required in the future to accommodate the forecast traffic volumes. With the estimated future traffic the peak hour traffic conditions at the key intersections in the study area are expected to continue to experience some congestion for the critical movements during the peak hours. The planned and assumed capital work projects will assist in managing the future capacity needs of the study area.

The capacity issues outlined under existing and background traffic conditions are anticipated to occur with or without the development of the subject lands. Remedial measures beyond those planned in the capital works will be required to accommodate the forecast traffic volumes with or without the development of the subject site.

- ▶ **Geometric & Traffic Control Improvements:** To accommodate the forecast traffic volumes associated with the development of the subject site and other developments a number of remedial measures are required. **Table 6.1** summarizes the potential remedial measures necessary to reasonably maintain acceptable long-term (Year 2030) intersection operations.

TABLE 6.1: POTENTIAL REMEDIAL MEASURES

Intersection	Remedial Measure	Obligation
Waterdown Road & North Service Road	Storage lane length modifications.	On-going monitoring required to confirm future capacity needs.
Waterdown Road & Highway 403 Westbound Off-Ramp	-	On-going monitoring required to confirm future capacity needs.
Waterdown Road & Highway 403 Eastbound Off-Ramp/South Service Road	Dual southbound left-turn lanes. Impact to the Highway 403 Bridge. Detailed design required.	Outside planned Capital Work projects
	Northbound right-turn lane. Impact to CNR bridge. Detailed design required.	Outside planned Capital Work projects
	Storage lane length modifications.	Ongoing monitoring required to confirm future queueing demands.



Waterdown Road & Masonry Court/Railway Road	Storage lane length modifications.	Ongoing monitoring required to confirm future queueing demands.
	Waterdown Road geometric expansion from two to four lanes. Including reconstruction of the Highway 403 bridge structure.	Part of the planned Capital Works. Class EA study complete.
South Service Road & GO Bus Driveway	-	On-going monitoring required to confirm future capacity needs.
South Service Road & West GO Driveway	-	GO Transit responsible for maintaining reasonable access to private driveway.
South Service Road & East GO Driveway/Highway 403 Eastbound On-Ramp	New South Service Road connection on east leg. Modifications to signal timings and lane geometrics to support the new connection.	Developed as part of subject site.
King Road & North Service Rd	King Road geometric expansion from two to four lanes. Including reconstruction of the Highway 403 bridge structure.	Part of the planned Capital Works.
King Road & South Service Rd	New signalized intersection. Modifications to lane geometrics to support the new connection.	Developed as part of subject site.
King Road & Plains Road East	Dual southbound left-turn lanes.	Outside planned Capital Work projects
	Westbound right-turn lane.	Outside planned Capital Work projects

6.2 Recommendations

Based on the findings of this study, it is recommended that:

- ▶ To achieve the modal split target of 30 percent it is imperative that transit services be provided along the South Service Road and King Road and that pedestrian facilities be developed within the subject lands.

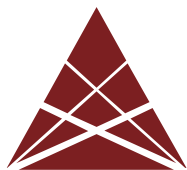


- ▶ The City of Burlington consider modify or adding additional transit routes to operate along the South Service Road.
- ▶ The remedial measures outline in **Table 6.1** be reviewed by the City of Burlington and the MTO to determine the appropriateness of the future lane geometrics and the potential design constraints that will need to be addressed in order to accommodate the forecast traffic volumes.

Based on the findings of this study, no other roadway or traffic control improvements are required or recommended to accommodate the future traffic within the study area.

Appendix A

Pre-study Consultation



Transportation
Planning

Transit
Planning

Traffic
Engineering

Parking
Planning

Philip E. Grubb

B.A.Sc., P.Eng.
President

James J.L. Mallett

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June 26, 2014

Arieh Kolet,
Permits Officer
Ministry of Transportation
1201 Wilson Ave., 7th Floor
Toronto, ON., M3M 1J8

Vito Tolone
Senior Transportation Planner
City of Burlington
426 Brant Street
Burlington, ON L7R 3Z6

Dear Mr. Kolet & Mr. Tolone:

**Re: Traffic Impact Study Scope of Work for
Mixed Use Employment Development - 1200
King Road (Burlington)**

PTSL is pleased to provide you with the scope of work for the Traffic Impact Study (TIS) in support of the proposed Mixed Use Employment Development located at 1200 King Road in the City of Burlington.

Background

The Paletta International Corporation is proposing to develop a ±42 hectare parcel of land in the City of Burlington that is generally bound by Highway 403 to the north, King Road to the east, the CN rail corridor to the south and the Aldershot GO Station to the west.

The property is proposed as employment lands. The development is planned to consist of mixed use, business corridor, and employment commercial lots as well as a recreational facility with seating for up to 9,000 people.

As part of the development, a South Service Road connecting Waterdown Road to King Road is proposed to be constructed as part of the development. A portion of this road has already been constructed through the GO Station lands. The remainder of the road is planned to have a two lane cross-section with bike lanes within a 20 metre road allowance.

Preliminary Site Concept Plan

The site encompasses an area of approximately 42 hectares. At present, much of the property is undeveloped and consists of open space. The property is located south of the Highway 403 corridor and north of the CN rail corridor between the Aldershot GO Station and King Road in the City of Burlington.

The following land uses have been identified by Metropolitan Consulting with respect to the various blocks to be built-out as part of the subject site:

1. 980,540 square feet of Business Park land uses

Paradigm Transportation Solutions Limited



2. 184,290 square feet of Mixed Retail & Service land uses
3. 6,000 high rise apartment units; and
4. An Arena with seating for 9,000 people.

Access to the subject lands will be provided primarily by the proposed extension of the South Service Road that will dissect the subject site. This roadway will be constructed on day one of development and will consist of a two lane cross-section with bike lanes within a 20 metre road allowance. The Mixed Retail & Service development blocks with frontage to King Road are assumed to have direct driveway access to King Road.

The phasing of the lands is largely unknown as construction will commence when the lands are purchased. It is assumed that the lands will be developed within a 20 year horizon with approximately 5 percent of development occurring per year. The Arena site is assumed to be constructed during year 8. The residential land uses are assumed to be constructed during year 10. Generally, the phasing of the lands will occur from east to west with the lands east of the Falcon Creek developing first.

The most current site concept plan can be found attached.

Scope of Work

Task 1 – Pre-Consultation. PTSL will arrange to review to the latest site plan and scope of work with the MTO and the City of Burlington to confirm if the work plan is acceptable and ensure that PTSL is aware of any traffic related issues to be responded to in the study.

Task 2 - Data Collection: The following intersections are assumed to form the study area intersections:

1. Waterdown Road and North Service Road/Highway 403 Westbound On-Ramp
2. Waterdown Road and Westbound Off-Ramp
3. Waterdown Road and Eastbound Off-Ramp/South Service Road
4. Waterdown Road and Masonry Court/Railway Road
5. King Road and North Service Road
6. King Road and Hydro Lane
7. King Road and Plains Road
8. South Service Road and Westerly GO Station Driveway
9. South Service Road and Easterly GO Station Driveway/Eastbound On-Ramp

The location of the above noted intersections are illustrated in Map 1 (attached). We will require confirmation from the MTO and City of existing construction at any of the study area intersections or along study area road sections to confirm if existing counts or any new counts are representative of typical conditions.

PTSL will obtain the most current traffic counts and signal timing plans (where applicable) for the study area intersections from the City and MTO. Should recent count data not be available, PTSL will obtain the counts. PTSL will contact Darren Hardenbrook at Metrolinx/GO Transit to obtain the latest short and long-term plans and ridership information relevant to the Lakeshore Line and the Aldershot GO Station for consideration in estimating the future trip generation reductions.



Task 3 – Site Visit: PTSL will conduct a site visit to inventory the traffic and roadway conditions in the immediate area of the development. The site visit will also include confirming the existing transportation infrastructure within the study area.

Task 4 – Traffic Forecasts. Estimates of the weekday AM and PM peak hour traffic generated by the proposed site will be prepared. The estimates of site traffic will be developed using trip generation data published by the Institute of Transportation Engineers. A variety of land use codes will be assumed and an average rate per 1,000 square feet of GFA will be utilized to estimate the trips generated by the proposed mixed retail and service areas. The additional trips estimated to be generated by the proposed arena will also be based on the Trip Generation, 9th Edition or in-house survey data based on a non-event condition. Development traffic will be distributed and assigned to the road network based on the plausible routes to and from the site.

Future background traffic estimates will be developed based on a future growth rate to be determined in consultation with the MTO and City of Burlington. Should there be any additional in-stream or recently approved developments in the area PTSL will include the trip generation from the respective traffic studies. The estimates of future background, site, and total traffic for the weekday AM and PM peak hours will be plotted for reference and report purposes.

For the purposes of this study the following horizon years are recommended for study:

1. Existing Conditions – Year 2014
2. Year 2020 – Completion of Arena Site
3. Year 2024 – Completion of Residential Lands
4. Year 2034 – Full Build-Out

Task 5 – Operational Analyses: Using the traffic forecasts developed in Task 4, we will evaluate the operation of the study area intersections. Any areas with possible traffic problems will be identified and appropriate improvements will be assessed. We will address the need for remedial measures where necessary. Based on these analyses, we will make recommendations on any traffic improvements required to ensure safe and efficient operations.

Task 6 – Transportation Study Report: PTSL will prepare a report documenting our investigations, findings, and recommendations related to the transportation network.

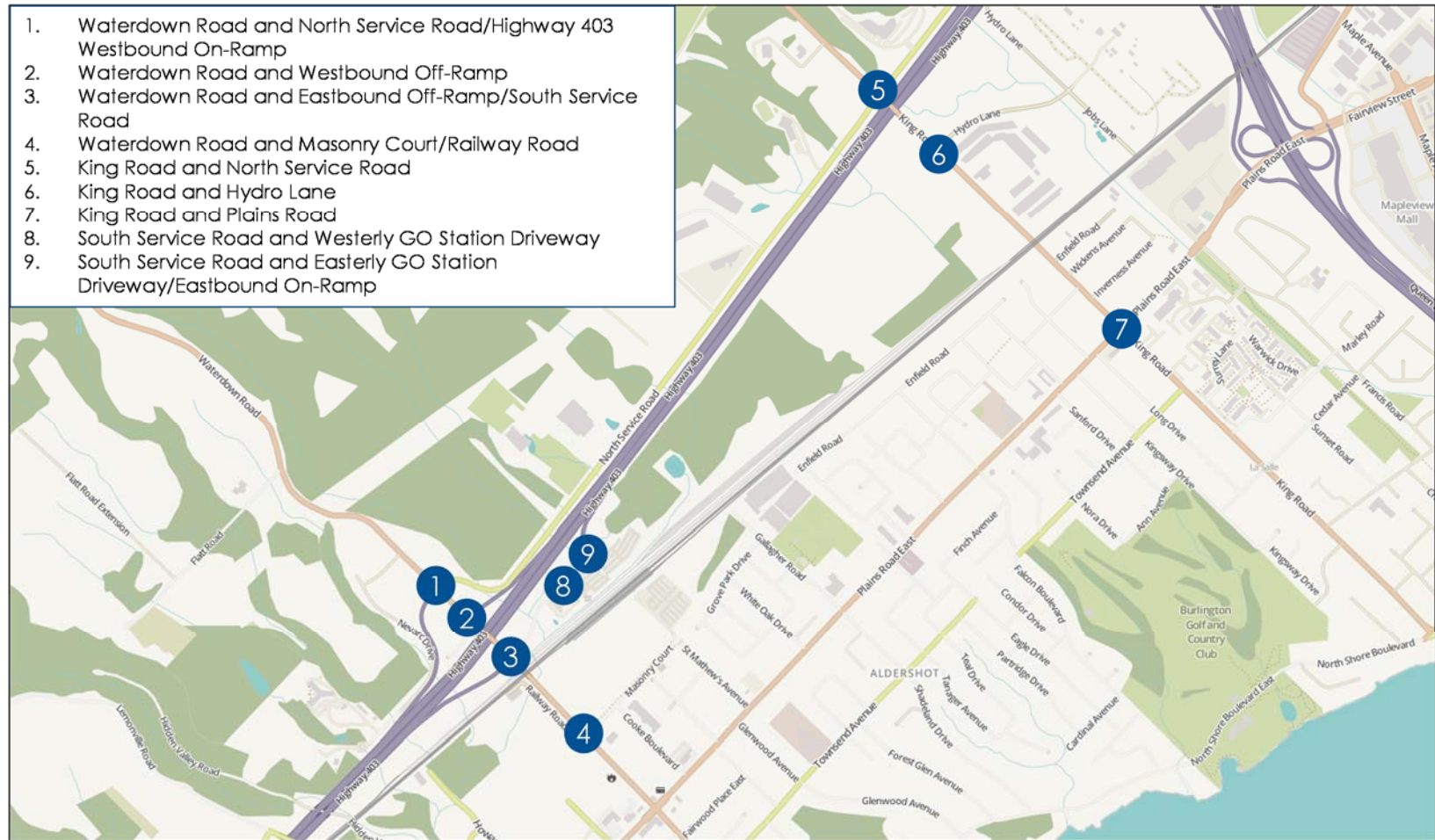
We trust that this scope of work will be acceptable. Please feel free to contact me if you require clarification of any of the above or if you have any questions or concerns.

Yours very truly,

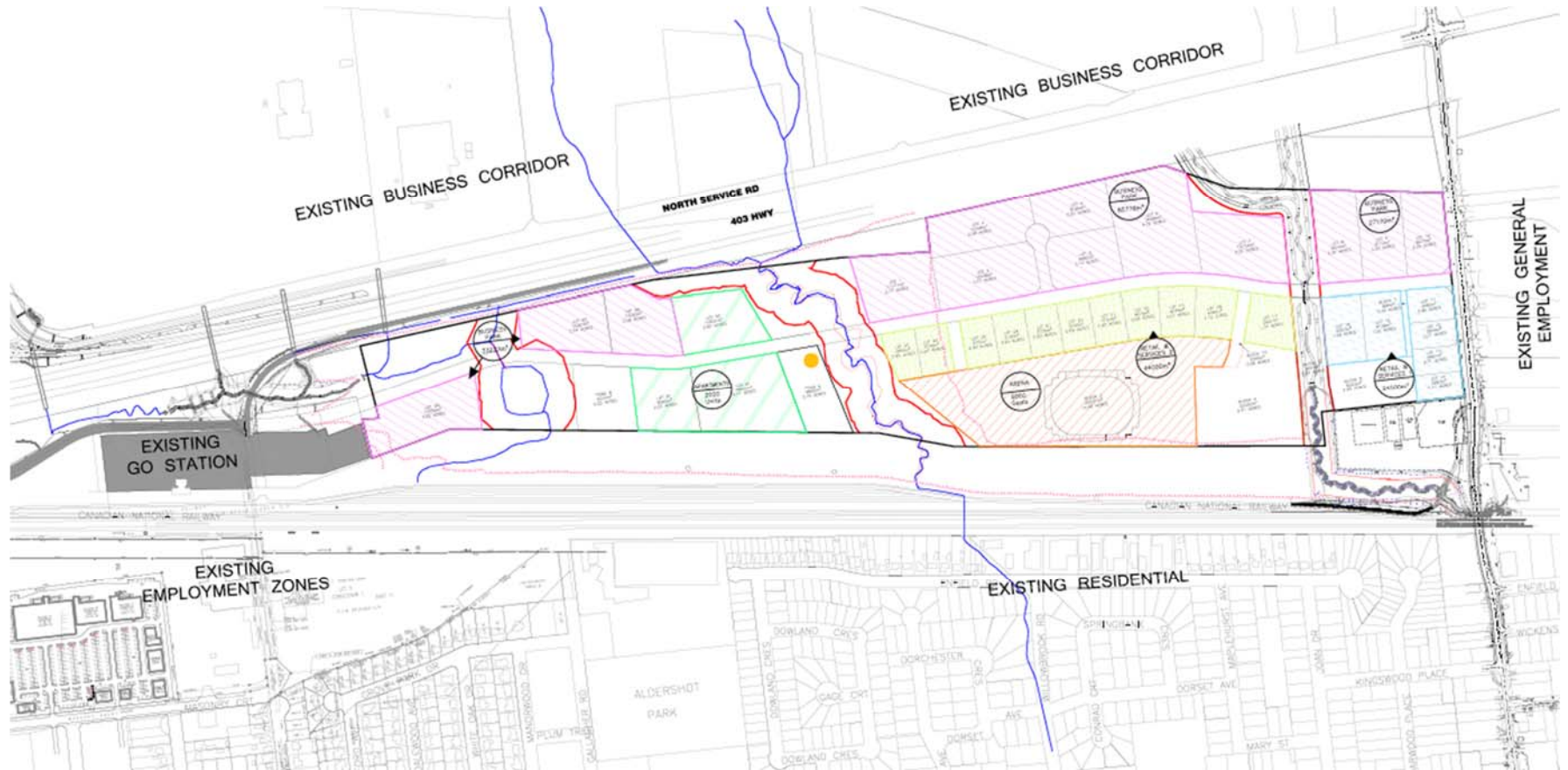
PARADIGM TRANSPORTATION SOLUTIONS LIMITED

Stewart K. Elkins
BES, MITE
Vice President

MAP 1 - STUDY AREA



SITE CONCEPT PLAN



LAND USE STATISTICS

Lot Number	Land Use Type	Color	Est Sqft	Units	Seats
Lot 1	Business Park	Pink	90,580	-	-
Lot 2	Business Park	Pink	100,430	-	-
Lot 3	Business Park	Pink	83,470	-	-
Lot 4	Business Park	Pink	66,040	-	-
Lot 5	Business Park	Pink	70,070	-	-
Lot 6	Business Park	Pink	156,450	-	-
Lot 7	Business Park	Pink	106,240	-	-
Lot 8	Business Park	Pink	77,340	-	-
Lot 9	Business Park	Pink	73,630	-	-
Lot 10	Business Park	Pink	66,840	-	-
Lot 11	Mixed Retail & Services	Blue	9,360	-	-
Lot 12	Mixed Retail & Services	Blue	7,700	-	-
Lot 13	Mixed Retail & Services	Blue	7,700	-	-
Lot 14	Mixed Retail & Services	Blue	7,750	-	-
Lot 15	Mixed Retail & Services	Blue	16,520	-	-
Lot 16	Mixed Retail & Services	Blue	16,680	-	-
Lot 17	Mixed Retail & Services	Yellow	14,530	-	-
Lot 18	Mixed Retail & Services	Yellow	12,220	-	-
Lot 19	Mixed Retail & Services	Yellow	10,980	-	-
Lot 20	Mixed Retail & Services	Yellow	10,820	-	-
Lot 21	Mixed Retail & Services	Yellow	10,120	-	-
Lot 22	Mixed Retail & Services	Yellow	10,120	-	-
Lot 23	Mixed Retail & Services	Yellow	10,120	-	-
Lot 24	Mixed Retail & Services	Yellow	10,120	-	-
Lot 25	Mixed Retail & Services	Yellow	10,120	-	-
Lot 26	Mixed Retail & Services	Yellow	10,120	-	-
Lot 27	Mixed Retail & Services	Yellow	9,310	-	-
Lot A1	High Rise Apartment	Green		2,000	-
Lot A2	High Rise Apartment	Green		2,000	-
Lot B1	High Rise Apartment	Green		2,000	-
Lot B2	Business Park	Pink	26,960	-	-
Lot B3	Business Park	Pink	27,610	-	-
Lot B4	Business Park	Pink	34,880	-	-
Block 3	Arena	Orange		-	9,000

Scott Catton

From: Routledge, Graham (MTO) <Graham.Routledge@ontario.ca>
Sent: August-18-14 11:57
To: scatton@ptsl.com
Cc: Beaulne, Diana (MTO)
Subject: RE: Traffic Impact Study - 1200 King Road, P10003

Good morning Scott,

In general, guidelines and information regarding requirements for Traffic Impact Studies may be found on our MTO web site at:

<http://www.mto.gov.on.ca/english/engineering/management/corridor/index.shtml>

With regard to the scope of work for the development of Mix Use Employment Development at 1200 King Road, Burlington submitted by Paradigm Transportation Solutions Limited, our Traffic office has provided the following comments;

- Please include following interchanges within study area
 - QEW off-ramp terminals at Fariveiw Street
 - QEW off-ramp terminals Brant Street
 - 403 off-ramp terminals at Waterdown Road
- As indicated in the scope of work, the development will consist of different phases with an ultimate full build out horizon year of 2034. Since it is difficult to forecast exact traffic volumes and growth within the study area for next 20 years plus 10 year horizon after full build out, hence, predictable results for 20+ year's horizon will be unreliable/ erratic at this time. Therefore, ministry will require separate TIS's in future for each individual phase (before start of the construction) to confirm either any of our infrastructure / ramp terminal will be adversely impacted by the phase total traffic or not, and what type of improvements will be required to keep operations at the ramp terminals within ministry's recommended threshold limits.
- For Arena, an event condition analysis should also be carried out along with non-event condition, and results to be presented within the report.
- Weekend mid-day peak hour analysis would also be included within the analysis.
- The study should also address heavy vehicle traffic impacts on the ramp terminals.
- Ministry recommends use of 2% growth rate for traffic at all the ramp terminals within the analysis limits; otherwise, please justify use of any other value.
- Please follow MTO general guidelines for traffic impact studies.

In addition, ministry recommends following assumptions should be considered within analysis (particularly for off-ramp terminals within the study limits):

- Default value for Saturation Flow Rate is not recommended to use within analysis. Please carryout saturation flow rate study at the ramp terminals and use that value within Synchro analysis. Also submit the SFR study for the ministry review.
- Please calculate PHF value from existing volume counts and use it within the analysis for existing as well as for all the future scenarios. Use of PHF=1 value within the analysis is not recommended.
- Please include results of 95th queue lengths from Sim Traffic analysis within the report. Sim Traffic model should be calibrated as per the existing before using it for analysis of any future scenario. The analysis should be carried

out with 10min seeding and 60 min recording for at least 3 iterations. The calibrated model should be used for all the future scenarios.

- For Synchro Analysis, value of lost time adjustment should be observed from the field as per the existing condition, and use it for existing as well as for all future scenarios.
- As outlined in MTO guidelines for Traffic impact studies, v/c ratio of 0.75 for ramp approaches and 0.85 for others are deemed to be critical in terms of operations and considered for geometric improvements. In report please provide recommendations for improvements if required by existing or any future scenario.
- Please also submit digital files of Synchro Analysis along with the report for ministry review.

If you have any questions in this regard, please contact me.

Thank you

Graham

From: Beaulne, Diana (MTO)
Sent: July-23-14 8:55 AM
To: Routledge, Graham (MTO)
Subject: FW: Traffic Impact Study - 1200 King Road, P10003

Graham,

I would think this is for you.
Diana

From: Kolet, ArieH (MTO)
Sent: July 22, 2014 1:17 PM
To: scatton@ptsl.com; Beaulne, Diana (MTO)
Subject: FW: Traffic Impact Study - 1200 King Road, P10003

Hi Scott,

Diana is the permits officer for Burlington. I have forwarded your email to her for review and comments. Diana please follow up with Scott.

Regards,

ArieH Kolet,
Permits Officer
Ministry of Transportation
1201 Wilson Ave., 7th Floor
Toronto, ON., M3M 1J8
Tel: (416) 235 3497
Email: arieh.kolet@ontario.ca

From: Scott Catton [<mailto:scatton@ptsl.com>]
Sent: July 22, 2014 1:14 PM

To: 'Tolone, Vito'; Kolet, ArieH (MTO); 'Stew Elkins'; 'Ozimkovic , Danijel'

Subject: RE: Traffic Impact Study - 1200 King Road, P10003

Vito/Dan – Have you any additional comments on the study's scope?

ArieH – Can you please provides us with feedback regarding the study's scope?

Scott D. Catton - PTSL

From: Tolone, Vito [<mailto:Vito.Tolone@burlington.ca>]

Sent: July 14, 2014 23:18

To: 'Scott Catton'; arieh.kolet@ontario.ca; 'Stew Elkins'

Cc: Ozimkovic , Danijel

Subject: RE: Traffic Impact Study - 1200 King Road, P10003

Hi Scott: I've been away for the last few weeks so I haven't had a chance to look through this proposed scope of work. I will try to do so this week. Just as a note, you may be aware that this study will involve review by the MTO, so whatever we say should not be taken as a final scope. The MTO will likely have more work. I will contact you soon.

Dan, can you please review this scope and lets discuss in the next day or two. Thanks

Vito

From: Scott Catton [<mailto:scatton@ptsl.com>]

Sent: Thursday, June 26, 2014 3:14 PM

To: Tolone, Vito; arieh.kolet@ontario.ca; 'Stew Elkins'

Subject: Traffic Impact Study - 1200 King Road, P10003

ArieH & Vito

We've been retained by Metropolitan Consulting to conduct the Traffic Impact Study for the proposed mixed use employment development located at 1200 King Road in the City of Burlington.

Please find attached the scope of work for the TIS. Can you please review and provide us with comment? Thank you.

If you have any questions or require any additional information, please feel free to contact me. Thank you.

Scott D. Catton, Dipl.T., C.E.T., MITE

Transportation Engineering Technologist



Paradigm Transportation Solutions Limited

43 Forest Road, Cambridge ON N1S 3B4

p: 905.381.2229 x302 or 519.896.3163 x302

e: scatton@ptsl.com

w: www.ptsl.com

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Scott Catton

From: Ozimkovic , Danijel <Danijel.Ozimkovic@burlington.ca>
Sent: July-24-14 14:53
To: 'Scott Catton'
Subject: RE: Traffic Impact Study - 1200 King Road, P10003

Hi Scott,

I don't have any issues with the scope of work you send us. I just want to let you know that the MTO should review this document as well since this proposed development is just south of the Highway 403.

Thanks,

Dan Ozimkovic, C.E.T

Transportation Engineering Technologist

Transportation Services

Development and Infrastructure Division

City of Burlington

(905) 335-7600 ext. 7485

danijel.ozimkovic@burlington.ca **New E-mail**

From: Scott Catton [mailto:scatton@ptsl.com]
Sent: Tuesday, July 22, 2014 1:22 PM
To: Ozimkovic , Danijel
Subject: RE: Traffic Impact Study - 1200 King Road, P10003

Thanks Dan. Appreciated.

Scott D. Catton - PTSL

From: Ozimkovic , Danijel [mailto:Danijel.Ozimkovic@burlington.ca]
Sent: July 22, 2014 13:20
To: 'Scott Catton'; Tolone, Vito; arieh.kolet@ontario.ca; 'Stew Elkins'
Subject: RE: Traffic Impact Study - 1200 King Road, P10003

Hi Scott,

I will have to get back to you by the end of this week. I have been busy with couple of cycling project and haven't had a chance to review the study scope.

Thanks,

Dan Ozimkovic, C.E.T

Transportation Engineering Technologist

Transportation Services

Development and Infrastructure Division

City of Burlington

(905) 335-7600 ext. 7485

danijel.ozimkovic@burlington.ca **New E-mail**

From: Scott Catton [<mailto:scatton@ptsl.com>]
Sent: Tuesday, July 22, 2014 1:14 PM
To: Tolone, Vito; arieh.kolet@ontario.ca; 'Stew Elkins'; Ozimkovic , Danijel
Subject: RE: Traffic Impact Study - 1200 King Road, P10003

Vito/Dan – Have you any additional comments on the study's scope?

Arieh – Can you please provides us with feedback regarding the study's scope?

Scott D. Catton - PTSL

From: Tolone, Vito [<mailto:Vito.Tolone@burlington.ca>]
Sent: July 14, 2014 23:18
To: 'Scott Catton'; arieh.kolet@ontario.ca; 'Stew Elkins'
Cc: Ozimkovic , Danijel
Subject: RE: Traffic Impact Study - 1200 King Road, P10003

Hi Scott: I've been away for the last few weeks so I haven't had a chance to look through this proposed scope of work. I will try to do so this week. Just as a note, you may be aware that this study will involve review by the MTO, so whatever we say should not be taken as a final scope. The MTO will likely have more work. I will contact you soon.

Dan, can you please review this scope and lets discuss in the next day or two. Thanks

Vito

From: Scott Catton [<mailto:scatton@ptsl.com>]
Sent: Thursday, June 26, 2014 3:14 PM
To: Tolone, Vito; arieh.kolet@ontario.ca; 'Stew Elkins'
Subject: Traffic Impact Study - 1200 King Road, P10003

Arieh & Vito

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Please find attached the scope of work for the TIS. Can you please review and provide us with comment? Thank you.

If you have any questions or require any additional information, please feel free to contact me. Thank you.

Scott D. Catton, Dipl.T., C.E.T., MITE
Transportation Engineering Technologist



Paradigm Transportation Solutions Limited

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Appendix B

Existing Traffic Data



Turning Movement Count (4 . WATERDOWN RD & NORTH SERVICE RD) MioID: 194614

Time	N Approach Waterdown Rd							E Approach North Service Rd							S Approach Waterdown Rd							W Approach North Service Rd(QEW WB On Ramp)							Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds CCW N:	Peds CW N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds CCW E:	Peds CW E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds CCW S:	Peds CW S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds CCW W:	Peds CW W:	Approach Total		
07:00:00	12	102	20	0	0	0	134	4	10	5	0	0	0	19	43	44	33	1	0	0	121	1	0	0	0	0	0	1	275	
07:15:00	15	96	33	0	0	0	144	4	8	12	0	0	0	24	56	46	46	0	0	0	148	0	0	0	0	1	0	0	316	
07:30:00	20	112	35	0	0	0	167	6	24	19	0	0	0	49	103	60	47	0	0	0	210	0	0	0	0	0	0	0	426	
07:45:00	22	128	47	0	0	0	197	10	19	14	0	0	0	43	91	90	37	0	0	0	218	0	0	0	0	0	0	0	458	1475
08:00:00	23	92	39	0	0	0	154	11	22	14	0	0	0	47	107	62	54	1	0	0	224	0	0	0	0	0	0	0	425	1625
08:15:00	11	122	40	0	0	1	173	9	23	15	0	0	0	47	117	71	37	0	0	0	225	0	0	0	0	0	1	0	445	1754
08:30:00	19	98	29	0	0	0	146	7	27	26	0	0	0	60	90	77	32	0	0	0	199	0	0	0	0	0	0	0	405	1733
08:45:00	18	116	27	0	0	0	161	17	17	16	0	0	0	50	93	59	23	0	0	0	175	0	0	0	0	0	0	0	386	1661
BREAK																														
11:00:00	5	51	8	0	0	0	64	10	17	12	0	0	0	39	34	54	29	0	0	0	117	0	0	0	0	0	0	0	220	
11:15:00	7	48	16	0	0	0	71	10	20	18	0	0	0	48	24	51	37	1	0	0	113	0	0	0	0	0	0	0	232	
11:30:00	7	57	14	0	0	0	78	22	20	15	0	0	0	57	26	57	37	0	0	0	120	0	0	0	0	0	0	0	255	
11:45:00	5	71	20	0	0	0	96	9	9	24	0	0	0	42	28	79	53	1	0	0	161	0	0	0	0	0	0	0	299	1006
12:00:00	6	62	20	0	0	0	88	12	31	28	0	0	0	71	39	69	35	0	0	0	143	0	0	0	0	0	0	0	302	1088
12:15:00	9	65	12	0	0	0	86	18	20	24	0	0	0	62	32	88	40	0	0	0	160	0	0	0	0	0	0	0	308	1164
12:30:00	7	55	20	0	0	0	82	14	15	27	0	0	0	56	34	67	37	0	0	0	138	0	0	0	0	0	0	0	276	1185
12:45:00	5	53	14	0	0	0	72	19	20	14	0	0	0	53	45	71	42	0	0	0	158	0	0	0	0	0	0	0	283	1169
13:00:00	11	58	12	0	0	0	81	11	22	17	0	0	0	50	40	62	43	0	0	0	145	0	0	0	0	0	0	0	276	1143
13:15:00	9	51	8	0	0	0	68	26	23	13	0	0	0	62	42	74	47	0	0	0	163	0	0	0	0	0	0	0	293	1128
13:30:00	14	54	12	0	0	0	80	20	27	26	0	0	0	73	38	72	36	0	0	0	146	0	0	0	0	0	0	0	299	1151
13:45:00	12	70	16	0	0	0	98	27	28	17	0	0	0	72	42	81	43	0	0	0	166	0	0	0	0	0	0	0	336	1204
BREAK																														
15:00:00	13	72	28	0	0	0	113	26	40	28	0	0	0	94	28	92	57	0	0	0	177	0	0	0	0	0	0	0	384	
15:15:00	15	64	16	0	0	0	95	16	45	28	0	0	0	89	43	96	38	0	0	0	177	0	0	0	1	0	0	1	362	
15:30:00	13	70	22	0	0	0	105	20	62	34	0	0	0	116	42	100	61	0	0	0	203	0	0	0	0	0	0	0	424	
15:45:00	29	69	15	0	0	0	113	42	47	46	0	0	0	135	35	113	59	0	0	0	207	0	0	0	0	0	0	0	455	1625
16:00:00	22	67	13	0	1	0	102	39	100	41	0	0	0	180	32	93	57	0	0	0	182	0	0	0	0	2	0	0	464	1705
16:15:00	14	80	10	0	0	0	104	32	89	55	0	0	0	176	43	97	79	0	0	0	219	0	0	0	0	0	0	0	499	1842
16:30:00	23	87	22	0	0	0	132	42	97	40	0	0	0	179	33	97	62	0	0	0	192	0	3	0	0	0	0	3	506	1924
16:45:00	18	84	15	0	0	0	117	40	104	53	0	0	0	197	53	133	99	0	0	0	285	0	0	0	0	0	0	0	599	2068
17:00:00	14	102	20	0	0	0	136	42	120	57	0	0	0	219	38	113	60	2	0	0	213	0	0	0	0	0	0	0	568	2172
17:15:00	32	75	20	0	0	0	127	29	98	49	0	0	0	176	35	113	47	0	0	0	195	0	0	0	0	0	0	0	498	2171



17:30:00	16	54	12	0	0	0	82	60	106	56	0	0	0	222	52	127	187	0	0	0	366	0	0	0	0	0	0	0	670	2335
17:45:00	18	87	13	0	0	0	118	30	95	38	0	0	0	163	39	116	133	0	0	0	288	0	0	0	0	0	0	0	569	2305
Grand Total	464	2472	648	0	1	1	3584	684	1405	881	0	0	0	2970	1597	2624	1727	6	0	0	5954	1	3	0	1	3	1	5	12513	-
Approach%	12.9%	69%	18.1%	0%			-	23%	47.3%	29.7%	0%			-	26.8%	44.1%	29%	0.1%			-	20%	60%	0%	20%			-	-	-
Totals %	3.7%	19.8%	5.2%	0%			28.6%	5.5%	11.2%	7%	0%			23.7%	12.8%	21%	13.8%	0%			47.6%	0%	0%	0%	0%			0%	-	-
Heavies	11	66	12	0			-	11	38	81	0			-	94	76	144	0			-	0	2	0	0			-	-	-
Heavies %	2.4%	2.7%	1.9%	0%			-	1.6%	2.7%	9.2%	0%			-	5.9%	2.9%	8.3%	0%			-	0%	66.7%	0%	0%			-	-	-



Peak: 07:30 AM - 08:30 AM

Time	N Approach Waterdown Rd							E Approach North Service Rd							S Approach Waterdown Rd							W Approach North Service Rd(QEW WB On Ramp)							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
07:30:00	20	112	35	0	0	0	167	6	24	19	0	0	0	49	103	60	47	0	0	0	210	0	0	0	0	0	0	0	426
07:45:00	22	128	47	0	0	0	197	10	19	14	0	0	0	43	91	90	37	0	0	0	218	0	0	0	0	0	0	0	458
08:00:00	23	92	39	0	0	0	154	11	22	14	0	0	0	47	107	62	54	1	0	0	224	0	0	0	0	0	0	0	425
08:15:00	11	122	40	0	0	1	173	9	23	15	0	0	0	47	117	71	37	0	0	0	225	0	0	0	0	0	1	0	445
Grand Total	76	454	161	0	0	1	691	36	88	62	0	0	0	186	418	283	175	1	0	0	877	0	0	0	0	0	1	0	1754
Approach%	11%	65.7%	23.3%	0%			-	19.4%	47.3%	33.3%	0%			-	47.7%	32.3%	20%	0.1%			-	0%	0%	0%	0%			-	-
Totals %	4.3%	25.9%	9.2%	0%			39.4%	2.1%	5%	3.5%	0%			10.6%	23.8%	16.1%	10%	0.1%			50%	0%	0%	0%	0%			0%	-
PHF	0.83	0.89	0.86	0			0.88	0.82	0.92	0.82	0			0.95	0.89	0.79	0.81	0.25			0.97	0	0	0	0			0	-
Heavies	1	14	2	0			17	2	2	10	0			14	13	9	14	0			36	0	0	0	0			0	-
Heavies %	1%	3%	1%	0%			2.5%	6%	2%	16%	0%			7.5%	3%	3%	8%	0%			4.1%	0%	0%	0%	0%			0%	-
Lights	75	440	159	0			674	34	86	52	0			172	405	274	161	1			841	0	0	0	0			0	-
Lights %	98.7%	96.9%	98.8%	0%			97.5%	94.4%	97.7%	83.9%	0%			92.5%	96.9%	96.8%	92%	100%			95.9%	0%	0%	0%	0%			0%	-
SingleUnit Trucks	0	5	1	0			6	1	0	4	0			5	4	5	9	0			18	0	0	0	0			0	-
SingleUnit Trucks %	0%	1.1%	0.6%	0%			0.9%	2.8%	0%	6.5%	0%			2.7%	1%	1.8%	5.1%	0%			2.1%	0%	0%	0%	0%			0%	-
Buses	0	9	1	0			10	1	1	3	0			5	6	3	1	0			10	0	0	0	0			0	-
Buses %	0%	2%	0.6%	0%			1.4%	2.8%	1.1%	4.8%	0%			2.7%	1.4%	1.1%	0.6%	0%			1.1%	0%	0%	0%	0%			0%	-
Articulated Trucks	1	0	0	0			1	0	1	3	0			4	3	1	4	0			8	0	0	0	0			0	-
Articulated Trucks %	1.3%	0%	0%	0%			0.1%	0%	1.1%	4.8%	0%			2.2%	0.7%	0.4%	2.3%	0%			0.9%	0%	0%	0%	0%			0%	-
Pedestrians	-	-	-	-	0	1	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	1	-	-
Pedestrians%	-	-	-	-	0%	50%	-	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-	-	-	-	0%	50%	-	-



Peak: 01:00 PM - 02:00 PM

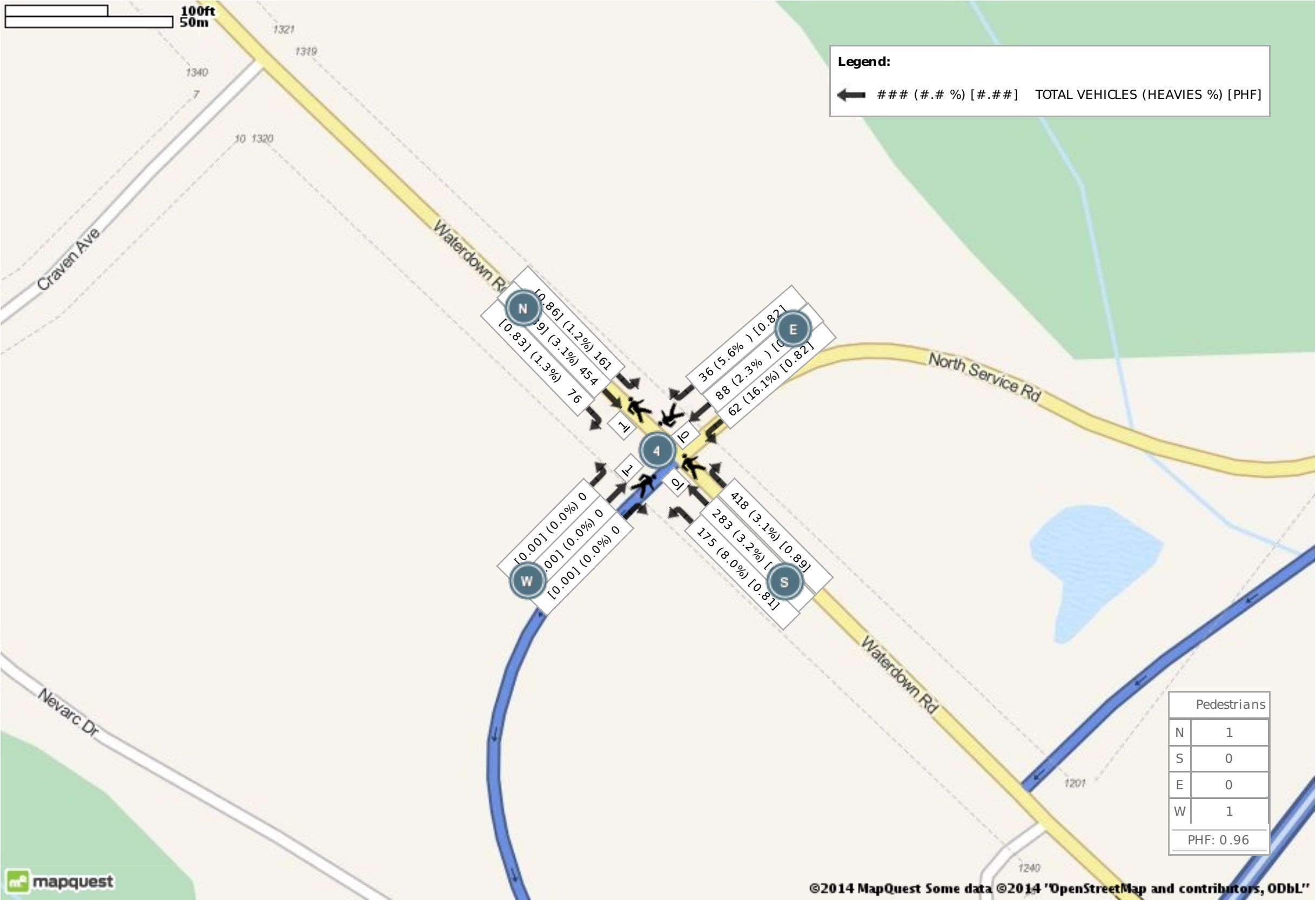
Time	N Approach Waterdown Rd							E Approach North Service Rd							S Approach Waterdown Rd							W Approach North Service Rd(QEW WB On Ramp)							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
13:00:00	11	58	12	0	0	0	81	11	22	17	0	0	0	50	40	62	43	0	0	0	145	0	0	0	0	0	0	0	276
13:15:00	9	51	8	0	0	0	68	26	23	13	0	0	0	62	42	74	47	0	0	0	163	0	0	0	0	0	0	0	293
13:30:00	14	54	12	0	0	0	80	20	27	26	0	0	0	73	38	72	36	0	0	0	146	0	0	0	0	0	0	0	299
13:45:00	12	70	16	0	0	0	98	27	28	17	0	0	0	72	42	81	43	0	0	0	166	0	0	0	0	0	0	0	336
Grand Total	46	233	48	0	0	0	327	84	100	73	0	0	0	257	162	289	169	0	0	0	620	0	0	0	0	0	0	0	1204
Approach%	14.1%	71.3%	14.7%	0%			-	32.7%	38.9%	28.4%	0%			-	26.1%	46.6%	27.3%	0%			-	0%	0%	0%	0%			-	-
Totals %	3.8%	19.4%	4%	0%			27.2%	7%	8.3%	6.1%	0%			21.3%	13.5%	24%	14%	0%			51.5%	0%	0%	0%	0%			0%	-
PHF	0.82	0.83	0.75	0			0.83	0.78	0.89	0.7	0			0.88	0.96	0.89	0.9	0			0.93	0	0	0	0			0	-
Heavies	3	8	1	0			12	1	8	10	0			19	17	5	23	0			45	0	0	0	0			0	-
Heavies %	7%	3%	2%	0%			3.7%	1%	8%	14%	0%			7.4%	10%	2%	14%	0%			7.3%	0%	0%	0%	0%			0%	-
Lights	43	225	47	0			315	83	92	63	0			238	145	284	146	0			575	0	0	0	0			0	-
Lights %	93.5%	96.6%	97.9%	0%			96.3%	98.8%	92%	86.3%	0%			92.6%	89.5%	98.3%	86.4%	0%			92.7%	0%	0%	0%	0%			0%	-
SingleUnit Trucks	2	6	1	0			9	1	4	6	0			11	10	3	15	0			28	0	0	0	0			0	-
SingleUnit Trucks %	4.3%	2.6%	2.1%	0%			2.8%	1.2%	4%	8.2%	0%			4.3%	6.2%	1%	8.9%	0%			4.5%	0%	0%	0%	0%			0%	-
Buses	1	2	0	0			3	0	1	1	0			2	1	2	5	0			8	0	0	0	0			0	-
Buses %	2.2%	0.9%	0%	0%			0.9%	0%	1%	1.4%	0%			0.8%	0.6%	0.7%	3%	0%			1.3%	0%	0%	0%	0%			0%	-
Articulated Trucks	0	0	0	0			0	0	3	3	0			6	6	0	3	0			9	0	0	0	0			0	-
Articulated Trucks %	0%	0%	0%	0%			0%	0%	3%	4.1%	0%			2.3%	3.7%	0%	1.8%	0%			1.5%	0%	0%	0%	0%			0%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-



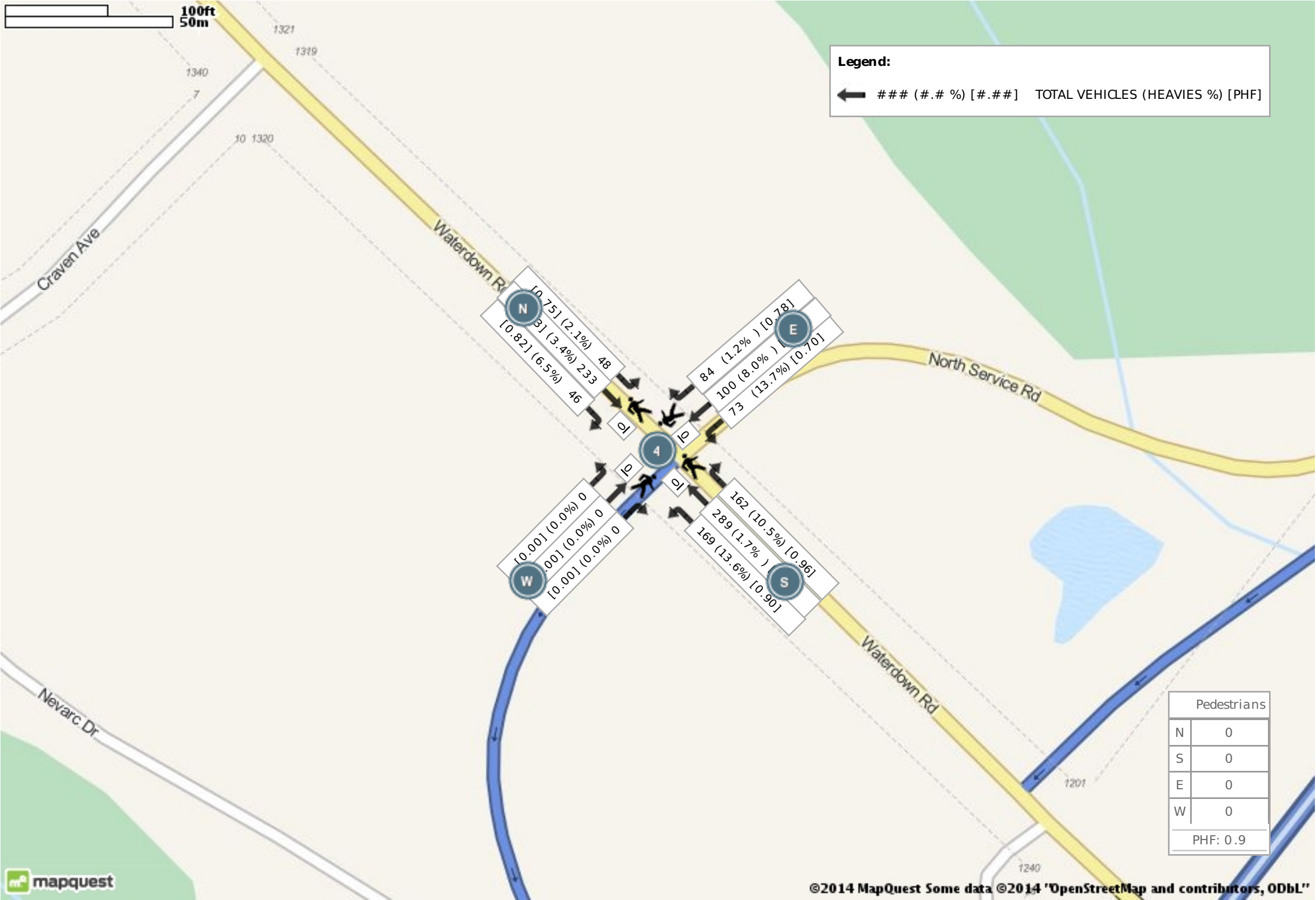
Peak: 04:45 PM - 05:45 PM

Time	N Approach Waterdown Rd							E Approach North Service Rd							S Approach Waterdown Rd							W Approach North Service Rd(QEW WB On Ramp)							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
16:45:00	18	84	15	0	0	0	117	40	104	53	0	0	0	197	53	133	99	0	0	0	285	0	0	0	0	0	0	0	599
17:00:00	14	102	20	0	0	0	136	42	120	57	0	0	0	219	38	113	60	2	0	0	213	0	0	0	0	0	0	0	568
17:15:00	32	75	20	0	0	0	127	29	98	49	0	0	0	176	35	113	47	0	0	0	195	0	0	0	0	0	0	0	498
17:30:00	16	54	12	0	0	0	82	60	106	56	0	0	0	222	52	127	187	0	0	0	366	0	0	0	0	0	0	0	670
Grand Total	80	315	67	0	0	0	462	171	428	215	0	0	0	814	178	486	393	2	0	0	1059	0	0	0	0	0	0	0	2335
Approach%	17.3%	68.2%	14.5%	0%			-	21%	52.6%	26.4%	0%			-	16.8%	45.9%	37.1%	0.2%			-	0%	0%	0%	0%			-	-
Totals %	3.4%	13.5%	2.9%	0%			19.8%	7.3%	18.3%	9.2%	0%			34.9%	7.6%	20.8%	16.8%	0.1%			45.4%	0%	0%	0%	0%			0%	-
PHF	0.63	0.77	0.84	0			0.85	0.71	0.89	0.94	0			0.92	0.84	0.91	0.53	0.25			0.72	0	0	0	0			0	-
Heavies	1	4	0	0			5	0	5	8	0			13	10	14	5	0			29	0	0	0	0			0	-
Heavies %	1%	1%	0%	0%			1.1%	0%	1%	4%	0%			1.6%	6%	3%	1%	0%			2.7%	0%	0%	0%	0%			0%	-
Lights	79	311	67	0			457	171	423	207	0			801	168	472	388	2			1030	0	0	0	0			0	-
Lights %	98.8%	98.7%	100%	0%			98.9%	100%	98.8%	96.3%	0%			98.4%	94.4%	97.1%	98.7%	100%			97.3%	0%	0%	0%	0%			0%	-
SingleUnit Trucks	0	0	0	0			0	0	1	2	0			3	4	10	2	0			16	0	0	0	0			0	-
SingleUnit Trucks %	0%	0%	0%	0%			0%	0%	0.2%	0.9%	0%			0.4%	2.2%	2.1%	0.5%	0%			1.5%	0%	0%	0%	0%			0%	-
Buses	1	4	0	0			5	0	0	3	0			3	3	3	3	0			9	0	0	0	0			0	-
Buses %	1.3%	1.3%	0%	0%			1.1%	0%	0%	1.4%	0%			0.4%	1.7%	0.6%	0.8%	0%			0.8%	0%	0%	0%	0%			0%	-
Articulated Trucks	0	0	0	0			0	0	4	3	0			7	3	1	0	0			4	0	0	0	0			0	-
Articulated Trucks %	0%	0%	0%	0%			0%	0%	0.9%	1.4%	0%			0.9%	1.7%	0.2%	0%	0%			0.4%	0%	0%	0%	0%			0%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-

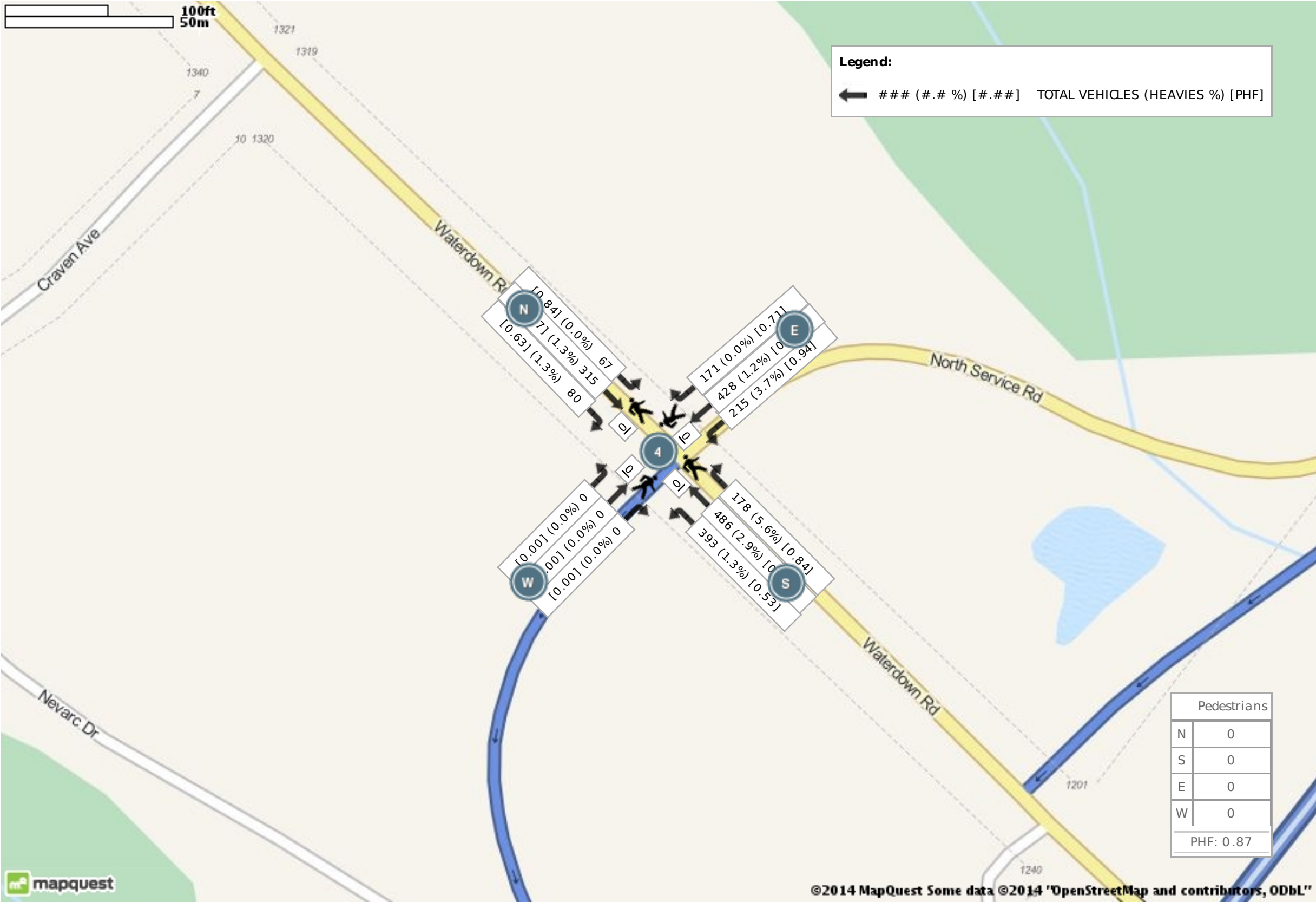
Peak: 07:30 AM - 08:30 AM



Peak: 01:00 PM - 02:00 PM



Peak: 04:45 PM - 05:45 PM





Turning Movement Count (5 . WATERDOWN RD & QEW WB OFF RAMP) MioID: 194613

Time	N Approach Waterdown Rd							E Approach QEW WB Off Ramp							S Approach Waterdown Rd							W Approach QEW WB On Ramp (N Service Rd)							Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U-Turn N:N	Peds CCW N:	Peds CW N:	Approach Total	Right E:N	Thru E:W	Left E:S	U-Turn E:E	Peds CCW E:	Peds CW E:	Approach Total	Right S:E	Thru S:N	Left S:W	U-Turn S:S	Peds CCW S:	Peds CW S:	Approach Total	Right W:S	Thru W:E	Left W:N	U-Turn W:W	Peds CCW W:	Peds CW W:	Approach Total			
07:00:00	1	110	0	0	0	0	111	19	0	30	0	0	0	49	0	101	0	0	0	0	101	0	0	0	0	0	0	0	261		
07:15:00	0	104	0	0	0	0	104	26	0	38	0	0	0	64	0	108	4	0	0	0	112	1	0	0	0	0	1	1	281		
07:30:00	1	129	0	0	0	0	130	37	0	34	0	0	0	71	0	173	0	0	0	0	173	0	0	1	0	0	0	1	375		
07:45:00	0	145	0	1	0	0	146	56	0	38	0	0	0	94	0	163	1	0	0	0	164	1	0	0	0	0	0	1	405	1322	
08:00:00	0	110	0	0	1	0	110	36	0	50	0	0	0	86	0	194	1	0	0	0	195	0	0	1	0	2	0	1	392	1453	
08:15:00	0	135	0	0	0	0	135	56	0	53	0	0	0	109	0	174	0	0	0	0	174	1	0	0	0	0	1	1	419	1591	
08:30:00	0	122	0	0	0	0	122	49	0	56	0	0	0	105	0	150	1	0	0	0	151	1	0	0	0	0	0	1	379	1595	
08:45:00	0	133	0	0	0	0	133	51	0	61	0	0	0	112	0	128	0	0	0	0	128	1	0	0	0	0	0	1	374	1564	
BREAK																															
11:00:00	0	60	0	1	0	0	61	26	0	54	0	0	0	80	0	95	1	0	0	0	96	0	0	0	0	0	0	0	237		
11:15:00	0	68	0	0	0	0	68	25	0	58	0	0	0	83	0	87	0	0	0	0	87	0	0	0	0	0	0	0	238		
11:30:00	1	73	0	0	0	0	74	34	0	49	0	0	0	83	0	84	0	0	0	0	84	0	0	0	0	0	0	0	241		
11:45:00	1	95	0	0	0	0	96	32	0	44	0	0	0	76	0	116	1	0	0	0	117	1	0	2	0	0	0	3	292	1008	
12:00:00	0	90	0	0	0	0	90	40	0	49	0	0	0	89	0	104	0	0	0	0	104	0	0	0	1	0	0	1	284	1055	
12:15:00	1	89	0	0	0	0	90	45	0	36	0	0	0	81	0	117	0	0	0	0	117	1	0	0	0	0	0	1	289	1106	
12:30:00	0	77	0	0	0	0	77	44	0	48	0	0	0	92	0	100	0	0	0	0	100	0	0	0	0	0	0	0	269	1134	
12:45:00	0	75	0	0	0	0	75	34	0	63	0	0	0	97	0	124	1	0	0	0	125	2	0	2	0	0	0	4	301	1143	
13:00:00	0	74	0	0	0	0	74	32	0	48	0	0	0	80	0	116	1	0	0	0	117	1	0	1	0	0	0	2	273	1132	
13:15:00	0	65	0	0	0	0	65	43	0	52	0	0	0	95	0	112	0	0	0	0	112	0	0	0	0	0	0	0	272	1115	
13:30:00	0	73	0	0	0	0	73	41	0	38	0	0	0	79	0	111	1	0	0	0	112	0	0	0	0	0	0	0	264	1110	
13:45:00	0	89	0	0	0	0	89	55	0	51	0	0	0	106	0	110	1	0	0	0	111	1	0	1	0	0	0	2	308	1117	
BREAK																															
15:00:00	0	101	0	0	0	0	101	35	0	51	0	0	0	86	0	127	1	0	1	0	128	1	0	0	0	0	0	1	316		
15:15:00	0	90	0	0	0	0	90	62	0	57	0	0	0	119	0	119	0	0	0	0	119	0	0	0	0	0	0	0	328		
15:30:00	0	100	0	0	0	0	100	42	0	48	0	0	0	90	0	151	2	0	0	0	153	0	0	0	0	0	0	0	343		
15:45:00	0	112	0	0	0	0	112	58	0	54	0	0	0	112	0	153	0	0	0	0	153	2	0	0	0	0	0	2	379	1366	
16:00:00	0	112	0	0	0	0	112	40	0	46	0	0	0	86	0	141	1	2	0	0	144	1	0	1	0	1	0	2	344	1394	
16:15:00	0	133	0	0	0	0	133	50	0	58	0	0	0	108	0	175	0	0	0	0	175	0	0	0	0	1	0	0	416	1482	
16:30:00	0	128	0	0	0	0	128	49	0	44	0	0	0	93	0	154	0	0	0	0	154	0	0	0	0	0	0	0	375	1514	
16:45:00	1	139	0	0	0	0	140	53	0	43	0	0	0	96	0	234	0	0	0	0	234	1	0	0	0	0	0	1	471	1606	
17:00:00	0	162	0	0	0	0	162	51	0	36	0	0	0	87	0	159	0	0	0	0	159	0	0	0	0	0	0	0	408	1670	
17:15:00	2	130	0	0	0	0	132	64	0	46	0	0	0	110	0	128	0	0	0	0	128	0	0	2	0	0	0	2	372	1626	



17:30:00	0	117	0	0	0	0	117	29	0	63	0	0	0	92	0	334	0	0	0	0	334	1	0	1	0	0	0	2	545	1796
17:45:00	0	127	0	0	0	0	127	50	0	47	0	0	0	97	0	228	0	0	0	0	228	0	0	0	0	0	0	0	452	1777
Grand Total	8	3367	0	2	1	0	3377	1364	0	1543	0	0	0	2907	0	4570	17	2	1	0	4589	17	0	12	1	4	2	30	10903	-
Approach%	0.2%	99.7%	0%	0.1%			-	46.9%	0%	53.1%	0%			-	0%	99.6%	0.4%	0%			-	56.7%	0%	40%	3.3%			-	-	-
Totals %	0.1%	30.9%	0%	0%			31%	12.5%	0%	14.2%	0%			26.7%	0%	41.9%	0.2%	0%			42.1%	0.2%	0%	0.1%	0%			0.3%	-	-
Heavies	3	137	0	0			-	52	0	138	0			-	0	248	1	0			-	5	0	0	0			-	-	-
Heavies %	37.5%	4.1%	0%	0%			-	3.8%	0%	8.9%	0%			-	0%	5.4%	5.9%	0%			-	29.4%	0%	0%	0%			-	-	-



Peak: 07:45 AM - 08:45 AM

Time	N Approach Waterdown Rd							E Approach QEW WB Off Ramp							S Approach Waterdown Rd							W Approach QEW WB On Ramp (N Service Rd)							Int. Total (15 min)	
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total		
07:45:00	0	145	0	1	0	0	146	56	0	38	0	0	0	94	0	163	1	0	0	0	0	164	1	0	0	0	0	0	1	405
08:00:00	0	110	0	0	1	0	110	36	0	50	0	0	0	86	0	194	1	0	0	0	0	195	0	0	1	0	2	0	1	392
08:15:00	0	135	0	0	0	0	135	56	0	53	0	0	0	109	0	174	0	0	0	0	0	174	1	0	0	0	0	1	1	419
08:30:00	0	122	0	0	0	0	122	49	0	56	0	0	0	105	0	150	1	0	0	0	0	151	1	0	0	0	0	0	1	379
Grand Total	0	512	0	1	1	0	513	197	0	197	0	0	0	394	0	681	3	0	0	0	0	684	3	0	1	0	2	1	4	1595
Approach%	0%	99.8%	0%	0.2%			-	50%	0%	50%	0%			-	0%	99.6%	0.4%	0%			-	75%	0%	25%	0%			-		-
Totals %	0%	32.1%	0%	0.1%			32.2%	12.4%	0%	12.4%	0%			24.7%	0%	42.7%	0.2%	0%			42.9%	0.2%	0%	0.1%	0%			0.3%		-
PHF	0	0.88	0	0.25			0.88	0.88	0	0.88	0			0.9	0	0.88	0.75	0			0.88	0.75	0	0.25	0			1		-
Heavies	0	16	0	0			16	8	0	12	0			20	0	31	1	0			32	2	0	0	0			2		-
Heavies %	0%	3%	0%	0%			3.1%	4%	0%	6%	0%			5.1%	0%	5%	33%	0%			4.7%	67%	0%	0%	0%			50%		-
Lights	0	496	0	1			497	189	0	185	0			374	0	650	2	0			652	1	0	1	0			2		-
Lights %	0%	96.9%	0%	100%			96.9%	95.9%	0%	93.9%	0%			94.9%	0%	95.4%	66.7%	0%			95.3%	33.3%	0%	100%	0%			50%		-
SingleUnit Trucks	0	7	0	0			7	4	0	9	0			13	0	11	0	0			11	1	0	0	0			1		-
SingleUnit Trucks %	0%	1.4%	0%	0%			1.4%	2%	0%	4.6%	0%			3.3%	0%	1.6%	0%	0%			1.6%	33.3%	0%	0%	0%			25%		-
Buses	0	7	0	0			7	1	0	2	0			3	0	15	1	0			16	1	0	0	0			1		-
Buses %	0%	1.4%	0%	0%			1.4%	0.5%	0%	1%	0%			0.8%	0%	2.2%	33.3%	0%			2.3%	33.3%	0%	0%	0%			25%		-
Articulated Trucks	0	2	0	0			2	3	0	1	0			4	0	5	0	0			5	0	0	0	0			0		-
Articulated Trucks %	0%	0.4%	0%	0%			0.4%	1.5%	0%	0.5%	0%			1%	0%	0.7%	0%	0%			0.7%	0%	0%	0%	0%			0%		-
Pedestrians	-	-	-	-	1	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	2	1	-		-
Pedestrians%	-	-	-	-	25%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	50%	25%			-



Peak: 12:00 PM - 01:00 PM

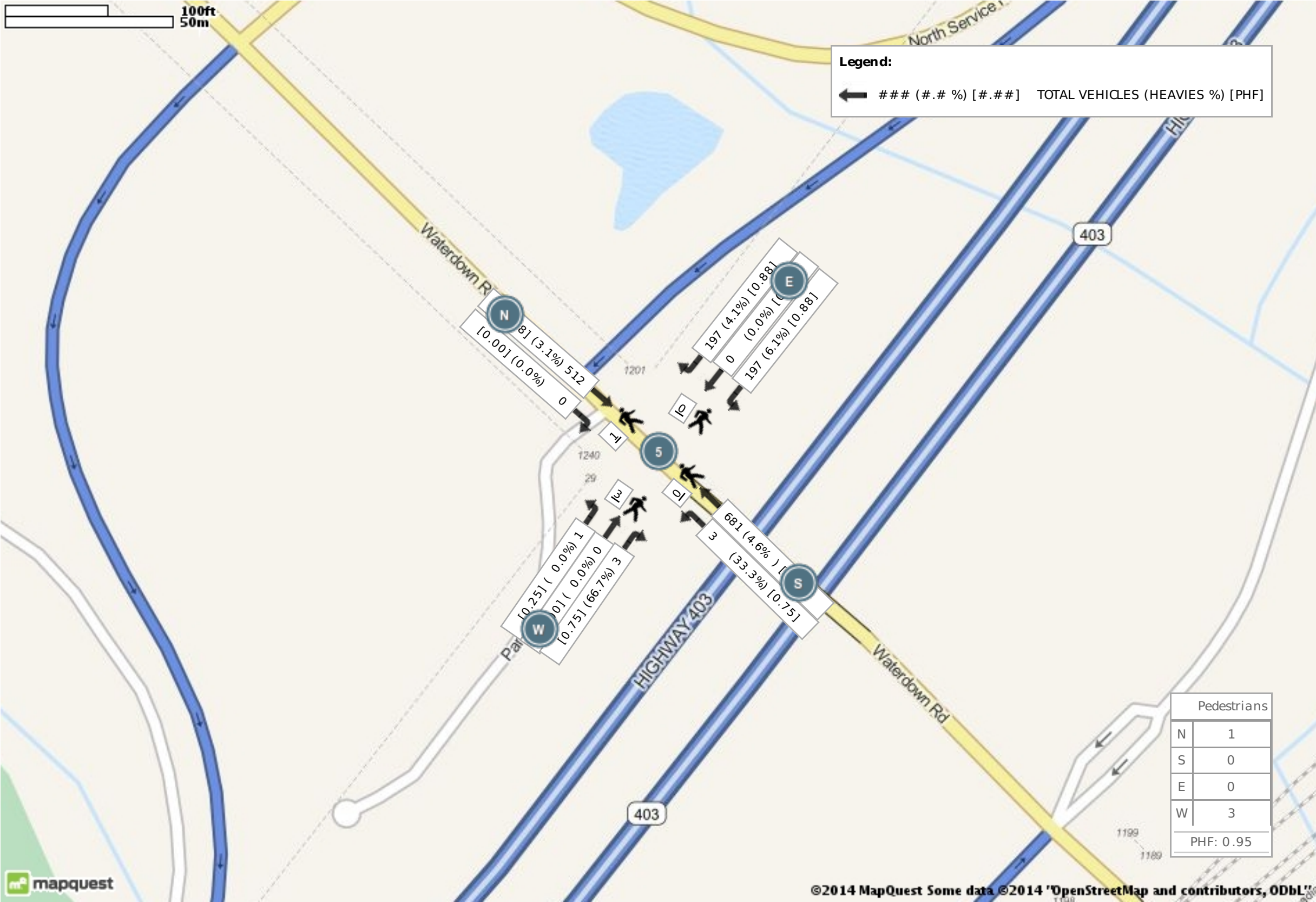
Time	N Approach Waterdown Rd							E Approach QEW WB Off Ramp							S Approach Waterdown Rd							W Approach QEW WB On Ramp (N Service Rd)							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
12:00:00	0	90	0	0	0	0	90	40	0	49	0	0	0	89	0	104	0	0	0	0	104	0	0	0	1	0	0	1	284
12:15:00	1	89	0	0	0	0	90	45	0	36	0	0	0	81	0	117	0	0	0	0	117	1	0	0	0	0	0	1	289
12:30:00	0	77	0	0	0	0	77	44	0	48	0	0	0	92	0	100	0	0	0	0	100	0	0	0	0	0	0	0	269
12:45:00	0	75	0	0	0	0	75	34	0	63	0	0	0	97	0	124	1	0	0	0	125	2	0	2	0	0	0	4	301
Grand Total	1	331	0	0	0	0	332	163	0	196	0	0	0	359	0	445	1	0	0	0	446	3	0	2	1	0	0	6	1143
Approach%	0.3%	99.7%	0%	0%			-	45.4%	0%	54.6%	0%			-	0%	99.8%	0.2%	0%			-	50%	0%	33.3%	16.7%			-	-
Totals %	0.1%	29%	0%	0%			29%	14.3%	0%	17.1%	0%			31.4%	0%	38.9%	0.1%	0%			39%	0.3%	0%	0.2%	0.1%			0.5%	-
PHF	0.25	0.92	0	0			0.92	0.91	0	0.78	0			0.93	0	0.9	0.25	0			0.89	0.38	0	0.25	0.25			0.38	-
Heavies	0	14	0	0			14	3	0	23	0			26	0	26	0	0			26	0	0	0	0			0	-
Heavies %	0%	4%	0%	0%			4.2%	2%	0%	12%	0%			7.2%	0%	6%	0%	0%			5.8%	0%	0%	0%	0%			0%	-
Lights	1	317	0	0			318	160	0	173	0			333	0	419	1	0			420	3	0	2	1			6	-
Lights %	100%	95.8%	0%	0%			95.8%	98.2%	0%	88.3%	0%			92.8%	0%	94.2%	100%	0%			94.2%	100%	0%	100%	100%			100%	-
SingleUnit Trucks	0	9	0	0			9	1	0	14	0			15	0	16	0	0			16	0	0	0	0			0	-
SingleUnit Trucks %	0%	2.7%	0%	0%			2.7%	0.6%	0%	7.1%	0%			4.2%	0%	3.6%	0%	0%			3.6%	0%	0%	0%	0%			0%	-
Buses	0	1	0	0			1	1	0	2	0			3	0	4	0	0			4	0	0	0	0			0	-
Buses %	0%	0.3%	0%	0%			0.3%	0.6%	0%	1%	0%			0.8%	0%	0.9%	0%	0%			0.9%	0%	0%	0%	0%			0%	-
Articulated Trucks	0	4	0	0			4	1	0	7	0			8	0	6	0	0			6	0	0	0	0			0	-
Articulated Trucks %	0%	1.2%	0%	0%			1.2%	0.6%	0%	3.6%	0%			2.2%	0%	1.3%	0%	0%			1.3%	0%	0%	0%	0%			0%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-



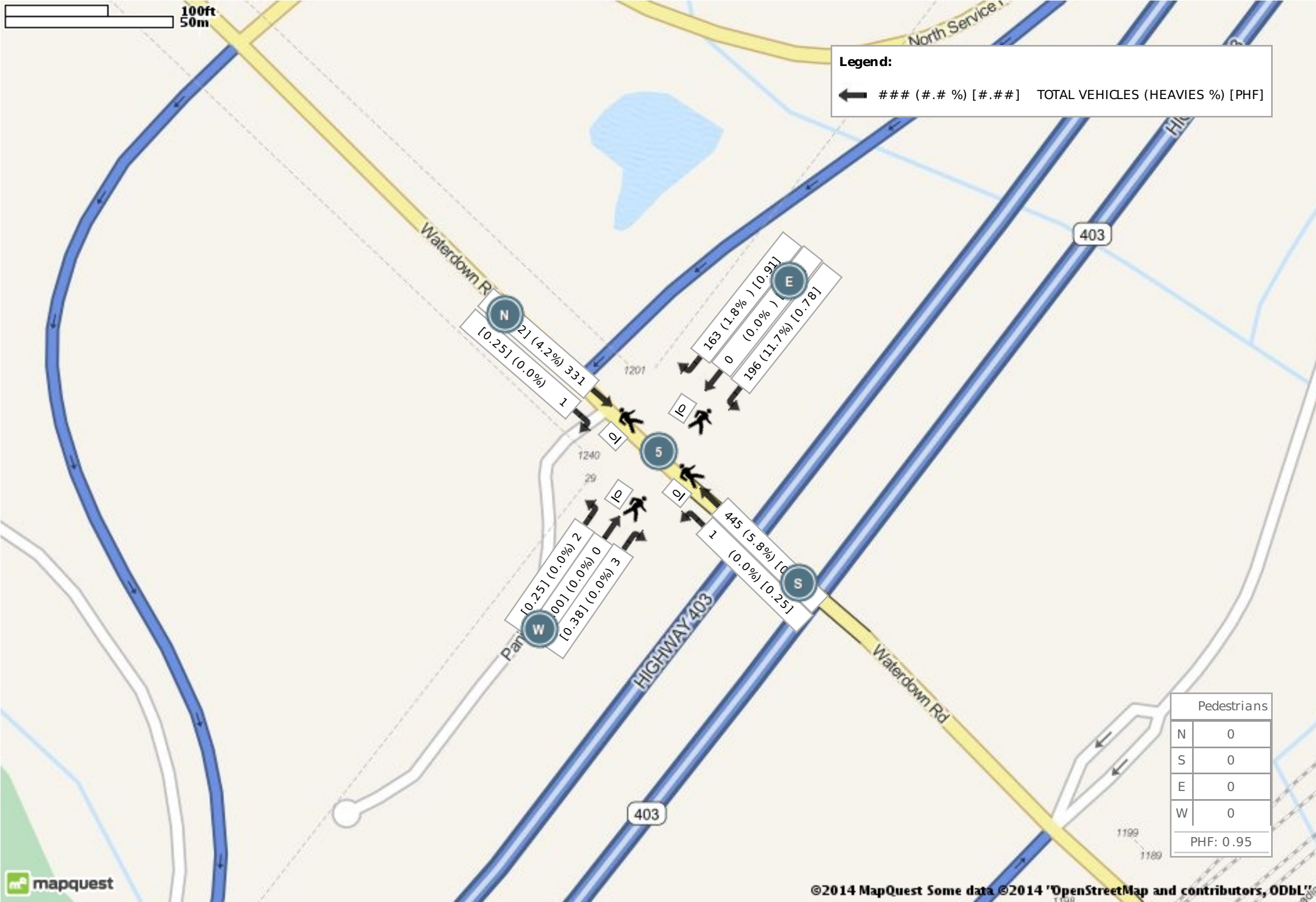
Peak: 04:45 PM - 05:45 PM

Time	N Approach Waterdown Rd							E Approach QEW WB Off Ramp							S Approach Waterdown Rd							W Approach QEW WB On Ramp (N Service Rd)							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
16:45:00	1	139	0	0	0	0	140	53	0	43	0	0	0	96	0	234	0	0	0	0	234	1	0	0	0	0	0	1	471
17:00:00	0	162	0	0	0	0	162	51	0	36	0	0	0	87	0	159	0	0	0	0	159	0	0	0	0	0	0	0	408
17:15:00	2	130	0	0	0	0	132	64	0	46	0	0	0	110	0	128	0	0	0	0	128	0	0	2	0	0	0	2	372
17:30:00	0	117	0	0	0	0	117	29	0	63	0	0	0	92	0	334	0	0	0	0	334	1	0	1	0	0	0	2	545
Grand Total	3	548	0	0	0	0	551	197	0	188	0	0	0	385	0	855	0	0	0	0	855	2	0	3	0	0	0	5	1796
Approach%	0.5%	99.5%	0%	0%			-	51.2%	0%	48.8%	0%			-	0%	100%	0%	0%			-	40%	0%	60%	0%			-	-
Totals %	0.2%	30.5%	0%	0%			30.7%	11%	0%	10.5%	0%			21.4%	0%	47.6%	0%	0%			47.6%	0.1%	0%	0.2%	0%			0.3%	-
PHF	0.38	0.85	0	0			0.85	0.77	0	0.75	0			0.88	0	0.64	0	0			0.64	0.5	0	0.38	0			0.63	-
Heavies	3	11	0	0			14	7	0	13	0			20	0	19	0	0			19	1	0	0	0			1	-
Heavies %	100%	2%	0%	0%			2.5%	4%	0%	7%	0%			5.2%	0%	2%	0%	0%			2.2%	50%	0%	0%	0%			20%	-
Lights	0	537	0	0			537	190	0	175	0			365	0	836	0	0			836	1	0	3	0			4	-
Lights %	0%	98%	0%	0%			97.5%	96.4%	0%	93.1%	0%			94.8%	0%	97.8%	0%	0%			97.8%	50%	0%	100%	0%			80%	-
SingleUnit Trucks	2	4	0	0			6	6	0	7	0			13	0	6	0	0			6	0	0	0	0			0	-
SingleUnit Trucks %	66.7%	0.7%	0%	0%			1.1%	3%	0%	3.7%	0%			3.4%	0%	0.7%	0%	0%			0.7%	0%	0%	0%	0%			0%	-
Buses	1	4	0	0			5	0	0	1	0			1	0	11	0	0			11	1	0	0	0			1	-
Buses %	33.3%	0.7%	0%	0%			0.9%	0%	0%	0.5%	0%			0.3%	0%	1.3%	0%	0%			1.3%	50%	0%	0%	0%			20%	-
Articulated Trucks	0	3	0	0			3	1	0	5	0			6	0	2	0	0			2	0	0	0	0			0	-
Articulated Trucks %	0%	0.5%	0%	0%			0.5%	0.5%	0%	2.7%	0%			1.6%	0%	0.2%	0%	0%			0.2%	0%	0%	0%	0%			0%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-

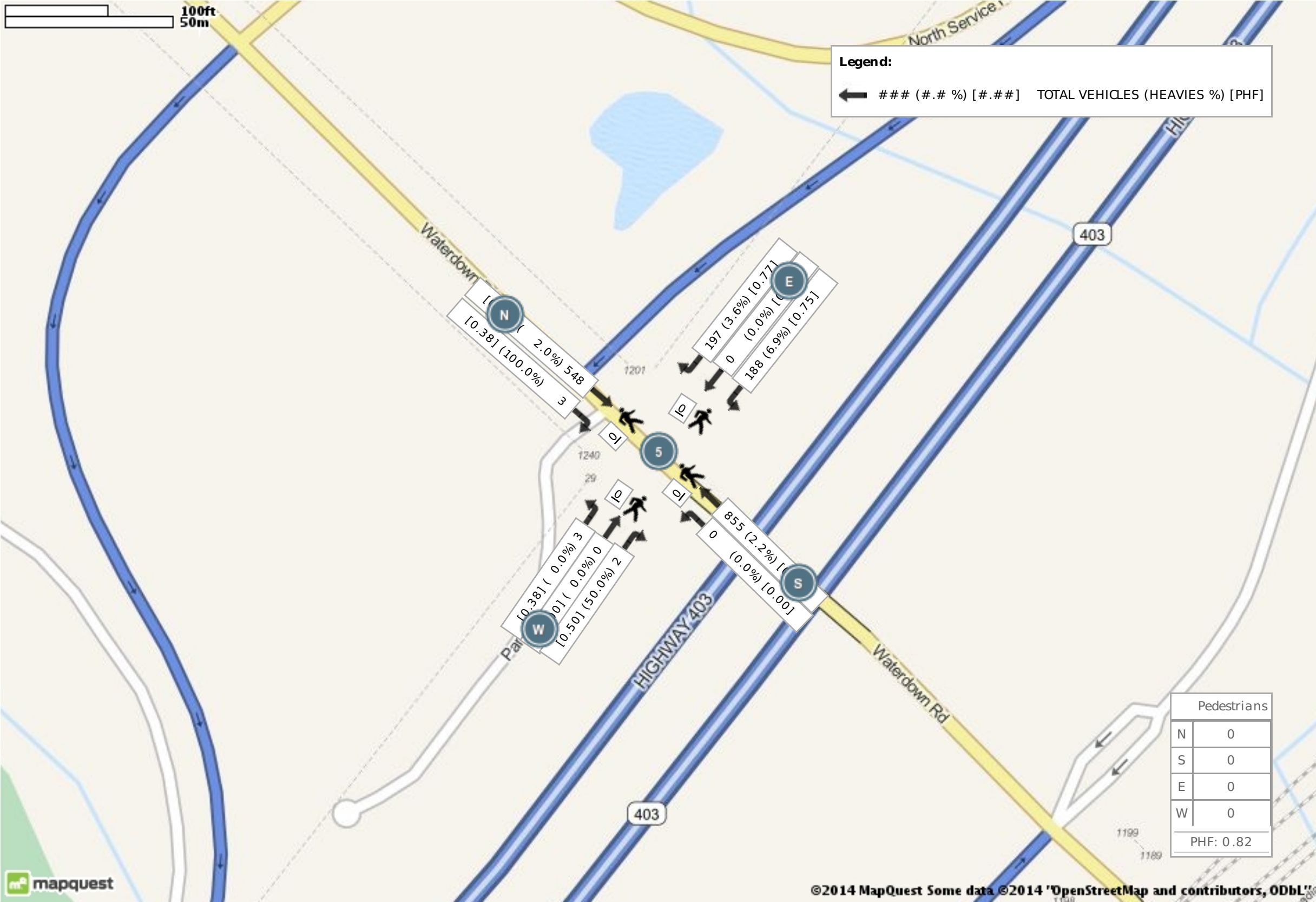
Peak: 07:45 AM - 08:45 AM



Peak: 12:00 PM - 01:00 PM



Peak: 04:45 PM - 05:45 PM





Turning Movement Count (6 . WATERDOWN RD & QEW EB OFF RAMP / SOUTH SERVICE RD) MioID: 194612

Time	N Approach Waterdown Rd							E Approach South Service Rd							S Approach Waterdown Rd							W Approach QEW EB Off Ramp							Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	Left N:E	U- Turn N:N	Peds CCW N:	Peds CW N:	Approach Total	Right E:N	Thru E:W	Left E:S	U- Turn E:E	Peds CCW E:	Peds CW E:	Approach Total	Right S:E	Thru S:N	Left S:W	U- Turn S:S	Peds CCW S:	Peds CW S:	Approach Total	Right W:S	Thru W:E	Left W:N	U- Turn W:W	Peds CCW W:	Peds CW W:	Approach Total		
07:00:00	0	65	76	0	0	0	141	15	0	2	0	0	0	17	83	59	0	0	0	1	142	61	80	31	0	0	0	172	472	
07:15:00	0	82	70	0	0	0	152	16	0	6	0	0	0	22	97	62	0	0	0	0	159	61	96	45	0	0	2	202	535	
07:30:00	0	81	78	0	0	0	159	13	0	6	0	0	0	19	85	99	0	0	0	0	184	70	63	64	0	0	0	197	559	
07:45:00	0	84	103	0	0	0	187	6	0	4	0	0	0	10	91	101	0	0	0	0	192	50	24	56	0	0	0	130	519	2085
08:00:00	0	95	63	0	0	0	158	16	0	6	0	0	0	22	97	123	0	0	0	0	220	54	29	54	0	0	0	137	537	2150
08:15:00	0	100	89	0	0	0	189	10	0	6	0	0	0	16	67	101	0	0	0	1	168	53	13	64	0	0	1	130	503	2118
08:30:00	0	107	67	0	0	0	174	6	0	4	0	0	0	10	71	76	0	0	0	0	147	52	17	68	0	0	0	137	468	2027
08:45:00	0	115	83	0	0	0	198	1	0	3	0	0	0	4	77	65	0	0	0	0	142	40	13	62	0	1	0	115	459	1967
BREAK																														
11:00:00	0	79	30	0	0	0	109	4	0	3	0	0	0	7	42	68	0	0	0	0	110	37	7	26	0	0	0	70	296	
11:15:00	0	88	36	0	0	0	124	3	0	2	0	0	0	5	42	64	0	0	0	0	106	49	5	16	0	0	0	70	305	
11:30:00	0	72	47	0	0	0	119	4	0	4	0	0	0	8	62	69	0	0	0	0	131	52	7	13	0	0	0	72	330	
11:45:00	0	94	44	0	0	0	138	9	0	3	0	0	0	12	43	94	0	0	0	1	137	54	10	17	0	0	0	81	368	1299
12:00:00	0	104	36	0	0	0	140	7	0	1	0	0	0	8	51	71	0	0	0	0	122	47	15	28	0	0	0	90	360	1363
12:15:00	0	73	53	0	0	0	126	8	0	3	0	0	0	11	53	83	0	0	0	0	136	50	7	22	0	0	1	79	352	1410
12:30:00	0	86	40	0	0	0	126	6	0	3	0	0	0	9	61	77	0	0	0	0	138	37	10	20	0	0	0	67	340	1420
12:45:00	0	92	44	0	0	0	136	12	0	5	0	0	0	17	51	87	0	0	0	0	138	37	10	20	0	0	0	67	358	1410
13:00:00	0	86	36	0	0	0	122	9	0	6	0	0	0	15	50	87	0	0	0	0	137	33	3	26	0	0	0	62	336	1386
13:15:00	0	79	37	0	0	0	116	10	0	6	0	0	0	16	50	78	0	0	0	0	128	42	7	22	0	0	0	71	331	1365
13:30:00	0	80	33	0	0	0	113	6	0	4	0	0	0	10	47	84	0	0	0	0	131	51	5	28	0	0	0	84	338	1363
13:45:00	0	93	50	0	0	0	143	17	0	4	0	0	0	21	51	78	0	0	0	0	129	34	9	17	0	0	0	60	353	1358
BREAK																														
15:00:00	0	97	56	0	0	0	153	12	0	3	0	0	0	15	50	102	0	0	1	0	152	49	7	17	0	0	0	73	393	
15:15:00	0	91	47	0	0	0	138	8	0	7	0	0	0	15	60	89	0	0	0	0	149	56	11	27	0	0	0	94	396	
15:30:00	0	94	62	0	0	0	156	12	0	1	0	0	0	13	45	94	0	0	0	1	139	47	8	35	0	0	0	90	398	
15:45:00	0	117	50	0	0	0	167	24	0	3	0	0	0	27	58	110	0	0	0	0	168	53	15	25	0	1	0	93	455	1642
16:00:00	0	105	57	0	0	0	162	13	0	8	0	0	0	21	62	100	0	0	0	0	162	50	15	32	0	0	0	97	442	1691
16:15:00	0	118	67	0	0	0	185	39	0	9	0	0	0	48	65	108	0	0	2	0	173	44	13	30	0	2	0	87	493	1788
16:30:00	0	108	73	0	0	0	181	15	0	3	0	0	0	18	55	102	0	0	0	0	157	41	9	28	0	0	0	78	434	1824
16:45:00	0	116	66	0	0	0	182	64	0	5	0	0	0	69	50	126	0	0	1	0	176	59	7	53	0	0	0	119	546	1915
17:00:00	0	119	74	0	0	0	193	13	0	5	0	0	0	18	54	99	0	0	0	2	153	66	13	37	0	0	0	116	480	1953
17:15:00	0	115	60	0	0	0	175	11	0	9	0	0	0	20	64	93	0	0	0	0	157	57	25	31	0	0	0	113	465	1925



17:30:00	0	126	54	0	0	0	180	154	0	38	0	0	0	192	59	149	0	0	0	0	208	62	14	40	0	0	0	116	696	2187
17:45:00	0	116	61	0	0	0	177	80	0	16	0	0	0	96	52	119	0	0	0	0	171	39	18	21	0	0	0	78	522	2163
Grand Total	0	3077	1842	0	0	0	4919	623	0	188	0	0	0	811	1945	2917	0	0	4	6	4862	1587	585	1075	0	4	4	3247	13839	-
Approach%	0%	62.6%	37.4%	0%			-	76.8%	0%	23.2%	0%			-	40%	60%	0%	0%			-	48.9%	18%	33.1%	0%			-	-	-
Totals %	0%	22.2%	13.3%	0%			35.5%	4.5%	0%	1.4%	0%			5.9%	14.1%	21.1%	0%	0%			35.1%	11.5%	4.2%	7.8%	0%			23.5%	-	-
Heavies	0	191	87	0			-	51	0	45	0			-	181	174	0	0			-	131	32	37	0			-	-	-
Heavies %	0%	6.2%	4.7%	0%			-	8.2%	0%	23.9%	0%			-	9.3%	6%	0%	0%			-	8.3%	5.5%	3.4%	0%			-	-	-



Peak: 07:15 AM - 08:15 AM

Time	N Approach Waterdown Rd							E Approach South Service Rd							S Approach Waterdown Rd							W Approach QEW EB Off Ramp							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
07:15:00	0	82	70	0	0	0	152	16	0	6	0	0	0	22	97	62	0	0	0	0	159	61	96	45	0	0	2	202	535
07:30:00	0	81	78	0	0	0	159	13	0	6	0	0	0	19	85	99	0	0	0	0	184	70	63	64	0	0	0	197	559
07:45:00	0	84	103	0	0	0	187	6	0	4	0	0	0	10	91	101	0	0	0	0	192	50	24	56	0	0	0	130	519
08:00:00	0	95	63	0	0	0	158	16	0	6	0	0	0	22	97	123	0	0	0	0	220	54	29	54	0	0	0	137	537
Grand Total	0	342	314	0	0	0	656	51	0	22	0	0	0	73	370	385	0	0	0	0	755	235	212	219	0	0	2	666	2150
Approach%	0%	52.1%	47.9%	0%			-	69.9%	0%	30.1%	0%			-	49%	51%	0%	0%			-	35.3%	31.8%	32.9%	0%			-	-
Totals %	0%	15.9%	14.6%	0%			30.5%	2.4%	0%	1%	0%			3.4%	17.2%	17.9%	0%	0%			35.1%	10.9%	9.9%	10.2%	0%			31%	-
PHF	0	0.9	0.76	0			0.88	0.8	0	0.92	0			0.83	0.95	0.78	0	0			0.86	0.84	0.55	0.86	0			0.82	-
Heavies	0	27	12	0			39	7	0	7	0			14	21	21	0	0			42	9	4	7	0			20	-
Heavies %	0%	8%	4%	0%			5.9%	14%	0%	32%	0%			19.2%	6%	5%	0%	0%			5.6%	4%	2%	3%	0%			3%	-
Lights	0	315	302	0			617	44	0	15	0			59	349	364	0	0			713	226	208	212	0			646	-
Lights %	0%	92.1%	96.2%	0%			94.1%	86.3%	0%	68.2%	0%			80.8%	94.3%	94.5%	0%	0%			94.4%	96.2%	98.1%	96.8%	0%			97%	-
SingleUnit Trucks	0	12	3	0			15	0	0	1	0			1	15	10	0	0			25	3	0	6	0			9	-
SingleUnit Trucks %	0%	3.5%	1%	0%			2.3%	0%	0%	4.5%	0%			1.4%	4.1%	2.6%	0%	0%			3.3%	1.3%	0%	2.7%	0%			1.4%	-
Buses	0	12	5	0			17	7	0	6	0			13	5	6	0	0			11	0	4	0	0			4	-
Buses %	0%	3.5%	1.6%	0%			2.6%	13.7%	0%	27.3%	0%			17.8%	1.4%	1.6%	0%	0%			1.5%	0%	1.9%	0%	0%			0.6%	-
Articulated Trucks	0	3	4	0			7	0	0	0	0			0	1	5	0	0			6	6	0	1	0			7	-
Articulated Trucks %	0%	0.9%	1.3%	0%			1.1%	0%	0%	0%	0%			0%	0.3%	1.3%	0%	0%			0.8%	2.6%	0%	0.5%	0%			1.1%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	2	-	-
Pedestrians%	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-	-	-	-	0%	100%	-	-



Peak: 11:45 AM - 12:45 PM

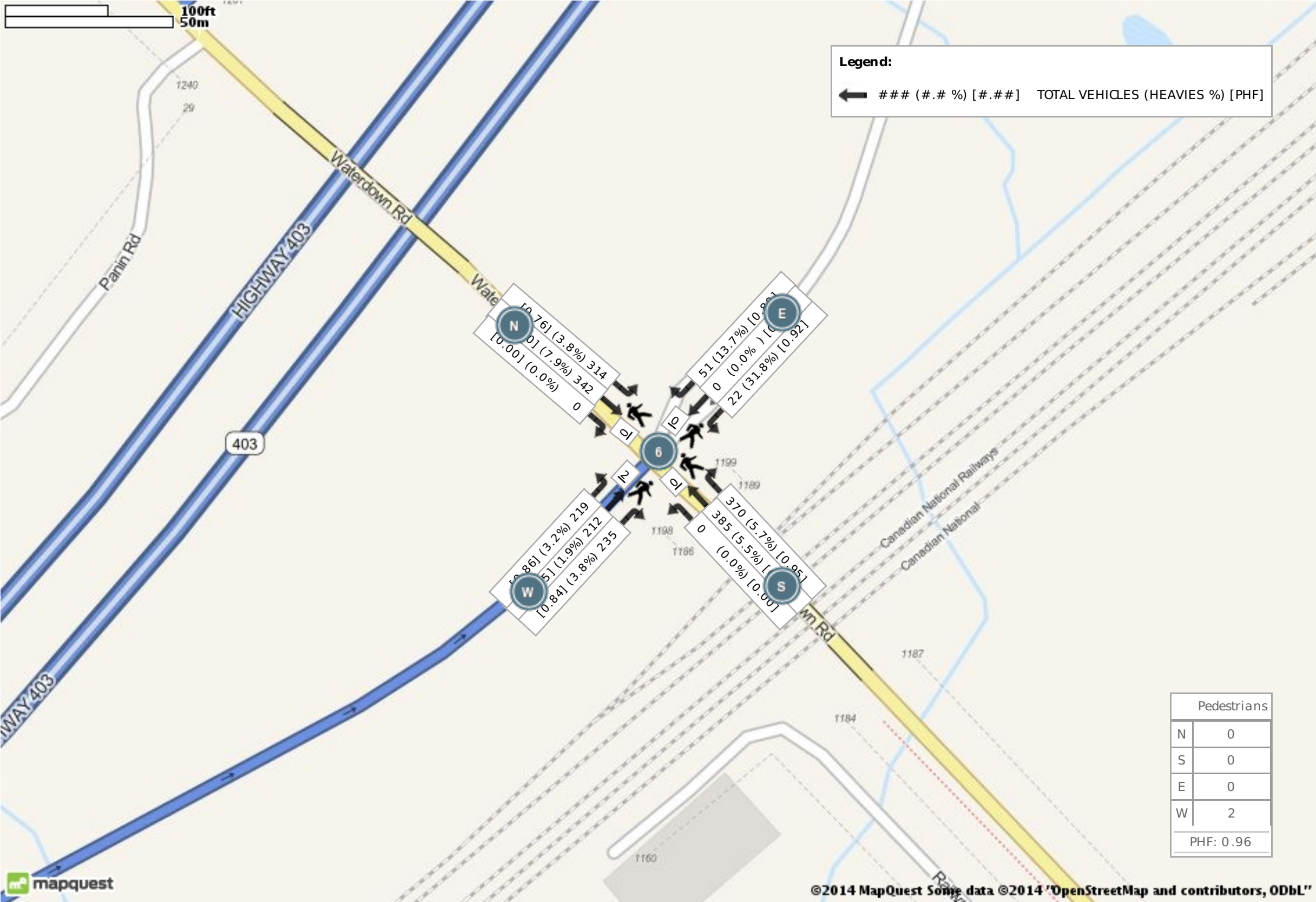
Time	N Approach Waterdown Rd							E Approach South Service Rd							S Approach Waterdown Rd							W Approach QEW EB Off Ramp							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
11:45:00	0	94	44	0	0	0	138	9	0	3	0	0	0	12	43	94	0	0	0	1	137	54	10	17	0	0	0	81	368
12:00:00	0	104	36	0	0	0	140	7	0	1	0	0	0	8	51	71	0	0	0	0	122	47	15	28	0	0	0	90	360
12:15:00	0	73	53	0	0	0	126	8	0	3	0	0	0	11	53	83	0	0	0	0	136	50	7	22	0	0	1	79	352
12:30:00	0	86	40	0	0	0	126	6	0	3	0	0	0	9	61	77	0	0	0	0	138	37	10	20	0	0	0	67	340
Grand Total	0	357	173	0	0	0	530	30	0	10	0	0	0	40	208	325	0	0	0	1	533	188	42	87	0	0	1	317	1420
Approach%	0%	67.4%	32.6%	0%			-	75%	0%	25%	0%			-	39%	61%	0%	0%			-	59.3%	13.2%	27.4%	0%			-	-
Totals %	0%	25.1%	12.2%	0%			37.3%	2.1%	0%	0.7%	0%			2.8%	14.6%	22.9%	0%	0%			37.5%	13.2%	3%	6.1%	0%			22.3%	-
PHF	0	0.86	0.82	0			0.95	0.83	0	0.83	0			0.83	0.85	0.86	0	0			0.97	0.87	0.7	0.78	0			0.88	-
Heavies	0	30	9	0			39	5	0	4	0			9	23	26	0	0			49	21	3	4	0			28	-
Heavies %	0%	8%	5%	0%			7.4%	17%	0%	40%	0%			22.5%	11%	8%	0%	0%			9.2%	11%	7%	5%	0%			8.8%	-
Lights	0	327	164	0			491	25	0	6	0			31	185	299	0	0			484	167	39	83	0			289	-
Lights %	0%	91.6%	94.8%	0%			92.6%	83.3%	0%	60%	0%			77.5%	88.9%	92%	0%	0%			90.8%	88.8%	92.9%	95.4%	0%			91.2%	-
SingleUnit Trucks	0	20	5	0			25	1	0	0	0			1	11	17	0	0			28	15	0	3	0			18	-
SingleUnit Trucks %	0%	5.6%	2.9%	0%			4.7%	3.3%	0%	0%	0%			2.5%	5.3%	5.2%	0%	0%			5.3%	8%	0%	3.4%	0%			5.7%	-
Buses	0	1	2	0			3	4	0	4	0			8	5	1	0	0			6	0	3	1	0			4	-
Buses %	0%	0.3%	1.2%	0%			0.6%	13.3%	0%	40%	0%			20%	2.4%	0.3%	0%	0%			1.1%	0%	7.1%	1.1%	0%			1.3%	-
Articulated Trucks	0	9	2	0			11	0	0	0	0			0	7	8	0	0			15	6	0	0	0			6	-
Articulated Trucks %	0%	2.5%	1.2%	0%			2.1%	0%	0%	0%	0%			0%	3.4%	2.5%	0%	0%			2.8%	3.2%	0%	0%	0%			1.9%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	1	-	-	-	-	-	0	1	-	-
Pedestrians%	-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	50%		-	-	-	-	0%	50%		-



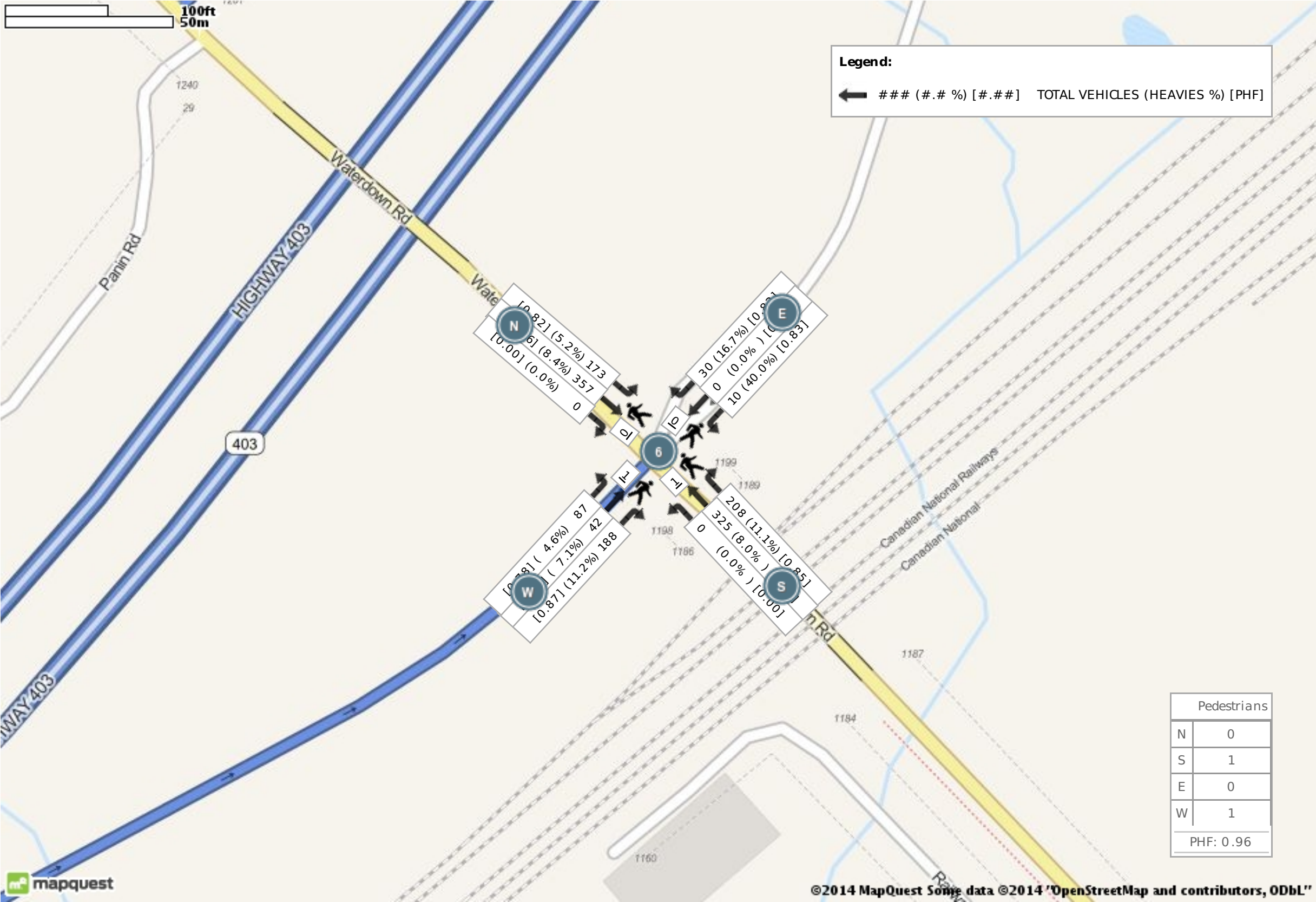
Peak: 04:45 PM - 05:45 PM

Time	N Approach Waterdown Rd							E Approach South Service Rd							S Approach Waterdown Rd							W Approach QEW EB Off Ramp							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
16:45:00	0	116	66	0	0	0	182	64	0	5	0	0	0	69	50	126	0	0	1	0	176	59	7	53	0	0	0	119	546
17:00:00	0	119	74	0	0	0	193	13	0	5	0	0	0	18	54	99	0	0	0	2	153	66	13	37	0	0	0	116	480
17:15:00	0	115	60	0	0	0	175	11	0	9	0	0	0	20	64	93	0	0	0	0	157	57	25	31	0	0	0	113	465
17:30:00	0	126	54	0	0	0	180	154	0	38	0	0	0	192	59	149	0	0	0	0	208	62	14	40	0	0	0	116	696
Grand Total	0	476	254	0	0	0	730	242	0	57	0	0	0	299	227	467	0	0	1	2	694	244	59	161	0	0	0	464	2187
Approach%	0%	65.2%	34.8%	0%			-	80.9%	0%	19.1%	0%			-	32.7%	67.3%	0%	0%			-	52.6%	12.7%	34.7%	0%			-	-
Totals %	0%	21.8%	11.6%	0%			33.4%	11.1%	0%	2.6%	0%			13.7%	10.4%	21.4%	0%	0%			31.7%	11.2%	2.7%	7.4%	0%			21.2%	-
PHF	0	0.94	0.86	0			0.95	0.39	0	0.38	0			0.39	0.89	0.78	0	0			0.83	0.92	0.59	0.76	0			0.97	-
Heavies	0	13	11	0			24	9	0	6	0			15	14	8	0	0			22	11	4	4	0			19	-
Heavies %	0%	3%	4%	0%			3.3%	4%	0%	11%	0%			5%	6%	2%	0%	0%			3.2%	5%	7%	2%	0%			4.1%	-
Lights	0	463	243	0			706	233	0	51	0			284	213	459	0	0			672	233	55	157	0			445	-
Lights %	0%	97.3%	95.7%	0%			96.7%	96.3%	0%	89.5%	0%			95%	93.8%	98.3%	0%	0%			96.8%	95.5%	93.2%	97.5%	0%			95.9%	-
SingleUnit Trucks	0	8	3	0			11	1	0	0	0			1	7	8	0	0			15	5	0	0	0			5	-
SingleUnit Trucks %	0%	1.7%	1.2%	0%			1.5%	0.4%	0%	0%	0%			0.3%	3.1%	1.7%	0%	0%			2.2%	2%	0%	0%	0%			1.1%	-
Buses	0	1	5	0			6	8	0	6	0			14	7	0	0	0			7	0	4	2	0			6	-
Buses %	0%	0.2%	2%	0%			0.8%	3.3%	0%	10.5%	0%			4.7%	3.1%	0%	0%	0%			1%	0%	6.8%	1.2%	0%			1.3%	-
Articulated Trucks	0	4	3	0			7	0	0	0	0			0	0	0	0	0			0	6	0	2	0			8	-
Articulated Trucks %	0%	0.8%	1.2%	0%			1%	0%	0%	0%	0%			0%	0%	0%	0%	0%			0%	2.5%	0%	1.2%	0%			1.7%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	1	2	-	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	-	0%	0%	-	-	-	-	-	0%	0%	-	-	-	-	-	33.3%	66.7%	-	-	-	-	-	0%	0%	-	-

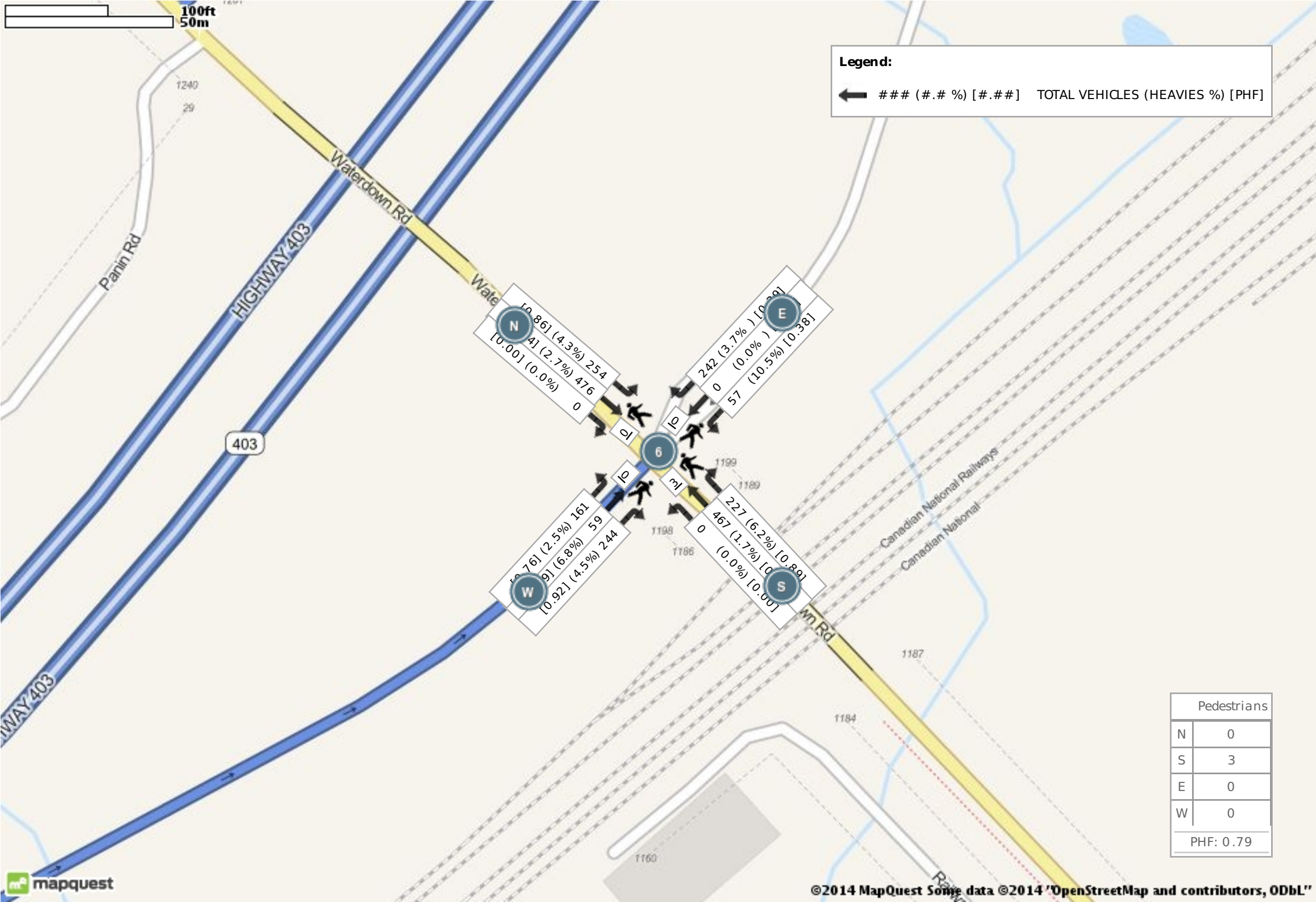
Peak: 07:15 AM - 08:15 AM



Peak: 11:45 AM - 12:45 PM



Peak: 04:45 PM - 05:45 PM



Waterdown Road & Masonry Court

Date: October 29, 2014

Counted By: AG

TIME ENDING	Masonry															Waterdown															15 Min Sum	60 Min Sum		
	EASTBOUND							WESTBOUND								NORTHBOUND							SOUTHBOUND											
	CAR			HV				PED	CYC	CAR			HV					PED	CYC	CAR			HV					PED	CYC					
	L	T	R	L	T	R	L			T	R	L	T	R	L	T	R			L	T	R	L	T	R									
07:15	4	0	3	19	0	3	0	0	1	0	3	0	0	0	0	0	0	98	7	1	5	0	0	0	44	62	2	0	3	4	0	0	259	
07:30	2	0	0	6	0	2	0	0	2	0	6	0	0	0	0	0	0	151	7	1	4	0	0	0	43	84	0	1	11	2	0	0	322	
07:45	5	0	2	5	0	0	0	0	1	0	13	0	0	1	0	0	2	180	12		7	0	0	1	36	101	1	0	12	3	0	0	382	
08:00	2	0	2	4	0	0	0	1	2	0	12	0	0	0	0	0	2	165	11	1	8	0	0	0	20	127	2	1	7	4	0	0	371	1334
08:15	0	0	4	5	0	1	0	0	5	0	4	0	0	0	0	0	2	158	7		7	0	0	0	23	115	1	0	3	6	0	0	341	1416
08:30	0	0	0	5	0	1	0	1	0	0	7	0	0	0	0	0	0	166	3	1	5	0	0	0	24	105		0	5	2	0	0	325	1419
08:45	4	0	3	0	0	0	0	1	1	0	9	0	0	0	0	0	0	136	2		6	0	0	0	15	114	1	0	6	3	0	0	301	1338
09:00	0	0	0	3	0	1	0	0	2	0	8	0	0	0	0	0	2	131	4		7	0	0	0	23	130	1	0	8	5	0	0	325	1292
11:15	1	0	0	1	0	1	0	0	1	0	7	0	0	0	0	0	0	79	1	1	4	0	0	0	6	101	2	0	6	5	0	0	216	
11:30	1	0	1	2	0		0	0	1	0	8	0	0	0	0	0	0	83	2	0	4	0	1	1	5	116	1	0	7	5	0	0	238	
11:45	3	0	1	1	0		0	0	0	0	9	0	0	0	0	0	0	115	0	0	5	0	0	0	8	121	1	0	9	6	0	0	279	
12:00	0	0	1	6	0	1	0	0	2	0	7	0	0	1	0	0	1	99	2	0	8	0	0	0	12	100	1	1	8	3	0	0	253	986
12:15	3	0	3	5	0	0	0	0	0	0	5	0	0	0	0	0	0	69	4	0	4	0	0	0	8	103	0	0	6	1	0	0	211	981
12:30	2	0	0	2	0	0	0	0	4	0	12	0	0	0	0	0	2	89	1	0	3	0	0	0	6	100	1	0	6	1	0	0	229	972
12:45	2	0	2	2	0	0	0	0	1	0	7	0	0	1	0	0	1	88	2	0	2	0	0	0	7	102	2	1	5	1	0	0	226	919
13:00	1	0	0	1	0	0	0	0	1	0	8	0	0	0	0	0	0	100	0	0	5	0	0	0	2	83	0	0	2	5	0	0	208	874
13:15	1	0	1	1	0	2	0	0	1	0	4	0	0	1	0	0	2	88	3	0	6	0	0	0	8	104	0	0	2	3	0	0	227	890
13:30	2	0	1	8	0	1	0	0	2	0	6	0	0	1	0	0	2	123	0	0	4	0	0	0	5	87	2	1	8	2	0	0	255	916
13:45	1	0	1	3	0	0	0	0	0	0	4	0	0	0	0	0	2	119	1	0	6	0	0	0	6	96	5	0	9	2	0	0	255	945
14:00	1	0	1	1	0	0	0	0	1	0	5	0	0	0	0	0	0	120	0	0	4	0	0	0	5	80	2	1	9	2	0	0	232	
15:15	0	0	1	5	0	1	0	1	3	0	12	0	0	0	0	0	0	100	2	1	10	0	0	0	6	129	1	0	6	3	1	0	282	
15:30	0	0	1	3	0	9	0	0	0	0	20	0	0	0	0	0	2	125	2	2	6	0	0	0	6	108	2	0	5	3	0	0	294	
15:45	1	0	1	5	0	2	0	0	0	0	27	0	0	0	0	0	0	88	2	1	4	0	0	0	6	144	2	0	6	5	0	0	294	1102
16:00	3	1	1	4	0	8	0	0	0	0	35	0	0	1	0	0	1	124	0	3	5	0	0	0	8	161	4	0	3	0	0	0	362	1232
16:15	5	0	2	1	0	5	0	1	0	0	28	0	0	0	0	0	1	143	0	0	12	0	0	0	5	155	2	0	9	3	0	0	372	1322
16:30	8	0	2	3	0	3	0	2	1	0	30	0	0	0	0	2	0	116	0	1	5	0	0	0	4	184	1	0	3	3	0	0	368	1396
16:45	9	0	1	3	0	1	0	0	8	0	36	0	0	0	0	0	0	112	0	0	6	0	0	0	10	206	1	0	7	3	0	0	403	1505
17:00	1	0	1	4	0	0	0	0	1	0	55	0	0	0	0	0	0	116	0	1	7	0	0	0	9	175	0	0	3	3	0	0	376	1519
17:15	1	0	3	4	0	1	0	1	10	0	62	0	0	0	0	0	0	96	3	0	3	0	0	0	9	192	1	0	2	3	0	0	391	1538
17:30	1	0	1	2	0	0	0	0	11	0	54	0	0	0	0	0	0	104	4	0	6	0	0	0	7	207	2	0	6	2	0	0	407	1577
17:45	1	2		1	0	0	1	0	22	1	45	0	0	0	0	0	0	102	3	0	4	0	0	0	6	194	1	0	4	2	0	0	389	1563
18:00	0	0	1	0	0	0	0	0	0	0	60	0	0	0	0	0	0	97	6	0	3	0	0	0	7	197	1	0	6	2	0	0	380	1567

Turning Movement Count (1 . SOUTH SERVICE ROAD & GO DRIVEWAY) MidID: 194609

Time	E Approach South Service Road						S Approach GO Driveway						W Approach South Service Road						Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	U- Turn E:E	Peds CCW E:	Peds CW E:	Approach Total	Right S:E	Left S:W	U- Turn S:S	Peds CCW S:	Peds CW S:	Approach Total	Right W:S	Thru W:E	U- Turn W:W	Peds CCW W:	Peds CW W:	Approach Total		
07:00:00	17	0	0	0	0	17	1	1	0	0	0	2	4	225	0	0	0	229	248	
07:15:00	18	0	0	0	0	18	0	4	0	0	0	4	1	264	0	0	0	265	287	
07:30:00	13	0	0	0	0	13	1	5	0	0	0	6	8	222	0	0	0	230	249	
07:45:00	8	0	0	0	0	8	0	3	0	0	0	3	5	212	0	0	0	217	228	1012
08:00:00	17	0	0	0	0	17	1	5	0	0	0	6	2	182	0	0	0	184	207	971
08:15:00	8	0	0	0	0	8	0	7	0	0	0	7	5	165	0	0	0	170	185	869
08:30:00	7	0	0	0	0	7	0	2	0	0	0	2	3	150	0	0	0	153	162	782
08:45:00	2	0	0	0	0	2	0	4	0	0	0	4	5	170	0	0	0	175	181	735
BREAK																				
11:00:00	3	0	0	0	0	3	0	1	0	0	0	1	5	86	0	0	0	91	95	
11:15:00	3	0	0	0	0	3	2	4	0	0	0	6	1	84	0	0	0	85	94	
11:30:00	6	0	0	0	0	6	1	0	0	0	0	1	5	113	0	0	0	118	125	
11:45:00	13	0	0	0	0	13	1	4	0	0	2	5	2	102	0	0	0	104	122	436
12:00:00	6	0	0	0	0	6	2	0	0	0	0	2	6	98	0	0	0	104	112	453
12:15:00	8	0	0	0	0	8	1	4	0	0	0	5	3	107	0	0	0	110	123	482
12:30:00	8	0	0	0	0	8	1	0	0	0	0	1	4	104	0	0	0	108	117	474
12:45:00	16	0	0	0	0	16	0	4	0	0	0	4	3	105	0	0	0	108	128	480
13:00:00	13	0	0	0	0	13	2	0	0	0	0	2	2	89	0	0	0	91	106	474
13:15:00	13	0	0	0	0	13	1	4	0	0	0	5	3	93	0	0	0	96	114	465
13:30:00	6	0	0	0	0	6	0	3	0	0	0	3	3	81	0	0	0	84	93	441
13:45:00	20	0	0	0	0	20	1	5	0	0	0	6	6	103	0	0	0	109	135	448
BREAK																				
15:00:00	13	0	1	0	0	14	3	4	0	0	0	7	6	108	0	0	0	114	135	
15:15:00	11	0	0	0	0	11	2	5	0	0	0	7	6	118	0	0	0	124	142	
15:30:00	9	0	0	0	0	9	0	3	0	0	0	3	5	114	0	0	0	119	131	
15:45:00	26	0	0	0	0	26	0	3	0	0	0	3	2	123	0	0	0	125	154	562



16:00:00	14	0	0	0	0	14	0	4	0	0	0	4	4	130	0	0	0	134	152	579
16:15:00	48	0	0	0	0	48	0	3	0	2	0	3	3	140	0	0	0	143	194	631
16:30:00	13	0	0	0	0	13	1	2	0	0	0	3	3	133	0	0	0	136	152	652
16:45:00	62	0	0	0	0	62	1	8	0	0	0	9	7	116	0	0	0	123	194	692
17:00:00	15	0	0	0	0	15	1	0	0	0	0	1	3	152	0	0	0	155	171	711
17:15:00	19	0	0	0	0	19	1	3	0	0	0	4	5	137	0	0	0	142	165	682
17:30:00	183	0	0	0	0	183	0	5	0	0	0	5	3	129	0	0	0	132	320	850
17:45:00	89	0	0	0	0	89	0	5	0	0	0	5	5	131	0	0	0	136	230	886
Grand Total	707	0	1	0	0	708	24	105	0	2	2	129	128	4286	0	0	0	4414	5251	-

Approach%	99.9%	0%	0.1%	-	18.6%	81.4%	0%	-	2.9%	97.1%	0%	-	-	-
Totals %	13.5%	0%	0%	13.5%	0.5%	2%	0%	2.5%	2.4%	81.59%	0%	84.1%	-	-
Heavies	3	0	0	-	2	95	0	-	94	207	0	-	-	-
Heavies %	0.4%	0%	0%	-	8.3%	90.5%	0%	-	73.4%	4.8%	0%	-	-	-



Peak: 07:00 AM - 08:00 AM

Time	E Approach South Service Road						S Approach GO Driveway						W Approach South Service Road						Int. Total (15 min)
	Thru	Left	U- Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U- Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	U- Turn	Peds CCW	Peds CW	Approach Total	
07:00:00	17	0	0	0	0	17	1	1	0	0	0	2	4	225	0	0	0	229	248
07:15:00	18	0	0	0	0	18	0	4	0	0	0	4	1	264	0	0	0	265	287
07:30:00	13	0	0	0	0	13	1	5	0	0	0	6	8	222	0	0	0	230	249
07:45:00	8	0	0	0	0	8	0	3	0	0	0	3	5	212	0	0	0	217	228
Grand Total	56	0	0	0	0	56	2	13	0	0	0	15	18	923	0	0	0	941	1012
Approach%	100%	0%	0%			-	13.3%	86.7%	0%			-	1.9%	98.1%	0%			-	-
Totals %	5.5%	0%	0%			5.5%	0.2%	1.3%	0%			1.5%	1.8%	91.2%	0%			93%	-
PHF	0.78	0	0			0.78	0.5	0.65	0			0.63	0.56	0.87	0			0.89	-
Heavies	0	0	0			0	0	12	0			12	13	30	0			43	-
Heavies %	0%	0%	0%			0%	0%	92%	0%			80%	72%	3%	0%			4.6%	-
Lights	56	0	0			56	2	1	0			3	5	893	0			898	-
Lights %	100%	0%	0%			100%	100%	7.7%	0%			20%	27.8%	96.7%	0%			95.4%	-
SingleUnit Trucks	0	0	0			0	0	0	0			0	1	17	0			18	-
SingleUnit Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	5.6%	1.8%	0%			1.9%	-
Buses	0	0	0			0	0	12	0			12	12	4	0			16	-
Buses %	0%	0%	0%			0%	0%	92.3%	0%			80%	66.7%	0.4%	0%			1.7%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	9	0			9	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	1%	0%			1%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-



Peak: 11:30 AM - 12:30 PM

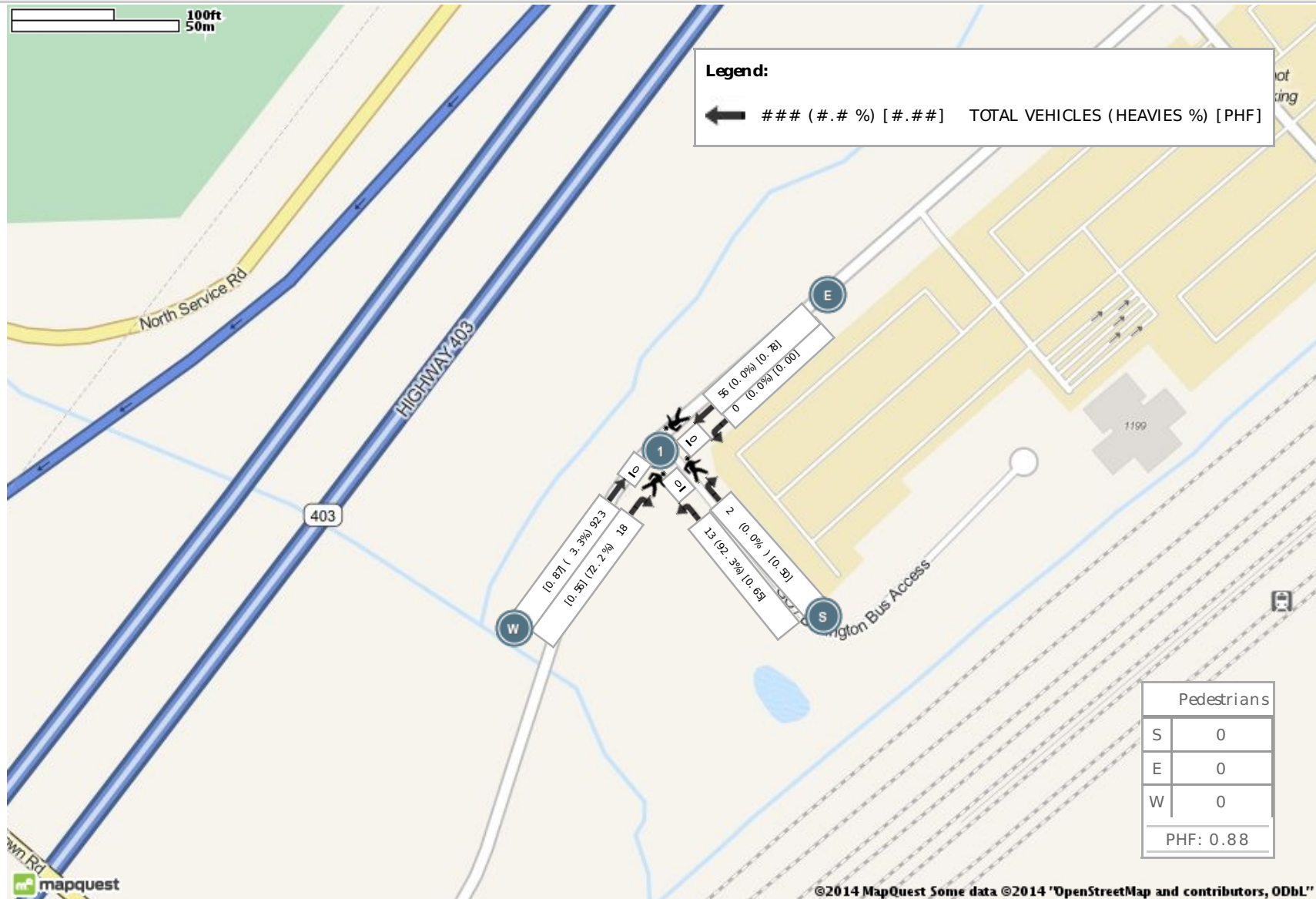
Time	E Approach South Service Road						S Approach GO Driveway						W Approach South Service Road						Int. Total (15 min)
	Thru	Left	U- Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U- Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	U- Turn	Peds CCW	Peds CW	Approach Total	
11:30:00	6	0	0	0	0	6	1	0	0	0	0	1	5	113	0	0	0	118	125
11:45:00	13	0	0	0	0	13	1	4	0	0	2	5	2	102	0	0	0	104	122
12:00:00	6	0	0	0	0	6	2	0	0	0	0	2	6	98	0	0	0	104	112
12:15:00	8	0	0	0	0	8	1	4	0	0	0	5	3	107	0	0	0	110	123
Grand Total	33	0	0	0	0	33	5	8	0	0	2	13	16	420	0	0	0	436	482
Approach%	100%	0%	0%			-	38.5%	61.5%	0%			-	3.7%	96.3%	0%			-	-
Totals %	6.8%	0%	0%			6.8%	1%	1.7%	0%			2.7%	3.3%	87.1%	0%			90.5%	-
PHF	0.63	0	0			0.63	0.63	0.5	0			0.65	0.67	0.93	0			0.92	-
Heavies	1	0	0			1	0	8	0			8	8	27	0			35	-
Heavies %	3%	0%	0%			3%	0%	100%	0%			61.5%	50%	6%	0%			8%	-
Lights	32	0	0			32	5	0	0			5	8	393	0			401	-
Lights %	97%	0%	0%			97%	100%	0%	0%			38.5%	50%	93.6%	0%			92%	-
Single Unit Trucks	1	0	0			1	0	0	0			0	0	17	0			17	-
Single Unit Trucks %	3%	0%	0%			3%	0%	0%	0%			0%	0%	4%	0%			3.9%	-
Buses	0	0	0			0	0	8	0			8	8	2	0			10	-
Buses %	0%	0%	0%			0%	0%	100%	0%			61.5%	50%	0.5%	0%			2.3%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	8	0			8	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	1.9%	0%			1.8%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	2	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%		-	-	-	0%	100%		-	-	-	0%	0%		-



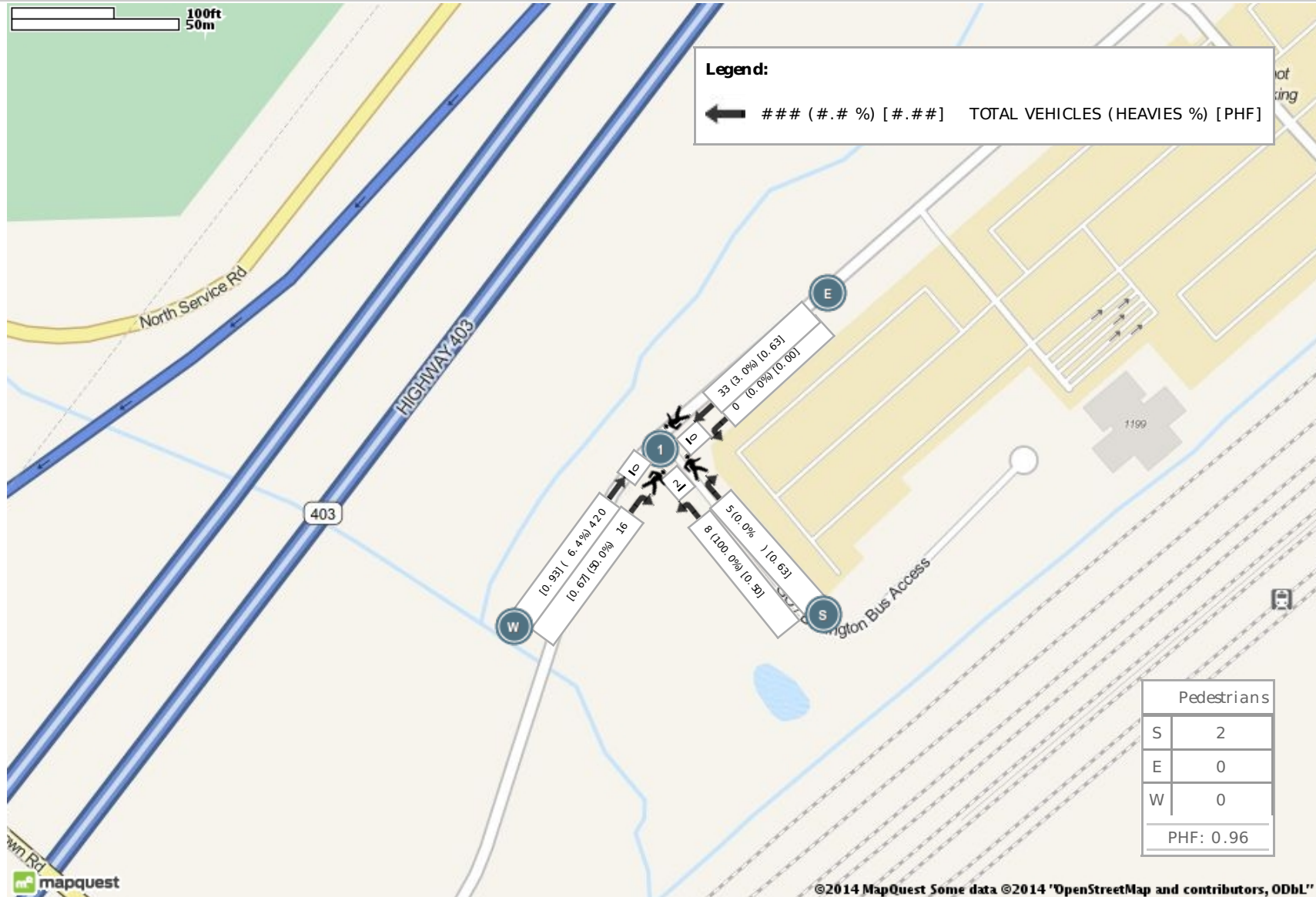
Peak: 05:00 PM - 06:00 PM

Time	E Approach South Service Road						S Approach GO Driveway						W Approach South Service Road						Int. Total (15 min)
	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	U-Turn	Peds CCW	Peds CW	Approach Total	
17:00:00	15	0	0	0	0	15	1	0	0	0	0	1	3	152	0	0	0	155	171
17:15:00	19	0	0	0	0	19	1	3	0	0	0	4	5	137	0	0	0	142	165
17:30:00	183	0	0	0	0	183	0	5	0	0	0	5	3	129	0	0	0	132	320
17:45:00	89	0	0	0	0	89	0	5	0	0	0	5	5	131	0	0	0	136	230
Grand Total	306	0	0	0	0	306	2	13	0	0	0	15	16	549	0	0	0	565	886
Approach%	100%	0%	0%			-	13.3%	86.7%	0%			-	2.8%	97.2%	0%			-	-
Totals %	34.5%	0%	0%			34.5%	0.2%	1.5%	0%			1.7%	1.8%	62%	0%			63.8%	-
PHF	0.42	0	0			0.42	0.5	0.65	0			0.75	0.8	0.9	0			0.91	-
Heavies	0	0	0			0	0	12	0			12	13	14	0			27	-
Heavies %	0%	0%	0%			0%	0%	92%	0%			80%	81%	3%	0%			4.8%	-
Lights	306	0	0			306	2	1	0			3	3	535	0			538	-
Lights %	100%	0%	0%			100%	100%	7.7%	0%			20%	18.8%	97.4%	0%			95.2%	-
SingleUnit Trucks	0	0	0			0	0	0	0			0	0	9	0			9	-
SingleUnit Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	1.6%	0%			1.6%	-
Buses	0	0	0			0	0	12	0			12	13	1	0			14	-
Buses %	0%	0%	0%			0%	0%	92.3%	0%			80%	81.3%	0.2%	0%			2.5%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	4	0			4	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	0.7%	0%			0.7%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-

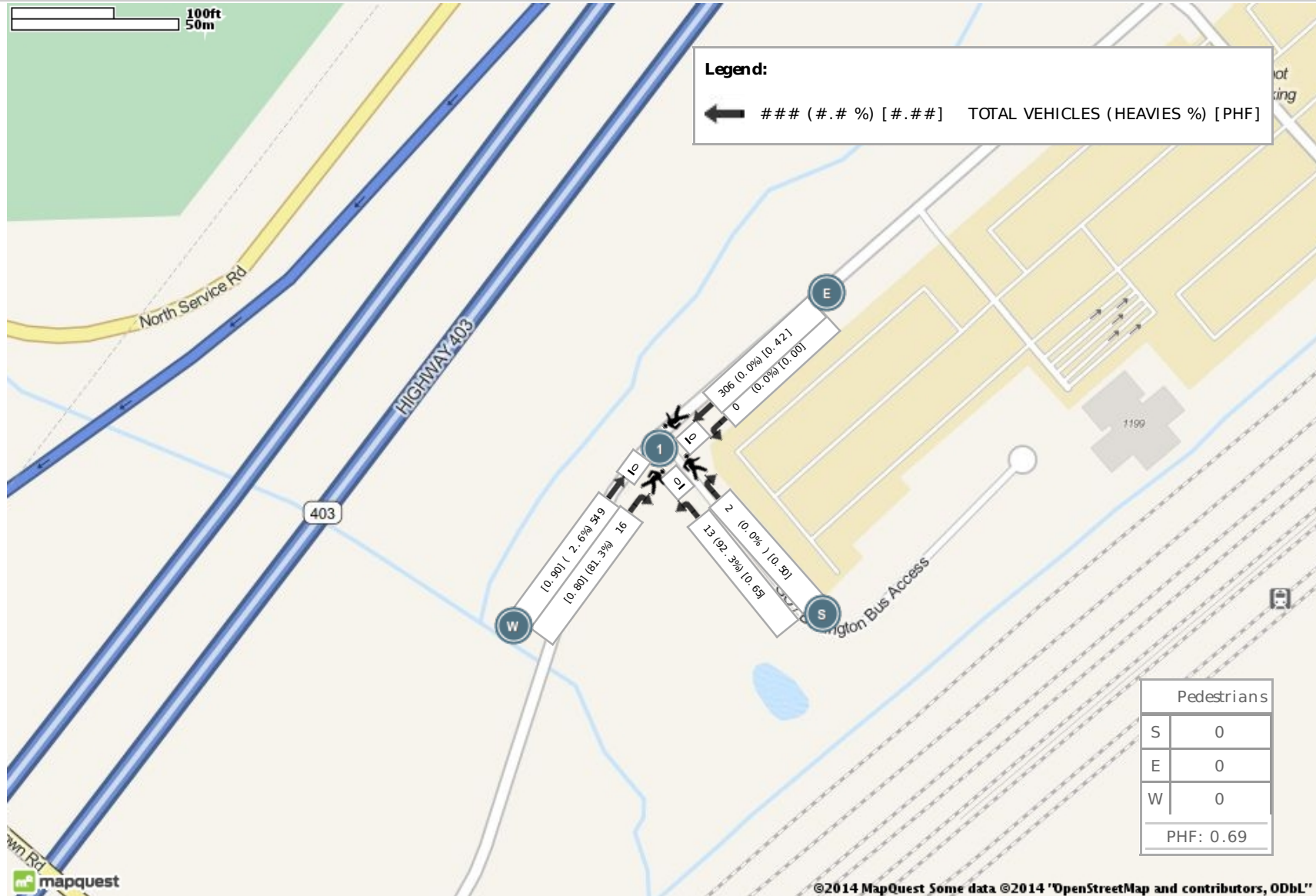
Peak: 07:00 AM - 08:00 AM



Peak: 11:30 AM - 12:30 PM



Peak: 05:00 PM - 06:00 PM



Turning Movement Count (2 . SOUTH SERVICE ROAD & GO BUS DRIVEWAY) MidD: 194610

Time	E Approach South Service Road						S Approach Go Bus Driveway						W Approach South Service Road						Int. Total (15 min)	Int. Total (1 hr)
	Thru E:W	Left E:S	U-Turn E:E	Peds CCW E:	Peds CW E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds CCW S:	Peds CW S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds CCW W:	Peds CW W:	Approach Total		
07:00:00	0	0	0	0	0	0	2	16	0	0	0	18	54	176	0	0	0	230	248	
07:15:00	4	0	0	0	0	4	3	13	0	0	0	16	31	230	0	0	0	261	281	
07:30:00	5	0	0	0	0	5	1	10	0	0	0	11	27	193	0	0	0	220	236	
07:45:00	3	0	0	0	0	3	1	5	0	0	0	6	20	194	0	0	0	214	223	988
08:00:00	2	0	0	0	0	2	2	17	0	0	0	19	16	165	0	0	0	181	202	942
08:15:00	2	0	0	0	0	2	0	7	0	0	0	7	13	153	0	0	0	166	175	836
08:30:00	0	0	0	0	0	0	1	6	0	0	0	7	11	138	0	0	0	149	156	756
08:45:00	1	0	0	0	0	1	1	1	0	0	0	2	13	160	0	0	0	173	176	709
BREAK																				
11:00:00	1	0	0	0	0	1	2	2	0	0	0	4	8	74	0	0	0	82	87	
11:15:00	0	0	0	0	0	0	1	3	0	0	0	4	10	80	0	0	0	90	94	
11:30:00	4	0	0	0	0	4	0	2	0	0	0	2	11	102	0	0	0	113	119	
11:45:00	4	0	0	0	0	4	0	5	0	0	0	5	12	85	0	0	0	97	106	406
12:00:00	0	0	0	0	0	0	1	5	0	0	0	6	11	91	0	0	0	102	108	427
12:15:00	4	0	0	0	0	4	1	4	0	0	0	5	18	93	0	0	0	111	120	453
12:30:00	3	0	0	0	0	3	1	5	0	0	0	6	14	90	0	0	0	104	113	447
12:45:00	6	0	0	0	0	6	2	12	0	0	0	14	13	92	0	0	0	105	125	466
13:00:00	5	0	0	0	0	5	0	6	0	0	0	6	4	86	1	0	0	91	102	460
13:15:00	6	0	0	0	0	6	0	8	0	0	0	8	11	81	0	0	0	92	106	446
13:30:00	1	0	0	0	0	1	0	4	0	0	0	4	8	77	0	0	0	85	90	423
13:45:00	8	0	0	0	0	8	1	13	0	0	0	14	10	91	0	0	0	101	123	421
BREAK																				
15:00:00	8	0	0	0	0	8	0	6	0	0	0	6	10	105	0	0	0	115	129	
15:15:00	5	0	0	0	0	5	1	7	0	0	0	8	12	106	0	0	0	118	131	
15:30:00	3	0	0	0	0	3	1	5	0	0	0	6	13	101	0	0	0	114	123	
15:45:00	11	0	0	0	0	11	0	15	0	0	0	15	20	105	0	0	0	125	151	534



Turning Movement Count
 Location Name: SOUTH SERVICE ROAD & GO BUS DRIVEWAY
 Date: 2014-10-29

Paradigm Transportation Solutions Ltd
 43 Forest Road
 Cambridge ON, CANADA, N1S 3B4

16:00:00	9	0	0	0	0	9	2	5	0	0	0	7	30	101	0	0	0	131	147	552
16:15:00	17	0	0	0	0	17	4	32	0	1	0	36	20	118	0	0	0	138	191	612
16:30:00	6	0	0	0	0	6	4	5	0	0	0	9	15	120	0	0	0	135	150	639
16:45:00	29	0	0	0	0	29	2	38	0	0	0	40	22	100	0	0	0	122	191	679
17:00:00	5	0	0	0	0	5	2	7	0	0	0	9	31	117	0	0	0	148	162	694
17:15:00	8	0	0	0	0	8	1	12	0	0	0	13	34	103	0	0	0	137	158	661
17:30:00	115	0	0	0	0	115	1	68	0	0	0	69	33	97	0	0	0	130	314	825
17:45:00	47	0	0	0	0	47	4	43	0	0	0	47	35	96	0	0	0	131	225	859
Grand Total	322	0	0	0	0	322	42	387	0	1	0	429	590	3720	1	0	0	4311	5062	-

Approach%	100%	0%	0%	-	9.8%	90.2%	0%	-	13.7%	86.3%	0%	-	-	-
Totals %	6.4%	0%	0%	6.4%	0.8%	7.6%	0%	8.5%	11.7%	73.5%	0%	85.2%	-	-
Heavies	2	0	0	-	0	2	0	-	0	207	0	-	-	-
Heavies %	0.6%	0%	0%	-	0%	0.5%	0%	-	0%	5.6%	0%	-	-	-



Peak: 07:00 AM - 08:00 AM

Time	E Approach South Service Road						S Approach Go Bus Driveway						W Approach South Service Road						Int. Total (15 min)
	Thru	Left	U- Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U- Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	U- Turn	Peds CCW	Peds CW	Approach Total	
07:00:00	0	0	0	0	0	0	2	16	0	0	0	18	54	176	0	0	0	230	248
07:15:00	4	0	0	0	0	4	3	13	0	0	0	16	31	230	0	0	0	261	281
07:30:00	5	0	0	0	0	5	1	10	0	0	0	11	27	193	0	0	0	220	236
07:45:00	3	0	0	0	0	3	1	5	0	0	0	6	20	194	0	0	0	214	223
Grand Total	12	0	0	0	0	12	7	44	0	0	0	51	132	793	0	0	0	925	988
Approach%	100%	0%	0%			-	13.7%	86.3%	0%			-	14.3%	85.7%	0%			-	-
Totals %	1.2%	0%	0%			1.2%	0.7%	4.5%	0%			5.2%	13.4%	80.3%	0%			93.6%	-
PHF	0.6	0	0			0.6	0.58	0.69	0			0.71	0.61	0.86	0			0.89	-
Heavies	0	0	0			0	0	0	0			0	0	29	0			29	-
Heavies %	0%	0%	0%			0%	0%	0%	0%			0%	0%	4%	0%			3.1%	-
Lights	12	0	0			12	7	44	0			51	132	764	0			896	-
Lights %	100%	0%	0%			100%	100%	100%	0%			100%	100%	96.3%	0%			96.9%	-
SingleUnit Trucks	0	0	0			0	0	0	0			0	0	17	0			17	-
SingleUnit Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	2.1%	0%			1.8%	-
Buses	0	0	0			0	0	0	0			0	0	2	0			2	-
Buses %	0%	0%	0%			0%	0%	0%	0%			0%	0%	0.3%	0%			0.2%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	10	0			10	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	1.3%	0%			1.1%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-



Peak: 12:00 PM - 01:00 PM

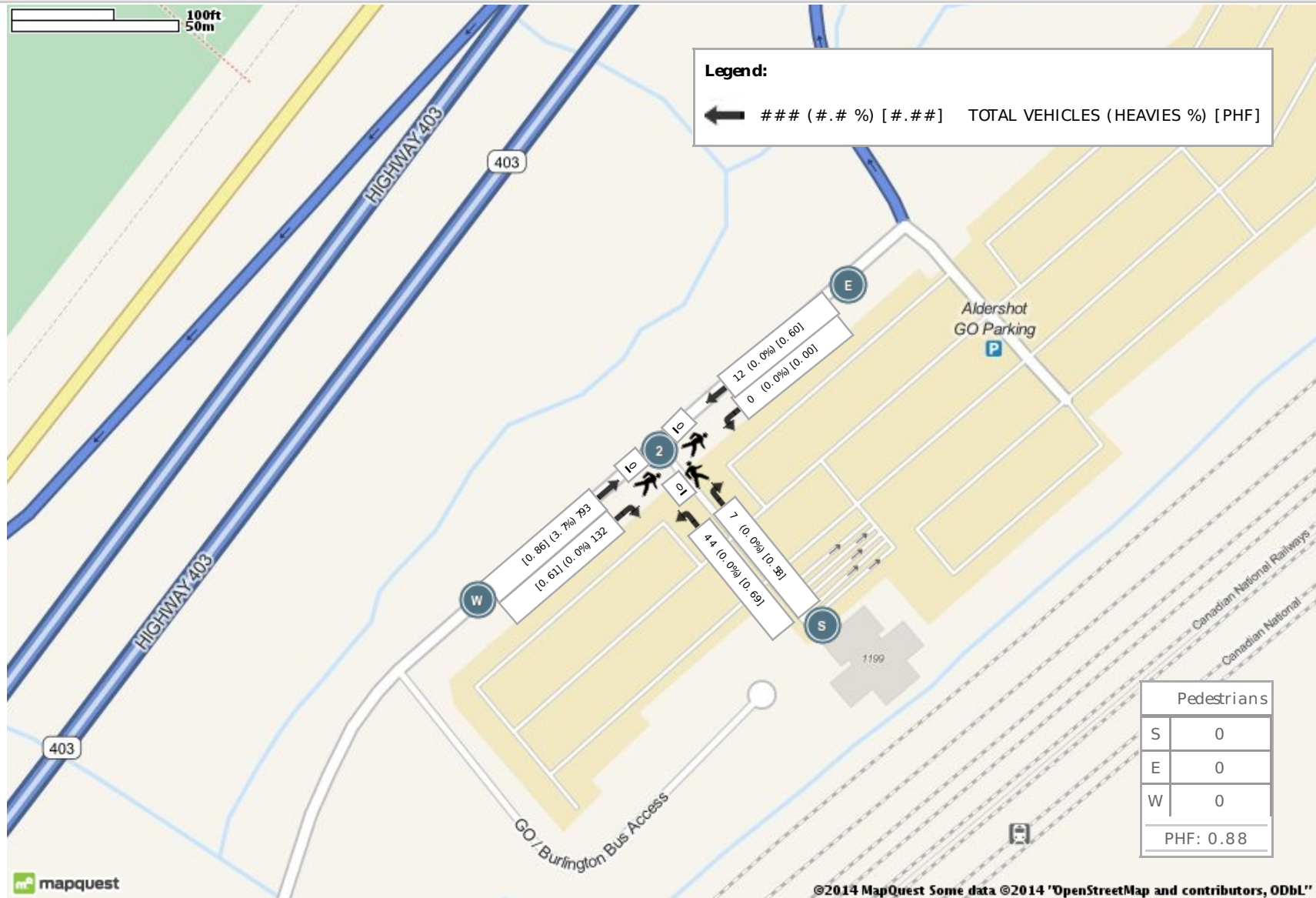
Time	E Approach South Service Road						S Approach Go Bus Driveway						W Approach South Service Road						Int. Total (15 min)
	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	U-Turn	Peds CCW	Peds CW	Approach Total	
12:00:00	0	0	0	0	0	0	1	5	0	0	0	6	11	91	0	0	0	102	108
12:15:00	4	0	0	0	0	4	1	4	0	0	0	5	18	93	0	0	0	111	120
12:30:00	3	0	0	0	0	3	1	5	0	0	0	6	14	90	0	0	0	104	113
12:45:00	6	0	0	0	0	6	2	12	0	0	0	14	13	92	0	0	0	105	125
Grand Total	13	0	0	0	0	13	5	26	0	0	0	31	56	366	0	0	0	422	466
Approach%	100%	0%	0%			-	16.1%	83.9%	0%			-	13.3%	86.7%	0%			-	-
Totals %	2.8%	0%	0%			2.8%	1.1%	5.6%	0%			6.7%	12%	78.5%	0%			90.6%	-
PHF	0.54	0	0			0.54	0.63	0.54	0			0.55	0.78	0.98	0			0.95	-
Heavies	0	0	0			0	0	1	0			1	0	26	0			26	-
Heavies %	0%	0%	0%			0%	0%	4%	0%			3.2%	0%	7%	0%			6.2%	-
Lights	13	0	0			13	5	25	0			30	56	340	0			396	-
Lights %	100%	0%	0%			100%	100%	96.2%	0%			96.8%	100%	92.9%	0%			93.8%	-
SingleUnit Trucks	0	0	0			0	0	1	0			1	0	15	0			15	-
SingleUnit Trucks %	0%	0%	0%			0%	0%	3.8%	0%			3.2%	0%	4.1%	0%			3.6%	-
Buses	0	0	0			0	0	0	0			0	0	1	0			1	-
Buses %	0%	0%	0%			0%	0%	0%	0%			0%	0%	0.3%	0%			0.2%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	10	0			10	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	2.7%	0%			2.4%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-



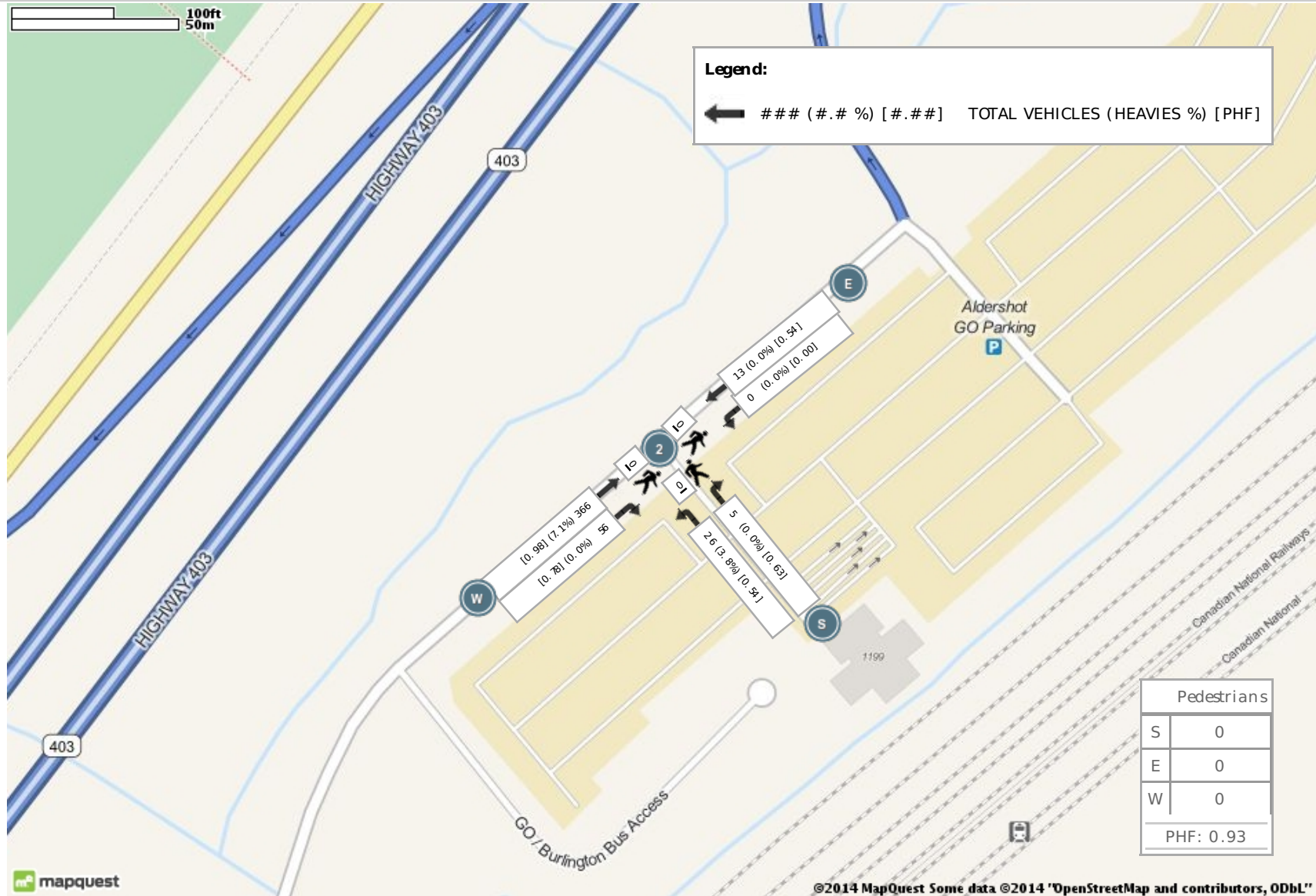
Peak: 05:00 PM - 06:00 PM

Time	E Approach South Service Road						S Approach Go Bus Driveway						W Approach South Service Road						Int. Total (15 min)
	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	U-Turn	Peds CCW	Peds CW	Approach Total	
17:00:00	5	0	0	0	0	5	2	7	0	0	0	9	31	117	0	0	0	148	162
17:15:00	8	0	0	0	0	8	1	12	0	0	0	13	34	103	0	0	0	137	158
17:30:00	115	0	0	0	0	115	1	68	0	0	0	69	33	97	0	0	0	130	314
17:45:00	47	0	0	0	0	47	4	43	0	0	0	47	35	96	0	0	0	131	225
Grand Total	175	0	0	0	0	175	8	130	0	0	0	138	133	413	0	0	0	546	859
Approach%	100%	0%	0%			-	5.8%	94.2%	0%			-	24.4%	75.6%	0%			-	-
Totals %	20.4%	0%	0%			20.4%	0.9%	15.1%	0%			16.1%	15.5%	48.1%	0%			63.6%	-
PHF	0.38	0	0			0.38	0.5	0.48	0			0.5	0.95	0.88	0			0.92	-
Heavies	0	0	0			0	0	0	0			0	0	14	0			14	-
Heavies %	0%	0%	0%			0%	0%	0%	0%			0%	0%	3%	0%			2.6%	-
Lights	175	0	0			175	8	130	0			138	133	399	0			532	-
Lights %	100%	0%	0%			100%	100%	100%	0%			100%	100%	96.6%	0%			97.4%	-
SingleUnit Trucks	0	0	0			0	0	0	0			0	0	9	0			9	-
SingleUnit Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	2.2%	0%			1.6%	-
Buses	0	0	0			0	0	0	0			0	0	1	0			1	-
Buses %	0%	0%	0%			0%	0%	0%	0%			0%	0%	0.2%	0%			0.2%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	4	0			4	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	1%	0%			0.7%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-

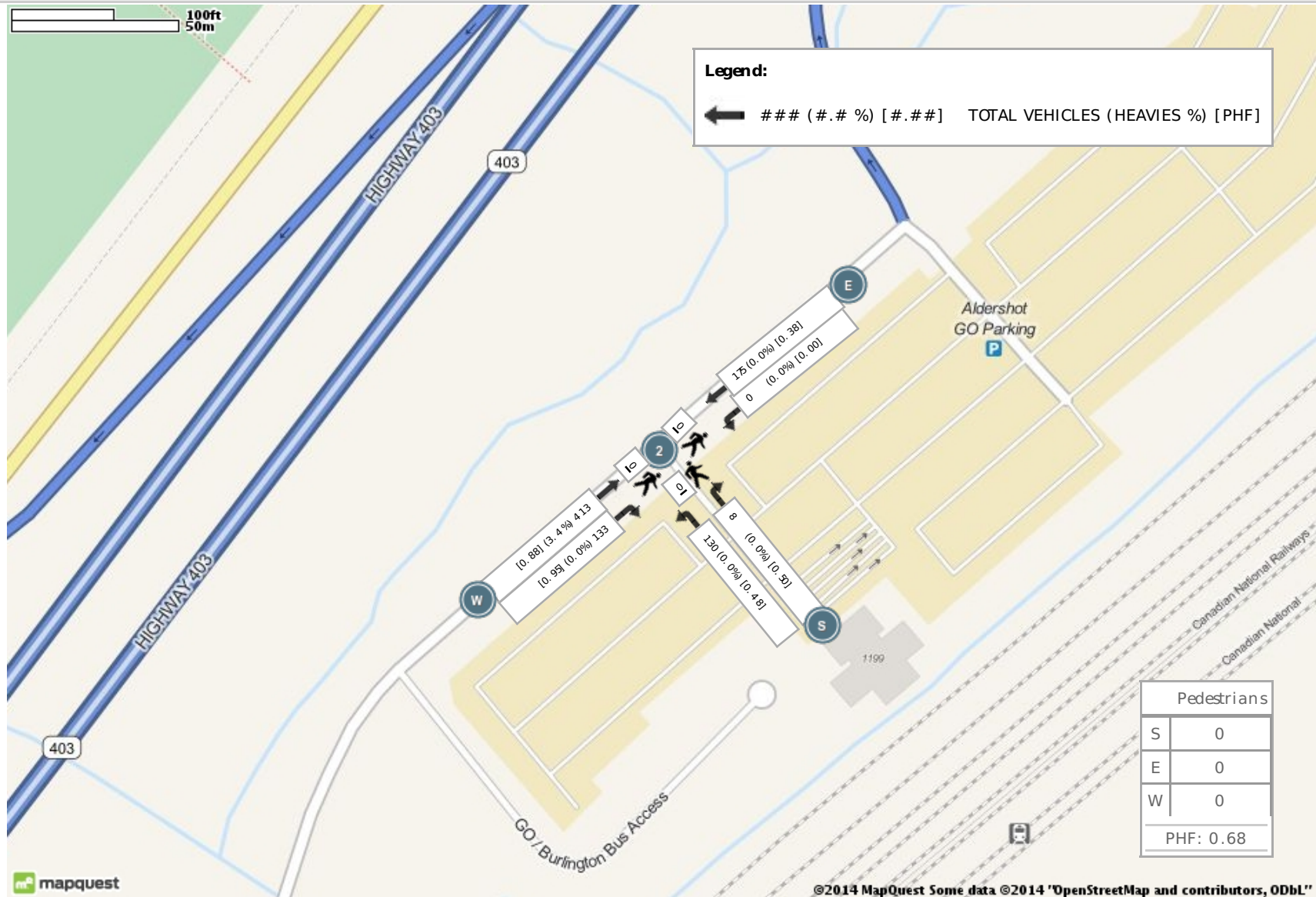
Peak: 07:00 AM - 08:00 AM



Peak: 12:00 PM - 01:00 PM



Peak: 05:00 PM - 06:00 PM





Turning Movement Count (7 . WATERDOWN RD & QEW EB ON RAMP) MidID: 194611

Time	N Approach QEW EB On Ramp						S Approach Go Parking Access						W Approach South Service Road						Int. Total (15 min)	Int. Total (1 hr)
	Right N:W	Thru N:S	U-Turn N:N	Peds CCW N:	Peds CW N:	Approach Total	Thru S:N	Left S:W	U-Turn S:S	Peds CCW S:	Peds CW S:	Approach Total	Right W:S	Left W:N	U-Turn W:W	Peds CCW W:	Peds CW W:	Approach Total		
07:00:00	0	0	0	0	0	0	3	0	0	0	0	3	70	105	0	0	0	175	178	
07:15:00	0	0	0	0	0	0	7	4	0	0	1	11	98	133	0	0	0	231	242	
07:30:00	0	0	0	0	0	0	6	4	0	0	0	10	60	129	1	0	0	190	200	
07:45:00	0	0	0	0	0	0	6	3	0	0	1	9	25	173	0	0	0	198	207	827
08:00:00	0	0	0	0	0	0	6	1	0	0	0	7	28	140	0	0	0	168	175	824
08:15:00	0	0	0	0	0	0	2	1	0	0	0	3	10	142	0	0	0	152	155	737
08:30:00	0	0	0	0	0	0	3	0	0	0	0	3	13	125	0	0	0	138	141	678
08:45:00	0	0	0	0	0	0	1	1	0	0	0	2	9	153	0	0	0	162	164	635
BREAK																				
11:00:00	0	0	0	0	0	0	1	1	0	0	0	2	0	78	0	0	0	78	80	
11:15:00	0	0	0	0	0	0	2	0	0	0	0	2	1	80	0	0	0	81	83	
11:30:00	0	0	0	0	0	0	1	4	0	0	0	5	2	100	0	0	0	102	107	
11:45:00	0	0	0	0	0	0	4	3	0	0	0	7	5	82	0	0	0	87	94	364
12:00:00	0	0	0	0	0	0	0	0	0	0	1	0	3	91	0	0	0	94	94	378
12:15:00	0	0	0	0	0	0	0	4	0	0	0	4	2	88	0	0	0	90	94	389
12:30:00	0	0	0	0	0	0	1	3	0	0	0	4	2	91	0	0	0	93	97	379
12:45:00	0	0	0	0	0	0	9	6	0	0	0	15	1	93	0	0	0	94	109	394
13:00:00	0	0	0	0	0	0	1	5	0	0	0	6	1	87	0	0	0	88	94	394
13:15:00	0	0	0	0	0	0	0	6	0	0	0	6	2	78	0	0	0	80	86	386
13:30:00	0	0	0	0	0	0	1	1	0	0	0	2	2	74	0	0	0	76	78	367
13:45:00	0	0	0	0	0	0	2	8	0	0	0	10	0	94	0	0	0	94	104	362
BREAK																				
15:00:00	0	0	0	0	0	0	2	7	0	0	0	9	0	101	0	0	0	101	110	
15:15:00	0	0	0	0	0	0	3	5	0	0	0	8	2	106	0	0	0	108	116	
15:30:00	0	0	0	0	0	0	0	3	0	0	0	3	0	103	0	0	0	103	106	
15:45:00	0	0	0	0	0	0	3	11	0	0	0	14	2	101	0	0	0	103	117	449



16:00:00	0	0	0	0	0	0	6	9	0	0	0	15	1	102	0	0	0	103	118	457
16:15:00	0	0	0	0	0	0	5	19	0	0	0	24	4	116	0	0	0	120	144	485
16:30:00	0	0	0	0	0	0	3	4	0	0	0	7	2	124	1	0	0	127	134	513
16:45:00	0	0	0	0	0	0	6	29	0	0	0	35	2	96	0	0	0	98	133	529
17:00:00	0	0	0	0	0	0	8	6	0	0	0	14	2	109	0	0	0	111	125	536
17:15:00	0	0	0	0	0	0	10	10	0	0	0	20	0	103	0	0	0	103	123	515
17:30:00	0	0	0	0	0	0	11	113	0	0	0	124	3	82	0	0	0	85	209	590
17:45:00	0	0	0	0	0	0	10	48	0	0	0	58	3	94	0	0	0	97	155	612
Grand Total	0	0	0	0	0	0	123	319	0	0	3	442	355	3373	2	0	0	3730	4172	-

Approach%	0%	0%	0%	-	27.8%	72.2%	0%	-	9.5%	90.4%	0.1%	-	-	-
Totals %	0%	0%	0%	0%	2.9%	7.6%	0%	10.6%	8.5%	80.8%	0%	89.4%	-	-
Heavies	0	0	0	-	0	2	0	-	1	202	1	-	-	-
Heavies %	0%	0%	0%	-	0%	0.6%	0%	-	0.3%	6%	50%	-	-	-



Peak: 07:00 AM - 08:00 AM

Time	N Approach QEWS EB On Ramp						S Approach Go Parking Access						W Approach South Service Road						Int. Total (15 min)
	Right	Thru	U-Turn	Peds CCW	Peds CW	Approach Total	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
07:00:00	0	0	0	0	0	0	3	0	0	0	0	3	70	105	0	0	0	175	178
07:15:00	0	0	0	0	0	0	7	4	0	0	1	11	98	133	0	0	0	231	242
07:30:00	0	0	0	0	0	0	6	4	0	0	0	10	60	129	1	0	0	190	200
07:45:00	0	0	0	0	0	0	6	3	0	0	1	9	25	173	0	0	0	198	207
Grand Total	0	0	0	0	0	0	22	11	0	0	2	33	253	540	1	0	0	794	827
Approach%	0%	0%	0%			-	66.7%	33.3%	0%			-	31.9%	68%	0.1%			-	-
Totals %	0%	0%	0%			0%	2.7%	1.3%	0%			4%	30.6%	65.3%	0.1%			96%	-
PHF	0	0	0			0	0.79	0.69	0			0.75	0.65	0.78	0.25			0.86	-
Heavies	0	0	0			0	0	0	0			0	0	28	0			28	-
Heavies %	0%	0%	0%			0%	0%	0%	0%			0%	0%	5%	0%			3.5%	-
Lights	0	0	0			0	22	11	0			33	253	512	1			766	-
Lights %	0%	0%	0%			0%	100%	100%	0%			100%	100%	94.8%	100%			96.5%	-
SingleUnit Trucks	0	0	0			0	0	0	0			0	0	17	0			17	-
SingleUnit Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	3.1%	0%			2.1%	-
Buses	0	0	0			0	0	0	0			0	0	2	0			2	-
Buses %	0%	0%	0%			0%	0%	0%	0%			0%	0%	0.4%	0%			0.3%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	9	0			9	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	1.7%	0%			1.1%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	2	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%		-	-	-	0%	100%		-	-	-	0%	0%		-



Peak: 12:15 PM - 01:15 PM

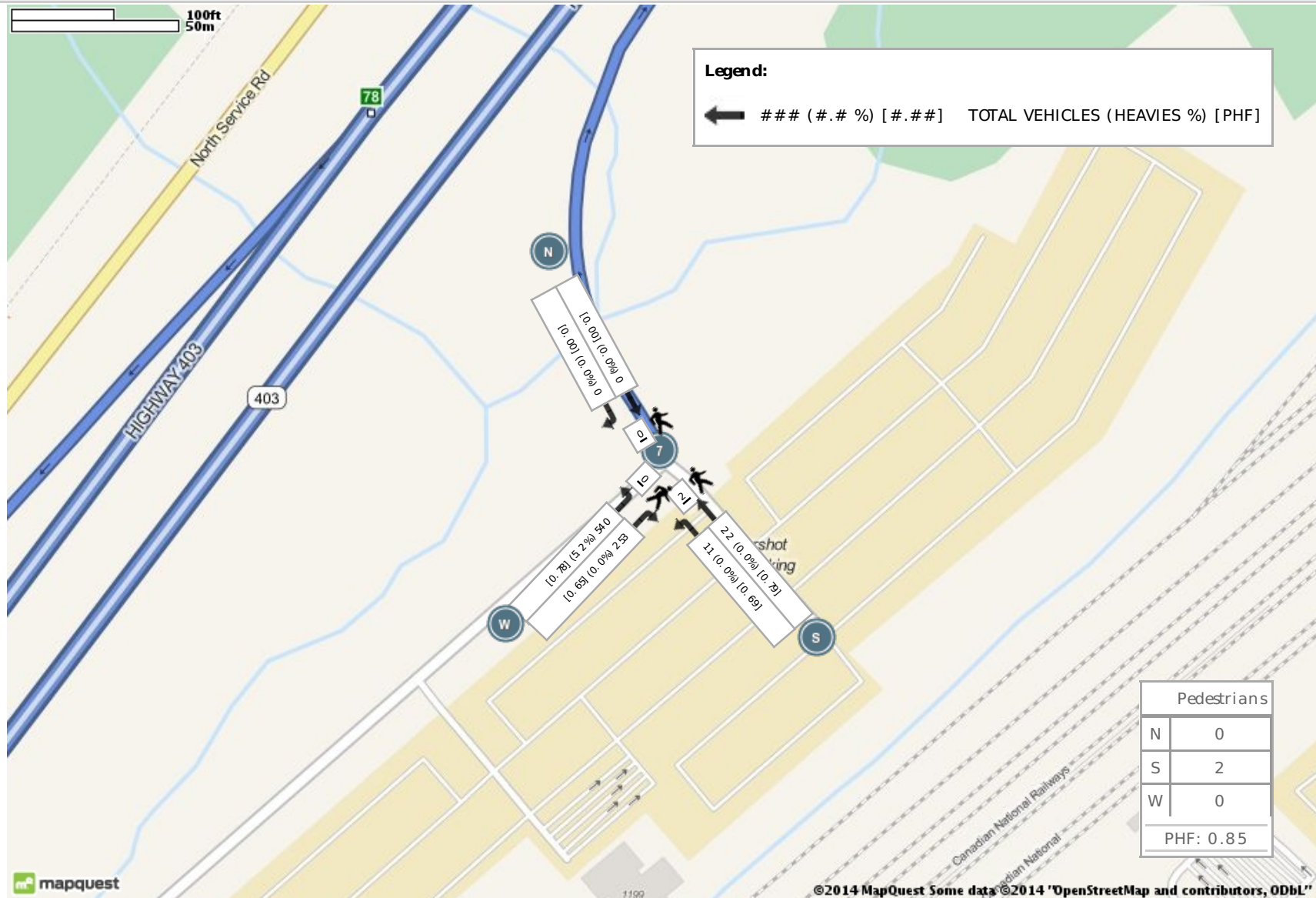
Time	N Approach QE W EB On Ramp						S Approach Go Parking Access						W Approach South Service Road						Int. Total (15 min)
	Right	Thru	U-Turn	Peds CCW	Peds CW	Approach Total	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
12:15:00	0	0	0	0	0	0	0	4	0	0	0	4	2	88	0	0	0	90	94
12:30:00	0	0	0	0	0	0	1	3	0	0	0	4	2	91	0	0	0	93	97
12:45:00	0	0	0	0	0	0	9	6	0	0	0	15	1	93	0	0	0	94	109
13:00:00	0	0	0	0	0	0	1	5	0	0	0	6	1	87	0	0	0	88	94
Grand Total	0	0	0	0	0	0	11	18	0	0	0	29	6	359	0	0	0	365	394
Approach%	0%	0%	0%			-	37.9%	62.1%	0%			-	1.6%	98.4%	0%			-	-
Totals %	0%	0%	0%			0%	2.8%	4.6%	0%			7.4%	1.5%	91.1%	0%			92.6%	-
PHF	0	0	0			0	0.31	0.75	0			0.48	0.75	0.97	0			0.97	-
Heavies	0	0	0			0	0	0	0			0	0	29	0			29	-
Heavies %	0%	0%	0%			0%	0%	0%	0%			0%	0%	8%	0%			7.9%	-
Lights	0	0	0			0	11	18	0			29	6	330	0			336	-
Lights %	0%	0%	0%			0%	100%	100%	0%			100%	100%	91.9%	0%			92.1%	-
SingleUnit Trucks	0	0	0			0	0	0	0			0	0	16	0			16	-
SingleUnit Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	4.5%	0%			4.4%	-
Buses	0	0	0			0	0	0	0			0	0	3	0			3	-
Buses %	0%	0%	0%			0%	0%	0%	0%			0%	0%	0.8%	0%			0.8%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	10	0			10	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	2.8%	0%			2.7%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%		-	-	-	0%	0%		-	-	-	0%	0%		-



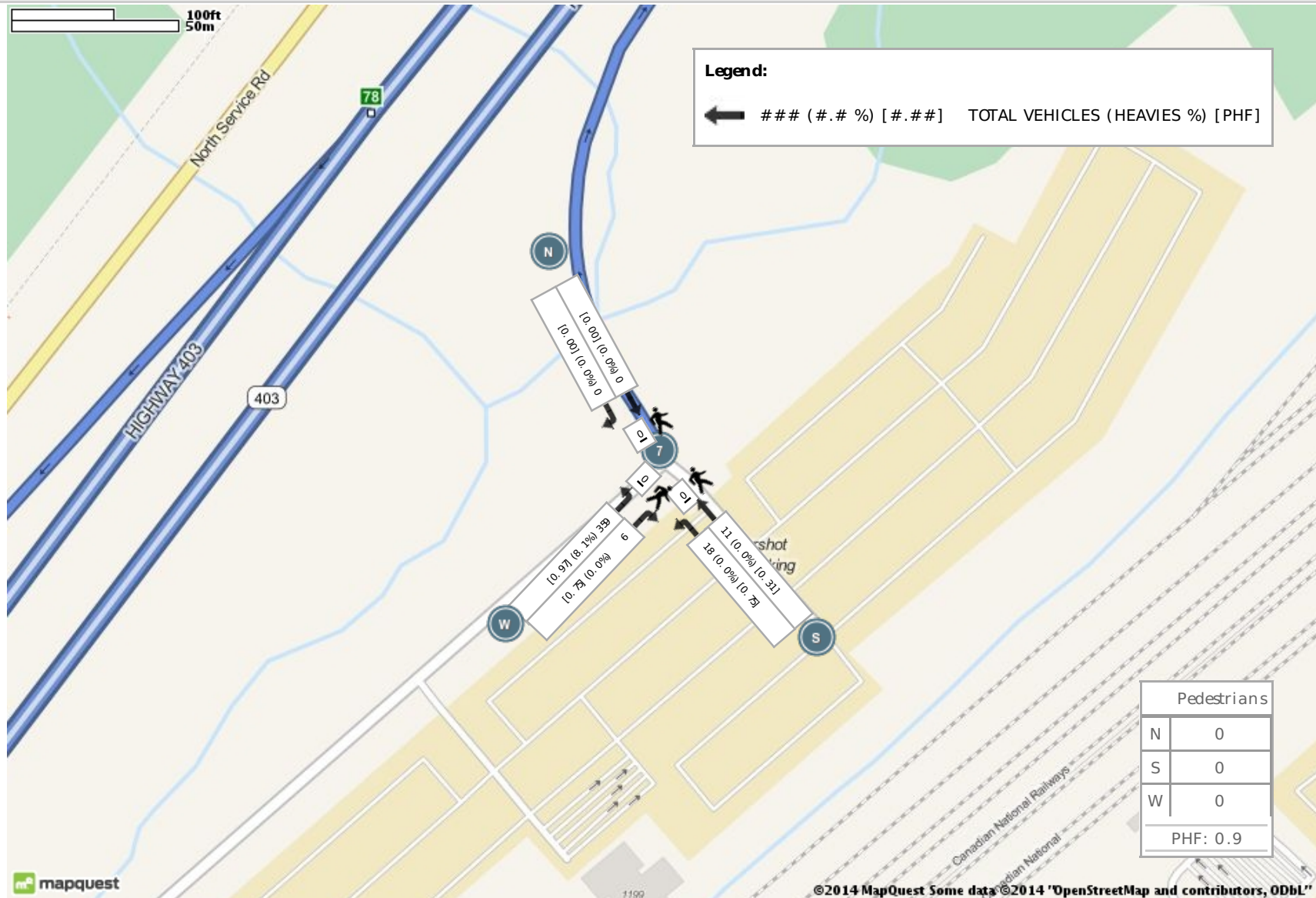
Peak: 05:00 PM - 06:00 PM

Time	N Approach QE W EB On Ramp						S Approach Go Parking Access						W Approach South Service Road						Int. Total (15 min)
	Right	Thru	U-Turn	Peds CCW	Peds CW	Approach Total	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
17:00:00	0	0	0	0	0	0	8	6	0	0	0	14	2	109	0	0	0	111	125
17:15:00	0	0	0	0	0	0	10	10	0	0	0	20	0	103	0	0	0	103	123
17:30:00	0	0	0	0	0	0	11	113	0	0	0	124	3	82	0	0	0	85	209
17:45:00	0	0	0	0	0	0	10	48	0	0	0	58	3	94	0	0	0	97	155
Grand Total	0	0	0	0	0	0	39	177	0	0	0	216	8	388	0	0	0	396	612
Approach%	0%	0%	0%			-	18.1%	81.9%	0%			-	2%	98%	0%			-	-
Totals %	0%	0%	0%			0%	6.4%	28.9%	0%			35.3%	1.3%	63.4%	0%			64.7%	-
PHF	0	0	0			0	0.89	0.39	0			0.44	0.67	0.89	0			0.89	-
Heavies	0	0	0			0	0	0	0			0	0	14	0			14	-
Heavies %	0%	0%	0%			0%	0%	0%	0%			0%	0%	4%	0%			3.5%	-
Lights	0	0	0			0	39	177	0			216	8	374	0			382	-
Lights %	0%	0%	0%			0%	100%	100%	0%			100%	100%	96.4%	0%			96.5%	-
SingleUnit Trucks	0	0	0			0	0	0	0			0	0	9	0			9	-
SingleUnit Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	2.3%	0%			2.3%	-
Buses	0	0	0			0	0	0	0			0	0	1	0			1	-
Buses %	0%	0%	0%			0%	0%	0%	0%			0%	0%	0.3%	0%			0.3%	-
Articulated Trucks	0	0	0			0	0	0	0			0	0	4	0			4	-
Articulated Trucks %	0%	0%	0%			0%	0%	0%	0%			0%	0%	1%	0%			1%	-
Pedestrians	-	-	-	0	0	-	-	-	-	0	0	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-	-	-	0%	0%	-	-

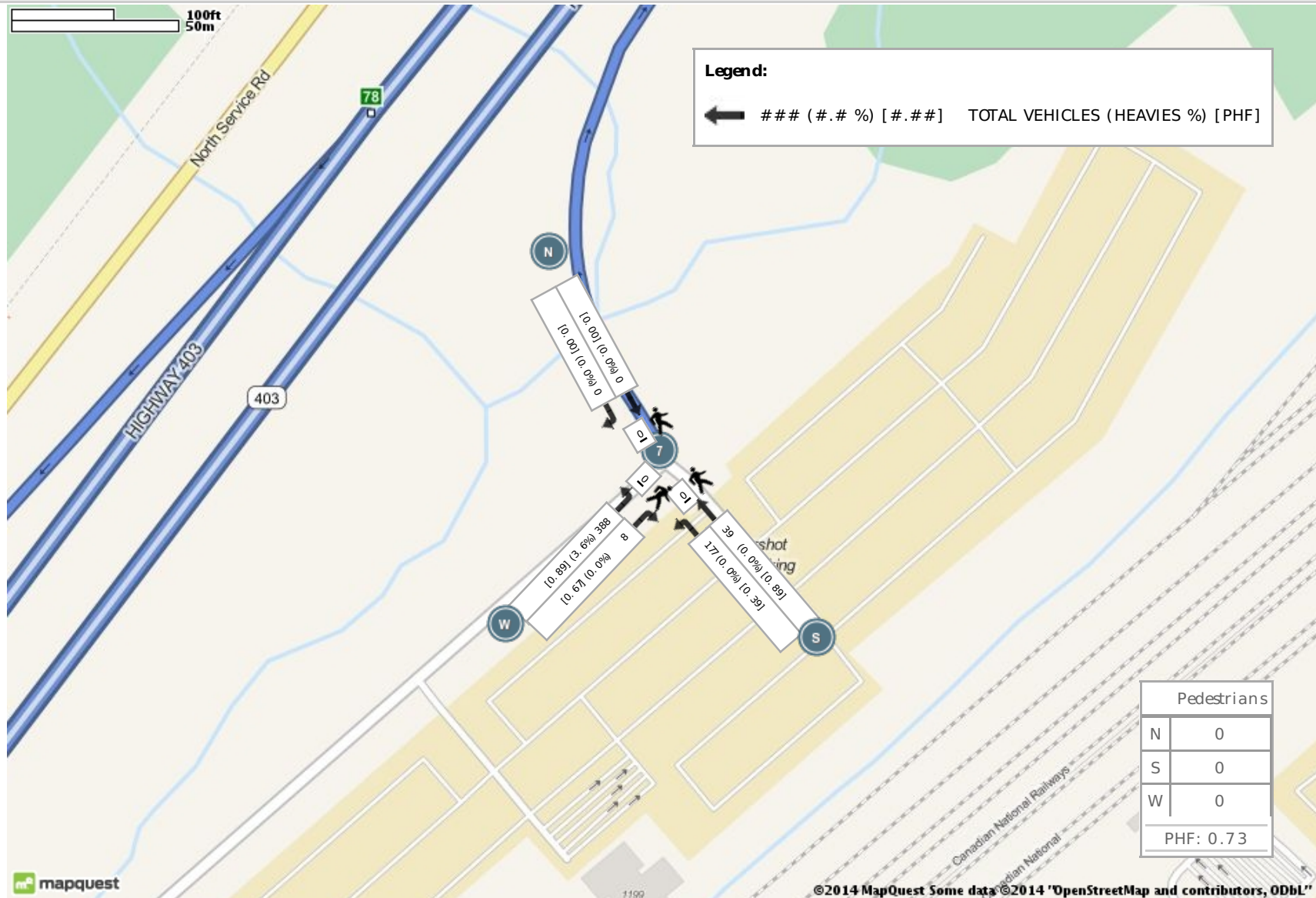
Peak: 07:00 AM - 08:00 AM

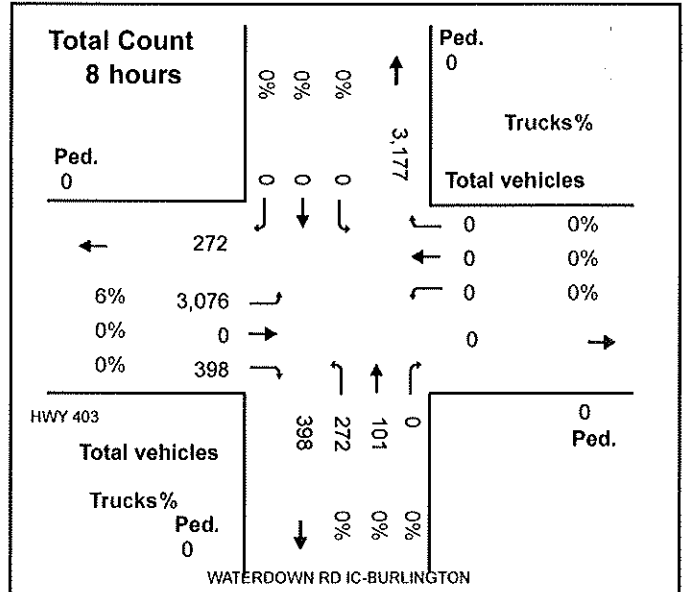
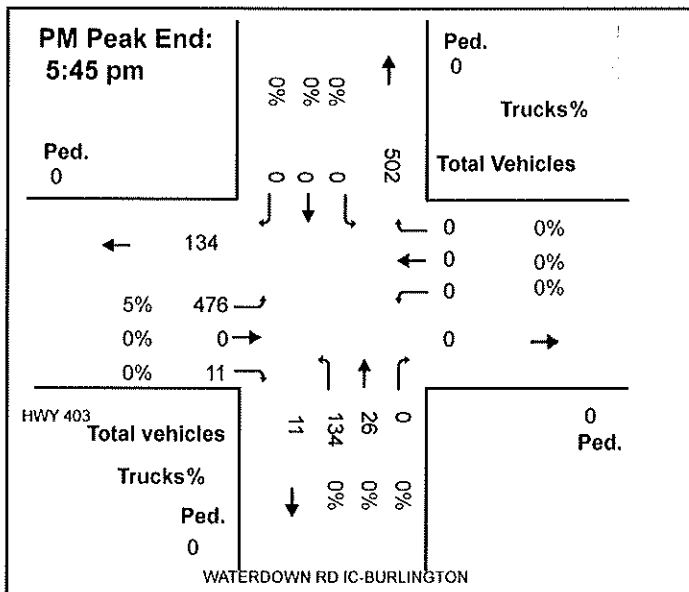
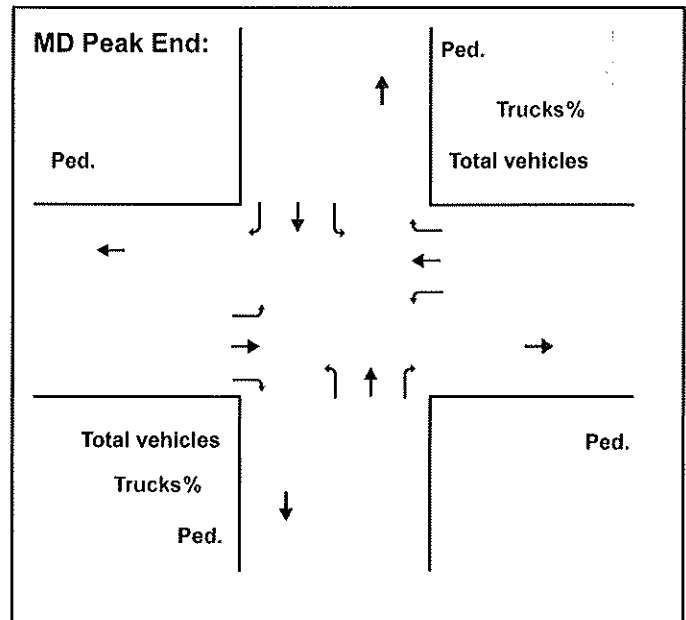
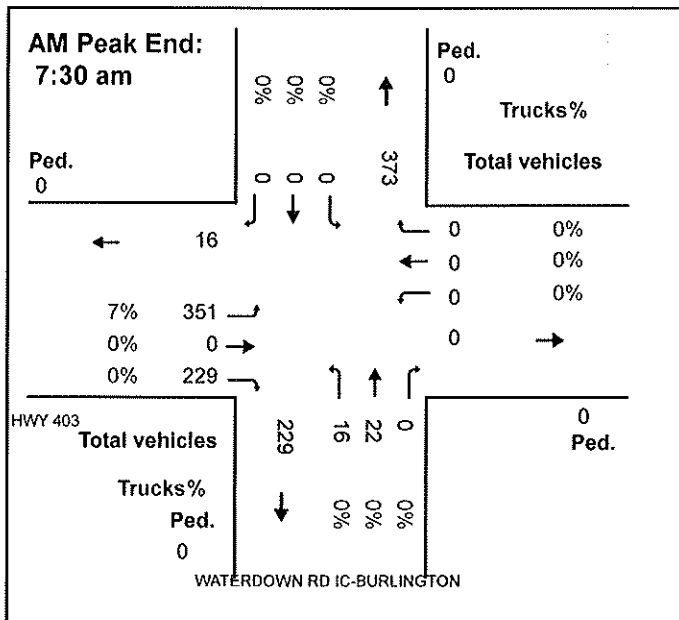


Peak: 12:15 PM - 01:15 PM



Peak: 05:00 PM - 06:00 PM





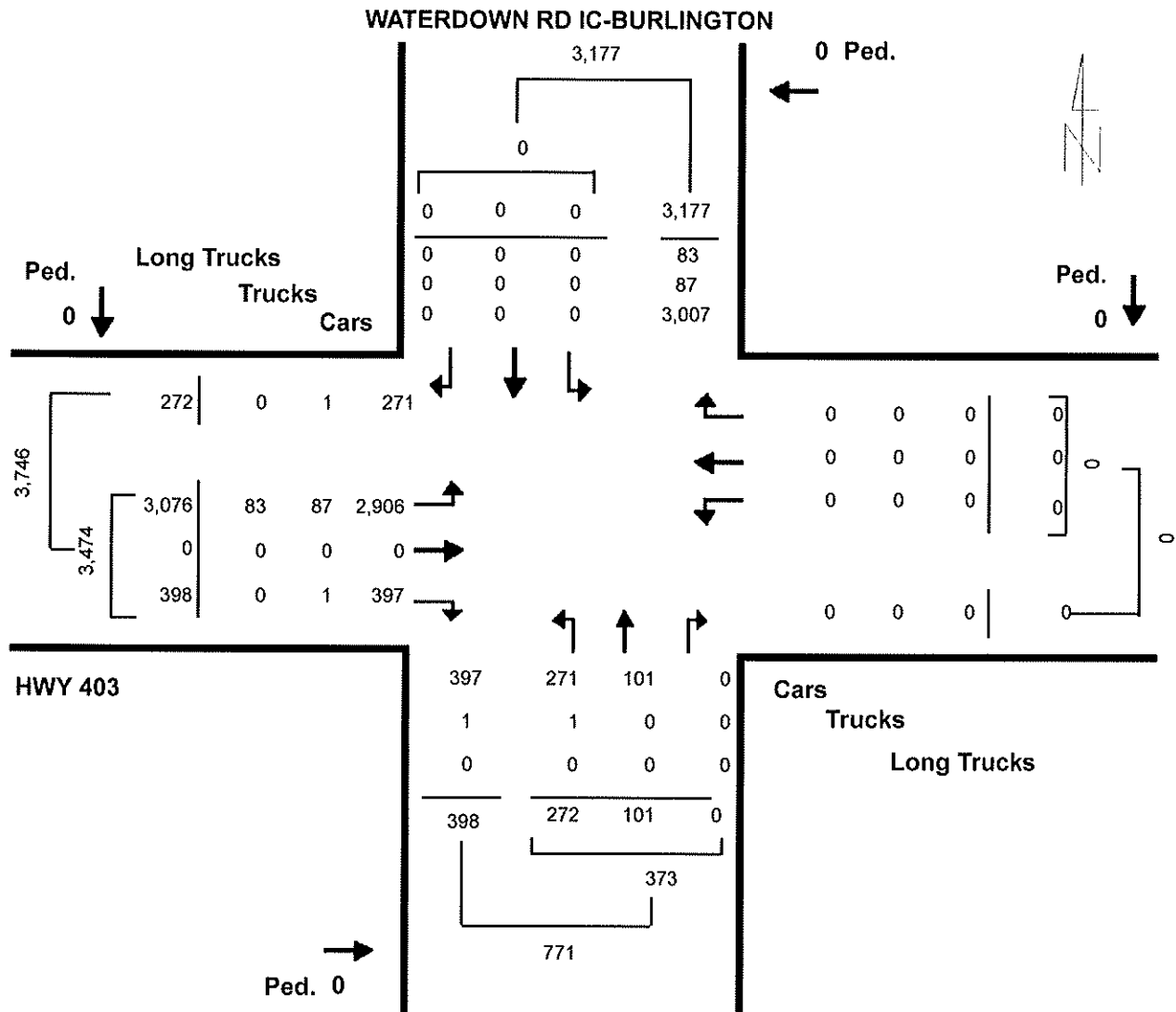
COUNT TOTAL

HWY 403 @ WATERDOWN RD IC-BURLINGTON

Central

Intersection ID:483000000

Date: 14-Nov-2013



15 MIN REPORT

Intersection ID:483000000

HWY 403 @ WATERDOWN RD IC-BURLINGTON

Municipality: Central

Date: 14-Nov-2013

NORTH APPROACH					EAST APPROACH					SOUTH APPROACH					WEST APPROACH					Total				
Time	Cars		Trucks		Heavies		Ped	Cars		Trucks		Heavies		Ped	Cars		Trucks		Heavies		Ped			
	Left	Thru/Right	Left	Thru/Right	Left	Thru/Right		Left	Thru/Right	Left	Thru/Right	Left	Thru/Right		Left	Thru/Right	Left	Thru/Right	Left			Thru/Right		
Period1																								
6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	64	0	11	1	0	0	0	78	
6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	70	0	25	1	0	0	1	101	
6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	79	0	37	1	0	0	4	126	
7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	80	0	45	3	0	0	3	142	
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	81	0	88	4	0	0	2	186	
7:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	87	0	59	3	0	0	4	164	
7:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	45	0	11	10	0	0	1	69	
8:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	0	10	1	0	0	0	99	
8:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	114	0	11	1	0	0	2	136	
8:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	133	0	24	1	0	0	2	167	
8:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	116	0	7	3	0	0	3	136	
9:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	120	0	10	2	0	0	4	140	
9:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	88	0	8	3	0	0	5	111	
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	62	0	4	2	0	0	1	69	
9:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	78	0	7	0	0	0	4	91	
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	80	0	3	1	0	0	3	91	
Period2																								
14:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	69	0	2	3	0	0	4	0	82
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	67	0	2	4	0	0	1	0	84
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	82	0	2	1	0	0	3	0	88
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	65	0	3	6	0	0	2	0	84
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	97	0	0	5	0	0	8	0	114
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	87	0	2	3	0	0	4	0	101
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	115	0	2	2	0	0	3	0	126
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	89	0	0	1	0	0	2	0	104
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	88	0	1	3	0	1	3	0	99
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	116	0	3	2	0	0	1	0	139
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	105	0	8	7	0	0	2	0	137
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	122	0	2	4	0	0	3	0	162
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	122	0	5	4	0	0	2	0	143
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	41	109	0	3	3	0	0	3	0	168
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	101	0	1	2	0	0	1	0	174
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	89	0	1	0	0	0	1	0	136



Turning Movement Count (3 . KING ROAD & NORTH SERVICE ROAD) MioID: 194615

Time	N Approach King Rd							E Approach North Service Rd							S Approach King Rd							W Approach North Service Rd							Int. Total (15 min)	Int. Total (1 hr)	
	Right N:W	Thru N:S	Left N:E	U- Turn N:N	Peds CCW N:	Peds CW N:	Approach Total	Right E:N	Thru E:W	Left E:S	U- Turn E:E	Peds CCW E:	Peds CW E:	Approach Total	Right S:E	Thru S:N	Left S:W	U- Turn S:S	Peds CCW S:	Peds CW S:	Approach Total	Right W:S	Thru W:E	Left W:N	U- Turn W:W	Peds CCW W:	Peds CW W:	Approach Total			
07:00:00	0	1	6	0	0	0	7	1	12	15	0	0	0	28	42	3	23	0	0	0	68	3	39	0	0	0	0	42	145		
07:15:00	1	5	7	0	0	0	13	6	24	30	0	0	0	60	62	3	18	0	0	0	83	14	50	4	0	0	0	68	224		
07:30:00	3	5	8	0	0	0	16	4	31	39	0	1	0	74	76	4	24	0	0	0	104	15	84	1	0	0	0	100	294		
07:45:00	1	5	3	0	0	0	9	1	45	47	0	0	0	93	88	8	22	0	0	0	118	20	106	1	0	0	0	127	347	1010	
08:00:00	2	5	7	0	0	0	14	7	67	36	0	0	0	110	71	2	29	0	1	0	102	14	93	1	0	0	0	108	334	1199	
08:15:00	2	10	6	0	0	0	18	4	46	37	0	0	0	87	94	10	27	0	0	0	131	20	109	3	0	0	0	132	368	1343	
08:30:00	3	8	5	0	0	0	16	11	70	47	0	0	0	128	66	5	20	0	0	0	91	15	102	1	0	0	0	118	353	1402	
08:45:00	1	6	7	0	0	0	14	8	50	47	0	0	0	105	48	8	15	0	0	0	71	18	81	2	0	0	0	101	291	1346	
BREAK																															
11:00:00	3	7	6	0	0	0	16	8	24	50	0	0	0	82	40	5	20	0	0	0	65	8	36	1	0	0	0	45	208		
11:15:00	3	6	4	0	0	0	13	4	35	39	0	0	0	78	37	8	15	0	0	0	60	10	29	0	0	0	0	39	190		
11:30:00	2	6	3	0	0	0	11	5	40	35	0	0	0	80	41	4	17	0	0	0	62	15	43	3	0	0	0	61	214		
11:45:00	2	5	9	0	0	0	16	8	34	56	0	0	0	98	55	3	18	0	0	0	76	13	38	0	0	0	0	51	241	853	
12:00:00	1	2	8	0	0	0	11	7	43	58	0	0	0	108	56	4	20	0	0	0	80	23	65	2	0	0	0	90	289	934	
12:15:00	3	4	6	0	0	0	13	10	50	50	0	0	0	110	35	7	15	0	0	0	57	10	40	2	0	0	0	52	232	976	
12:30:00	1	5	13	0	0	0	19	7	43	52	0	0	0	102	45	5	14	0	0	0	64	20	41	2	0	0	0	63	248	1010	
12:45:00	1	6	8	0	0	0	15	9	48	47	0	0	0	104	56	2	14	0	0	0	72	11	45	4	0	0	0	60	251	1020	
13:00:00	2	5	8	0	0	0	15	12	37	53	0	0	0	102	43	12	19	0	0	0	74	9	36	2	0	0	0	47	238	969	
13:15:00	2	10	6	0	0	0	18	11	52	43	0	0	0	106	45	9	23	0	0	0	77	11	38	2	0	0	0	51	252	989	
13:30:00	3	2	5	0	0	0	10	5	60	35	0	0	0	100	60	9	13	0	0	0	82	6	40	3	0	0	0	49	241	982	
13:45:00	3	4	4	0	0	0	11	5	52	38	0	0	0	95	42	11	19	0	0	0	72	10	43	1	0	0	0	54	232	963	
BREAK																															
15:00:00	2	6	3	0	0	0	11	3	59	44	0	0	0	106	42	13	39	0	0	0	94	22	47	1	0	0	0	70	281		
15:15:00	3	2	6	0	0	0	11	3	78	48	0	0	0	129	67	15	26	0	0	0	108	16	41	2	0	0	0	59	307		
15:30:00	2	4	2	0	0	0	8	8	98	67	0	0	0	173	54	14	39	0	0	0	107	28	77	6	0	0	0	111	399		
15:45:00	1	4	8	0	0	0	13	8	87	68	0	0	0	163	54	13	27	0	0	0	94	17	64	0	0	0	0	81	351	1338	
16:00:00	4	2	3	0	0	0	9	19	137	97	0	0	0	253	43	15	32	0	0	0	90	19	53	0	0	0	0	72	424	1481	
16:15:00	4	6	9	0	0	0	19	10	126	83	0	0	0	219	51	10	26	0	0	0	87	12	58	0	0	0	0	70	395	1569	
16:30:00	1	7	9	0	0	0	17	25	137	90	0	0	0	252	49	29	22	0	0	0	100	27	64	2	0	0	0	93	462	1632	
16:45:00	3	6	9	0	0	0	18	21	153	104	0	0	0	278	40	17	15	0	0	0	72	17	72	3	0	0	0	92	460	1741	
17:00:00	4	18	6	0	0	0	28	24	142	108	0	0	0	274	52	32	23	0	0	0	107	20	82	3	0	0	0	105	514	1831	
17:15:00	4	6	2	0	0	0	12	29	157	115	0	0	0	301	75	14	23	0	0	0	112	14	64	1	0	0	0	79	504	1940	



17:30:00	2	5	4	0	0	0	11	17	163	112	0	0	0	292	66	28	12	0	0	0	106	18	65	1	0	0	0	84	493	1971
17:45:00	1	8	4	0	0	0	13	18	122	92	0	0	0	232	58	6	8	0	0	0	72	11	38	1	0	0	0	50	367	1878
Grand Total	70	181	194	0	0	0	445	318	2322	1882	0	1	0	4522	1753	328	677	0	1	0	2758	486	1883	55	0	0	0	2424	10149	-
Approach%	15.7%	40.7%	43.6%	0%			-	7%	51.3%	41.6%	0%			-	63.6%	11.9%	24.5%	0%			-	20%	77.7%	2.29%	0%			-	-	-
Totals %	0.7%	1.8%	1.9%	0%			4.4%	3.1%	22.9%	18.5%	0%			44.6%	17.3%	3.2%	6.7%	0%			27.2%	4.8%	18.6%	0.5%	0%			23.9%	-	-
Heavies	6	2	5	0			-	2	73	63	0			-	67	2	21	0			-	14	74	3	0			-	-	-
Heavies %	8.6%	1.1%	2.6%	0%			-	0.6%	3.1%	3.3%	0%			-	3.8%	0.6%	3.1%	0%			-	2.9%	3.9%	5.5%	0%			-	-	-



Peak: 07:45 AM - 08:45 AM

Time	N Approach King Rd							E Approach North Service Rd							S Approach King Rd							W Approach North Service Rd							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
07:45:00	1	5	3	0	0	0	9	1	45	47	0	0	0	93	88	8	22	0	0	0	118	20	106	1	0	0	0	127	347
08:00:00	2	5	7	0	0	0	14	7	67	36	0	0	0	110	71	2	29	0	1	0	102	14	93	1	0	0	0	108	334
08:15:00	2	10	6	0	0	0	18	4	46	37	0	0	0	87	94	10	27	0	0	0	131	20	109	3	0	0	0	132	368
08:30:00	3	8	5	0	0	0	16	11	70	47	0	0	0	128	66	5	20	0	0	0	91	15	102	1	0	0	0	118	353
Grand Total	8	28	21	0	0	0	57	23	228	167	0	0	0	418	319	25	98	0	1	0	442	69	410	6	0	0	0	485	1402
Approach%	14%	49.1%	36.8%	0%			-	5.5%	54.5%	40%	0%			-	72.2%	5.7%	22.2%	0%			-	14.2%	84.5%	1.2%	0%			-	-
Totals %	0.6%	2%	1.5%	0%			4.1%	1.6%	16.3%	11.9%	0%			29.8%	22.8%	1.8%	7%	0%			31.5%	4.9%	29.2%	0.4%	0%			34.6%	-
PHF	0.67	0.7	0.75	0			0.79	0.52	0.81	0.89	0			0.82	0.85	0.63	0.84	0			0.84	0.86	0.94	0.5	0			0.92	-
Heavies	0	0	0	0			0	0	8	7	0			15	11	0	1	0			12	1	16	0	0			17	-
Heavies %	0%	0%	0%	0%			0%	0%	4%	4%	0%			3.6%	3%	0%	1%	0%			2.7%	1%	4%	0%	0%			3.5%	-
Lights	8	28	21	0			57	23	220	160	0			403	308	25	97	0			430	68	394	6	0			468	-
Lights %	100%	100%	100%	0%			100%	100%	96.5%	95.8%	0%			96.4%	96.6%	100%	99%	0%			97.3%	98.6%	96.1%	100%	0%			96.5%	-
SingleUnit Trucks	0	0	0	0			0	0	3	4	0			7	8	0	1	0			9	0	7	0	0			7	-
SingleUnit Trucks %	0%	0%	0%	0%			0%	0%	1.3%	2.4%	0%			1.7%	2.5%	0%	1%	0%			2%	0%	1.7%	0%	0%			1.4%	-
Buses	0	0	0	0			0	0	4	2	0			6	3	0	0	0			3	0	6	0	0			6	-
Buses %	0%	0%	0%	0%			0%	0%	1.8%	1.2%	0%			1.4%	0.9%	0%	0%	0%			0.7%	0%	1.5%	0%	0%			1.2%	-
Articulated Trucks	0	0	0	0			0	0	1	1	0			2	0	0	0	0			0	1	3	0	0			4	-
Articulated Trucks %	0%	0%	0%	0%			0%	0%	0.4%	0.6%	0%			0.5%	0%	0%	0%	0%			0%	1.4%	0.7%	0%	0%			0.8%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	1	0	-	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	100%	0%		-	-	-	-	0%	0%		-



Peak: 12:00 PM - 01:00 PM

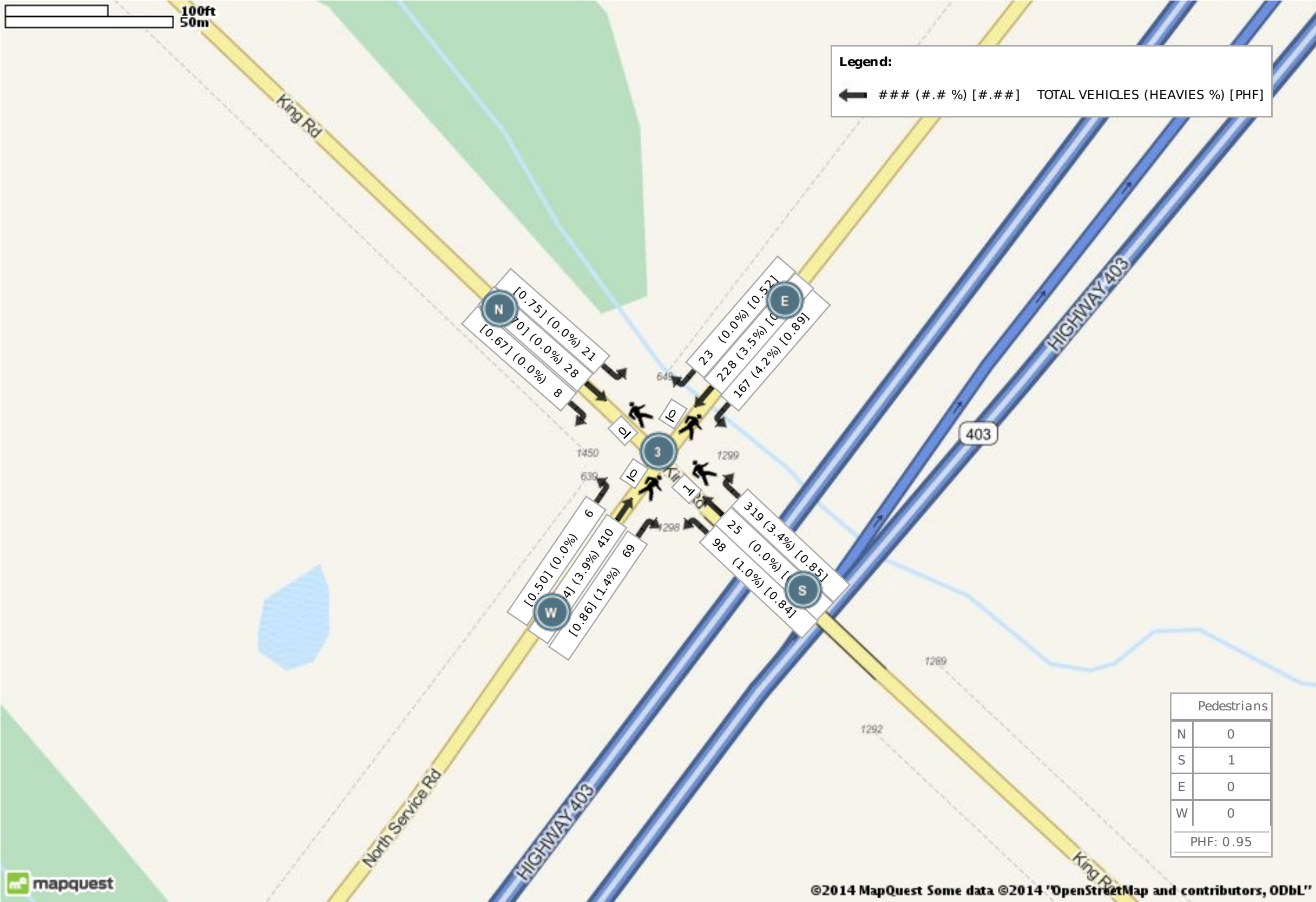
Time	N Approach King Rd							E Approach North Service Rd							S Approach King Rd							W Approach North Service Rd							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
12:00:00	1	2	8	0	0	0	11	7	43	58	0	0	0	108	56	4	20	0	0	0	80	23	65	2	0	0	0	90	289
12:15:00	3	4	6	0	0	0	13	10	50	50	0	0	0	110	35	7	15	0	0	0	57	10	40	2	0	0	0	52	232
12:30:00	1	5	13	0	0	0	19	7	43	52	0	0	0	102	45	5	14	0	0	0	64	20	41	2	0	0	0	63	248
12:45:00	1	6	8	0	0	0	15	9	48	47	0	0	0	104	56	2	14	0	0	0	72	11	45	4	0	0	0	60	251
Grand Total	6	17	35	0	0	0	58	33	184	207	0	0	0	424	192	18	63	0	0	0	273	64	191	10	0	0	0	265	1020
Approach%	10.3%	29.3%	60.3%	0%			-	7.8%	43.4%	48.8%	0%			-	70.3%	6.6%	23.1%	0%			-	24.2%	72.1%	3.8%	0%			-	-
Totals %	0.6%	1.7%	3.4%	0%			5.7%	3.2%	18%	20.3%	0%			41.6%	18.8%	1.8%	6.2%	0%			26.8%	6.3%	18.7%	1%	0%			26%	-
PHF	0.5	0.71	0.67	0			0.76	0.83	0.92	0.89	0			0.96	0.86	0.64	0.79	0			0.85	0.7	0.73	0.63	0			0.74	-
Heavies	0	0	0	0			0	0	11	5	0			16	7	0	0	0			7	0	9	0	0			9	-
Heavies %	0%	0%	0%	0%			0%	0%	6%	2%	0%			3.8%	4%	0%	0%	0%			2.6%	0%	5%	0%	0%			3.4%	-
Lights	6	17	35	0			58	33	173	202	0			408	185	18	63	0			266	64	182	10	0			256	-
Lights %	100%	100%	100%	0%			100%	100%	94%	97.6%	0%			96.2%	96.4%	100%	100%	0%			97.4%	100%	95.3%	100%	0%			96.6%	-
SingleUnit Trucks	0	0	0	0			0	0	5	5	0			10	6	0	0	0			6	0	7	0	0			7	-
SingleUnit Trucks %	0%	0%	0%	0%			0%	0%	2.7%	2.4%	0%			2.4%	3.1%	0%	0%	0%			2.2%	0%	3.7%	0%	0%			2.6%	-
Buses	0	0	0	0			0	0	2	0	0			2	0	0	0	0			0	0	0	0	0			0	-
Buses %	0%	0%	0%	0%			0%	0%	1.1%	0%	0%			0.5%	0%	0%	0%	0%			0%	0%	0%	0%	0%			0%	-
Articulated Trucks	0	0	0	0			0	0	4	0	0			4	1	0	0	0			1	0	2	0	0			2	-
Articulated Trucks %	0%	0%	0%	0%			0%	0%	2.2%	0%	0%			0.9%	0.5%	0%	0%	0%			0.4%	0%	1%	0%	0%			0.8%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-



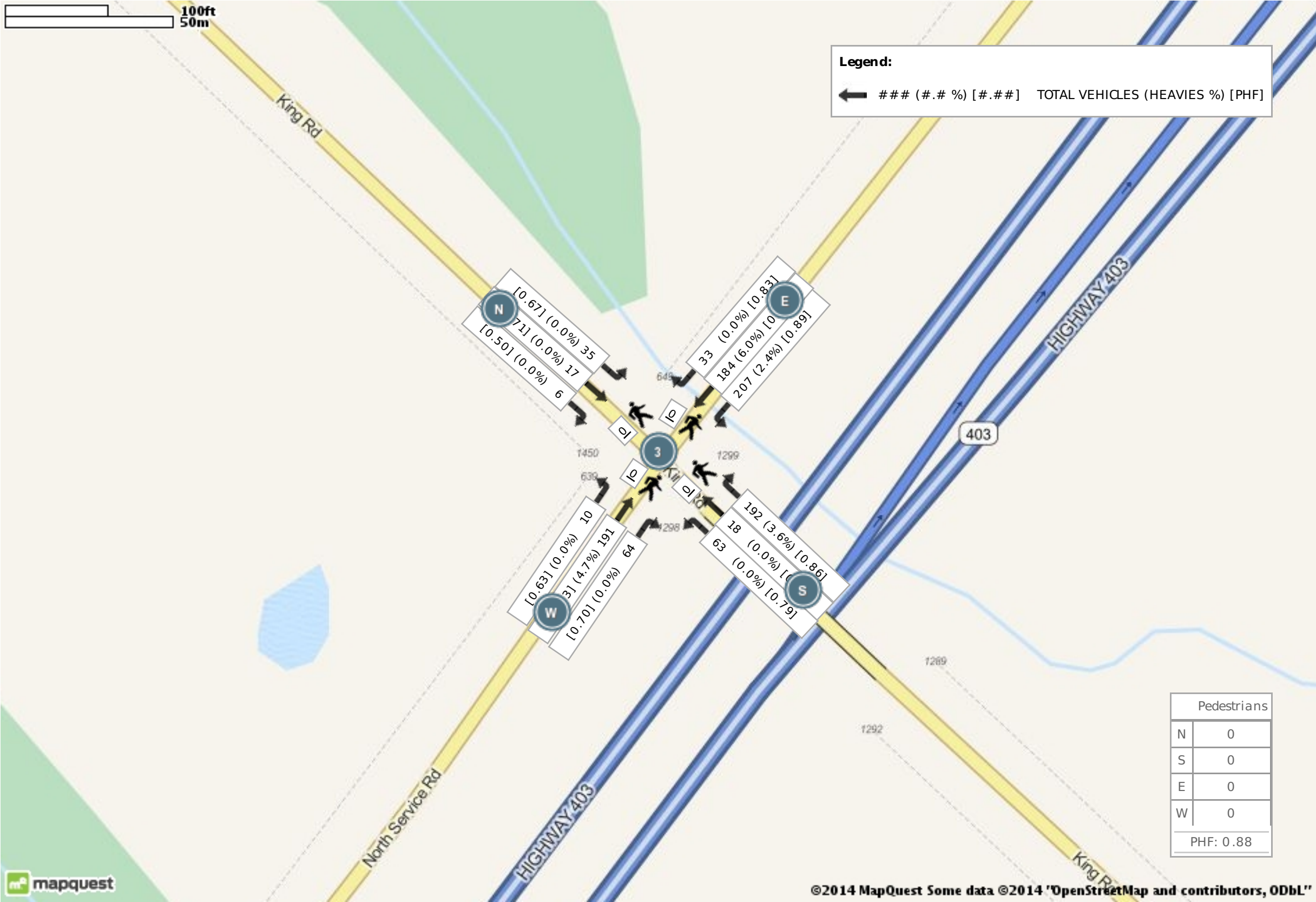
Peak: 04:45 PM - 05:45 PM

Time	N Approach King Rd							E Approach North Service Rd							S Approach King Rd							W Approach North Service Rd							Int. Total (15 min)
	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	Right	Thru	Left	U-Turn	Peds CCW	Peds CW	Approach Total	
16:45:00	3	6	9	0	0	0	18	21	153	104	0	0	0	278	40	17	15	0	0	0	72	17	72	3	0	0	0	92	460
17:00:00	4	18	6	0	0	0	28	24	142	108	0	0	0	274	52	32	23	0	0	0	107	20	82	3	0	0	0	105	514
17:15:00	4	6	2	0	0	0	12	29	157	115	0	0	0	301	75	14	23	0	0	0	112	14	64	1	0	0	0	79	504
17:30:00	2	5	4	0	0	0	11	17	163	112	0	0	0	292	66	28	12	0	0	0	106	18	65	1	0	0	0	84	493
Grand Total	13	35	21	0	0	0	69	91	615	439	0	0	0	1145	233	91	73	0	0	0	397	69	283	8	0	0	0	360	1971
Approach%	18.8%	50.7%	30.4%	0%			-	7.9%	53.7%	38.3%	0%			-	58.7%	22.9%	18.4%	0%			-	19.2%	78.6%	2.2%	0%			-	-
Totals %	0.7%	1.8%	1.1%	0%			3.5%	4.6%	31.2%	22.3%	0%			58.1%	11.8%	4.6%	3.7%	0%			20.1%	3.5%	14.4%	0.4%	0%			18.3%	-
PHF	0.81	0.49	0.58	0			0.62	0.78	0.94	0.95	0			0.95	0.78	0.71	0.79	0			0.89	0.86	0.86	0.67	0			0.86	-
Heavies	0	0	0	0			0	0	4	4	0			8	3	1	1	0			5	1	7	0	0			8	-
Heavies %	0%	0%	0%	0%			0%	0%	1%	1%	0%			0.7%	1%	1%	1%	0%			1.3%	1%	2%	0%	0%			2.2%	-
Lights	13	35	21	0			69	91	611	435	0			1137	230	90	72	0			392	68	276	8	0			352	-
Lights %	100%	100%	100%	0%			100%	100%	99.3%	99.1%	0%			99.3%	98.7%	98.9%	98.6%	0%			98.7%	98.6%	97.5%	100%	0%			97.8%	-
SingleUnit Trucks	0	0	0	0			0	0	1	3	0			4	2	1	0	0			3	1	3	0	0			4	-
SingleUnit Trucks %	0%	0%	0%	0%			0%	0%	0.2%	0.7%	0%			0.3%	0.9%	1.1%	0%	0%			0.8%	1.4%	1.1%	0%	0%			1.1%	-
Buses	0	0	0	0			0	0	2	1	0			3	0	0	1	0			1	0	3	0	0			3	-
Buses %	0%	0%	0%	0%			0%	0%	0.3%	0.2%	0%			0.3%	0%	0%	1.4%	0%			0.3%	0%	1.1%	0%	0%			0.8%	-
Articulated Trucks	0	0	0	0			0	0	1	0	0			1	1	0	0	0			1	0	1	0	0			1	-
Articulated Trucks %	0%	0%	0%	0%			0%	0%	0.2%	0%	0%			0.1%	0.4%	0%	0%	0%			0.3%	0%	0.4%	0%	0%			0.3%	-
Pedestrians	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-	-	-	-	0	0	-	-
Pedestrians%	-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-	-	-	-	0%	0%		-

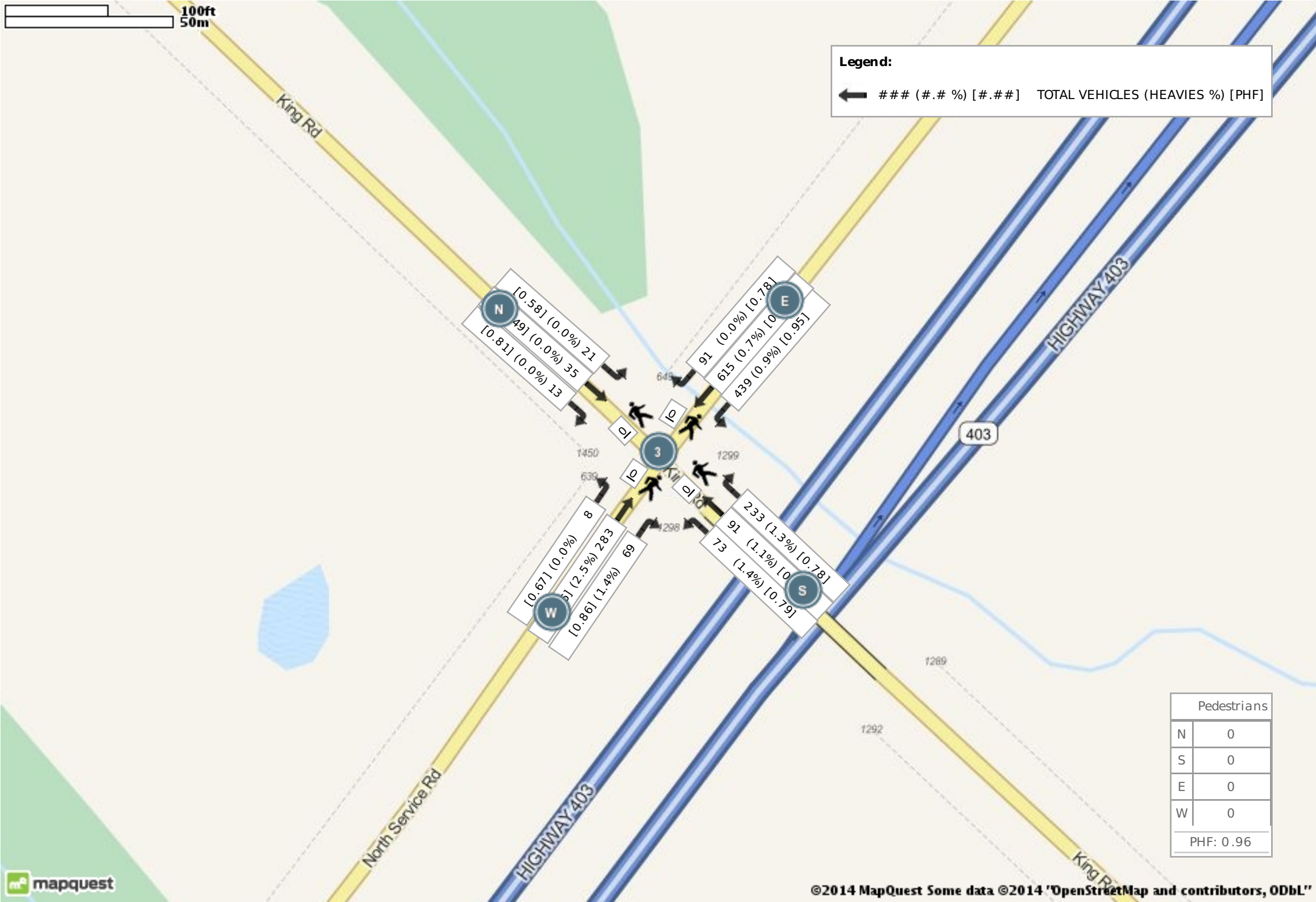
Peak: 07:45 AM - 08:45 AM



Peak: 12:00 PM - 01:00 PM



Peak: 04:45 PM - 05:45 PM



King Road & Hydro Lane

Date: October 28, 2014

Counted By: AG

TIME ENDING	Hydro Lane																King Road																15 Min Sum	60 Min Sum
	EASTBOUND								WESTBOUND								NORTHBOUND								SOUTHBOUND									
	CAR			HV			PED	CYC	CAR			HV			PED	CYC	CAR			HV			PED	CYC										
	L	T	R	L	T	R			L	T	R	L	T	R			L	T	R	L	T	R			L	T	R							
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	68	1	0	1		0	0	2	46	0	0	0	0	0	118			
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	65	3	0	4		0	0	3	39	0	0	2	0	0	116			
07:45	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	98	1	0	4	1	0	0	2	52	0	0	0	0	0	160			
08:00	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	97	4	0	2		0	0	1	62	0	0	2	0	0	170			
08:15	0	0	0	0	0	0	0	0	0	4	0		1	0	0	0	127	6	0	1		0	0	2	56	0	0	1	0	0	198			
08:30	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	0	107	6	0	2		0	0	3	58	0	0	2	0	0	184			
08:45	0	0	0	0	0	0	0	0	0	1	0	3	1	0	0	0	125	2	0			0	0	2	72	0	0	0	0	0	206			
09:00	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	70	1	0	3		0	0	1	60	0	0	0	0	0	137			
11:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	52	2	0			0	0	1	60	0	0	1	0	0	118			
11:30	0	0	0	0	0	0	0	0	0	4	0	1	0	0	0	0	68	2	0	1		0	0	0	80	0	0	2	0	0	158			
11:45	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	69	1	0	1		0	0	1	51	0	0	2	0	0	129			
12:00	0	0	0	0	0	0	0	0	0	5	0	2	0	0	0	4	77	2	0			0	0	0	52	0	1	3	0	0	146			
12:15	0	0	0	0	0	0	0	0	0	5	0	1	0	0	0	0	63	3	0			0	0	1	75	0	0	0	0	0	148			
12:30	0	0	0	0	0	0	0	0	0	3	0	1	0	0	1	0	79	2	0	2	1	0	0	2	97	0	0	4	0	0	192			
12:45	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	58	3	0	2		0	0	5	64	0	0	3	0	0	136			
13:00	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	84	1	0	5		0	0	3	68	0	0	0	0	0	161			
13:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	51	1	0	3		0	0	0	64	0	1	0	0	0	121			
13:30	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	69	3	0	2		0	0	2	57	0	0	0	0	0	134			
13:45	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	53	1	0	2		0	0	1	46	0	0	1	0	0	107			
14:00	0	0	0	0	0	0	0	0	0	3	0	4	0	0	0	0	55	0	0	0		0	0	0	49	0	0	0	0	0	111			
15:15	0	0	0	0	0	0	0	0	0	1	0	4	0	0	0	0	91		0			0	0	1	80	0	0	1	0	0	178			
15:30	0	0	0	0	0	0	0	0	0	2	0	4	0	0	0	0	90	1	0	3		0	0	2	90	0	0	2	0	0	194			
15:45	0	0	0	0	0	0	0	0	0	3	0	9	0	0	0	0	102	1	0			0	0	0	121	0	0	1	0	0	237			
16:00	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	117		0			0	0	2	108	0	0	3	0	0	233			
16:15	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	105		0	6		0	0	2	126	0	0	1	0	0	241			
16:30	0	0	0	0	0	0	0	0	0	3	0		0	0	1	0	75		0	1		0	0	0	99	0	0	3	0	0	182			
16:45	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	0	113	1	0			0	0	0	138	0	0	3	0	0	259			
17:00	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	0	103		0			0	0	0	155	0	0	0	0	0	261			
17:15	0	0	0	0	0	0	0	0	0	3	0	1	0	0	0	1	158	1	0	1		1	0	0	163	0	0	0	0	0	329			
17:30	0	0	0	0	0	0	0	0	0	4	0	2	0	0	0	0	116		0	1		0	0	0	157	0	0	3	0	0	283			
17:45	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	111	1	0			0	0	0	140	0	0	1	0	0	260			
18:00	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	96		0			0	0	0	106	0	0	1	0	0	209			

Plains Rd @ King Rd

Morning Peak Diagram

Specified Period

From: 7:00:00

To: 9:00:00

One Hour Peak

From: 8:00:00

To: 9:00:00

Municipality: Burlington

Site #: 0000201155

Intersection: Plains Rd & King Rd

TFR File #: 2

Count date: 26-Sep-2013

Weather conditions:

Sunny/Dry

Person(s) who counted:

Michael

Jessica

** Signalized Intersection **

Major Road: Plains Rd runs W/E

North Leg Total: 544

North Entering: 266

North Peds: 7

Peds Cross: $\times$

Cyclists	0	2	0	2
Trucks	2	4	6	12
Cars	28	66	158	252
Totals	30	72	164	



Cyclists 3

Trucks 11

Cars 264

Totals 278

East Leg Total: 1752

East Entering: 652

East Peds: 16

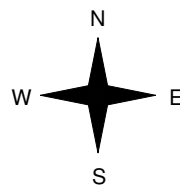
Peds Cross: $\times$

Cyclists	Trucks	Cars	Totals
2	39	686	727



Plains Rd

Cyclists	Trucks	Cars	Totals
1	3	89	93
2	43	815	860
0	5	142	147
3	51	1046	



King Rd

Cars	Trucks	Cyclists	Totals
78	6	1	85
479	32	2	513
52	2	0	54
609	40	3	

Plains Rd



Cars	Trucks	Cyclists	Totals
1043	55	2	1100

Peds Cross: $\times$

West Peds: 4

West Entering: 1100

West Leg Total: 1827

Cars	260
Trucks	11
Cyclists	2
Totals	273



Cars	179	97	70	346
Trucks	5	2	6	13
Cyclists	0	1	0	1
Totals	184	100	76	

Peds Cross: $\times$

South Peds: 9

South Entering: 360

South Leg Total: 633

Comments

Plains Rd @ King Rd

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: Burlington

Site #: 0000201155

Intersection: Plains Rd & King Rd

TFR File #: 2

Count date: 26-Sep-2013

Weather conditions:

Sunny/Dry

Person(s) who counted:

Michael

Jessica

** Signalized Intersection **

Major Road: Plains Rd runs W/E

North Leg Total: 618

North Entering: 325

North Peds: 8

Peds Cross: $\times$

Cyclists	0	4	0	4
Trucks	2	2	5	9
Cars	70	85	157	312
Totals	72	91	162	



Cyclists 1

Trucks 15

Cars 277

Totals 293

East Leg Total: 2021

East Entering: 941

East Peds: 21

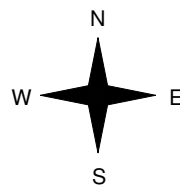
Peds Cross: $\times$

Cyclists	Trucks	Cars	Totals
3	38	956	997



Plains Rd

Cyclists	Trucks	Cars	Totals
0	5	88	93
6	31	797	834
0	2	121	123
6	38	1006	



King Rd

Cars	Trucks	Cyclists	Totals
96	7	0	103
725	31	3	759
78	1	0	79
899	39	3	

Plains Rd



Cars	Trucks	Cyclists	Totals
1034	40	6	1080

Peds Cross: $\times$

West Peds: 11

West Entering: 1050

West Leg Total: 2047

Cars	284
Trucks	5
Cyclists	4
Totals	293



Cars	161	93	80	334
Trucks	5	3	4	12
Cyclists	0	1	0	1
Totals	166	97	84	

Peds Cross: $\times$

South Peds: 7

South Entering: 347

South Leg Total: 640

Comments

Plains Rd @ King Rd

Afternoon Peak Diagram

Specified Period

From: 15:00:00

To: 18:00:00

One Hour Peak

From: 16:15:00

To: 17:15:00

Municipality: Burlington

Site #: 0000201155

Intersection: Plains Rd & King Rd

TFR File #: 2

Count date: 26-Sep-2013

Weather conditions:

Sunny/Dry

Person(s) who counted:

Michael

Jessica

** Signalized Intersection **

Major Road: Plains Rd runs W/E

North Leg Total: 905

North Entering: 587

North Peds: 10

Peds Cross: $\times$

Cyclists	0	3	0	3
Trucks	2	1	5	8
Cars	90	166	320	576
Totals	92	170	325	



Cyclists 4

Trucks 12

Cars 302

Totals 318

East Leg Total: 3024

East Entering: 1633

East Peds: 33

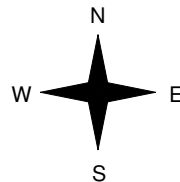
Peds Cross: $\times$

Cyclists	Trucks	Cars	Totals
7	57	1835	1899



Plains Rd

Cyclists	Trucks	Cars	Totals
0	4	98	102
2	28	964	994
1	2	85	88
3	34	1147	



King Rd

Cars	Trucks	Cyclists	Totals
66	6	0	72
1404	51	6	1461
100	0	0	100
1570	57	6	

Plains Rd



Cars	Trucks	Cyclists	Totals
1352	36	3	1391

Peds Cross: $\times$

West Peds: 4

West Entering: 1184

West Leg Total: 3083

Cars	351
Trucks	3
Cyclists	4
Totals	358



Cars	341	138	68	547
Trucks	4	2	3	9
Cyclists	1	4	1	6
Totals	346	144	72	

Peds Cross: $\times$

South Peds: 6

South Entering: 562

South Leg Total: 920

Comments

Plains Rd @ King Rd

Total Count Diagram

Municipality: Burlington
Site #: 0000201155
Intersection: Plains Rd & King Rd
TFR File #: 2
Count date: 26-Sep-2013

Weather conditions:
 Sunny/Dry
Person(s) who counted:
 Michael
 Jessica

**** Signalized Intersection ****

Major Road: Plains Rd runs W/E

North Leg Total: 4813
 North Entering: 2630
 North Peds: 100
 Peds Cross: $\nlessgtr$

	Cyclists	0	13	0	13
Trucks	22	20	55	97	
Cars	445	694	1381	2520	
Totals	467	727	1436		



	Cyclists	21
Trucks	100	
Cars	2062	
Totals	2183	

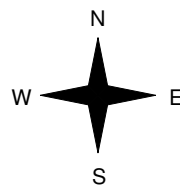
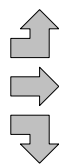
East Leg Total: 16416
 East Entering: 8047
 East Peds: 197
 Peds Cross: $\nlessgtr$

Cyclists	Trucks	Cars	Totals
33	324	8592	8949



Plains Rd

Cyclists	Trucks	Cars	Totals
2	29	575	606
24	263	6087	6374
6	34	903	943
32	326	7565	



King Rd

Cars	Trucks	Cyclists	Totals
660	50	1	711
6439	262	29	6730
594	12	0	606
7693	324	30	

Plains Rd



Cars	Trucks	Cyclists	Totals
7991	353	25	8369

Peds Cross: $\nlessgtr$
 West Peds: 67
 West Entering: 7923
 West Leg Total: 16872

	Cars	2191
Trucks	66	
Cyclists	19	
Totals	2276	



Cars	1708	827	523	3058
Trucks	40	21	35	96
Cyclists	4	18	1	23
Totals	1752	866	559	

Peds Cross: $\nlessgtr$
 South Peds: 62
 South Entering: 3177
 South Leg Total: 5453

Comments

Plains Rd @ King Rd

Annual Average Daily Traffic Diagram

Total Factor = Monthly Factor(1.00) x Daily Factor(0.91) x 24 Hour Factor(1.85) = 1.683500

Municipality: Burlington
Site #: 0000201155
Intersection: Plains Rd & King Rd
TFR File #: 2
Count date: 26-Sep-2013

Weather conditions:
 Sunny/Dry
Person(s) who counted:
 Michael
 Jessica

**** Signalized Intersection ****

Major Road: Plains Rd runs W/E

North Leg Total: 8103
 North Entering: 4428
 North Peds: 168
 Peds Cross: $\nlessgtr$

	Cyclists	0	22	0	22
Trucks	37	34	93	163	
Cars	749	1168	2325	4242	
Totals	786	1224	2418		



Cyclists 35
 Trucks 168
 Cars 3471
 Totals 3675

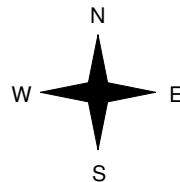
East Leg Total: 27636
 East Entering: 13547
 East Peds: 332
 Peds Cross: $\nlessgtr$

Cyclists	Trucks	Cars	Totals
56	545	14465	15066



Plains Rd

Cyclists	Trucks	Cars	Totals
3	49	968	1020
40	443	10247	10731
10	57	1520	1588
54	549	12736	



King Rd



Cars	Trucks	Cyclists	Totals
1111	84	2	1197
10840	441	49	11330
1000	20	0	1020
12951	545	51	

Plains Rd



Cars	Trucks	Cyclists	Totals
13453	594	42	14089

Peds Cross: $\nlessgtr$
 West Peds: 113
 West Entering: 13338
 West Leg Total: 28404

Cars	3689
Trucks	111
Cyclists	32
Totals	3832



Cars	2875	1392	880	5148
Trucks	67	35	59	162
Cyclists	7	30	2	39
Totals	2949	1458	941	

Peds Cross: $\nlessgtr$
 South Peds: 104
 South Entering: 5348
 South Leg Total: 9180

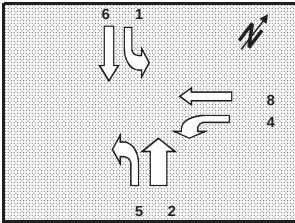
Comments

**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

INT: Waterdown Road @ North Service INT: 106 EFFECTIVE DATE: September / 29 /2011

GROUP NO: 1018

NEMA PHASE MOVEMENTS



CYCLE DEFINITION TABLE:							
PHASE	VEH MIN	PED WLK	PED CLR	AMB	ALL RED	SP	MIN
1	7			3	0		11
2	8	15	8	4	2	C	30
3	0			0			0
4	8	10	14	4	3	E	34
5	7			3	0		11
6	8	15	8	4	2	C	30
7	0			0			0
8	8	10	14	4	3	E	34
Min Cycle = 75							

AM PEAK: 90 sec Cycle		PHASE MOVEMENTS							
SPLIT 1		1	2	3	4	5	6	7	8
	in %	25	45	0	30	22	48	0	30
	in sec	22	41	0	27	19	44	0	27
NOON PEAK: 90 sec Cycle		PHASE MOVEMENTS							
SPLIT 2		1	2	3	4	5	6	7	8
	in %	19	43	0	38	24	38	0	38
	in sec	16	39	0	35	20	35	0	35
PM PEAK: 100 sec Cycle		PHASE MOVEMENTS							
SPLIT 3		1	2	3	4	5	6	7	8
	in %	16	46	0	38	25	37	0	38
	in sec	15	46	0	39	24	37	0	39
OFF PEAK: 0 sec Cycle		PHASE MOVEMENTS							
SPLIT 4		1	2	3	4	5	6	7	8
	in %	19	44	0	37	22	41	0	37
	in sec	0	0	0	0	0	0	0	0
Go Train 100 sec Cycle		PHASE MOVEMENTS							
SPLIT 5		1	2	3	4	5	6	7	8
	in %	16	56	0	28	27	45	0	28
	in sec	15	56	0	29	26	45	0	29

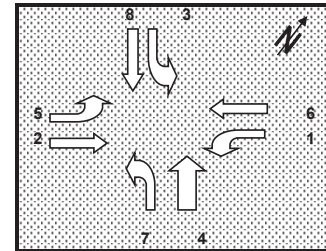
**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

INT: Plains Rd @ King Rd

INT: 112 EFFECTIVE DATE: June / 3 / 2011

GROUP NO: 1022

NEMA PHASE MOVEMENTS



CYCLE DEFINITION TABLE:							
PHASE	VEH MIN	PED WLK	PED CLR	AMB	ALL RED	SP	MIN
1	6			4			11
2	8	16	14	4	2	C	37
3	6			4			11
4	8	12	17	4	3	E	39
5	6			4			11
6	8	16	14	4	2	C	37
7	6			4			11
8	8	12	17	4	3	E	39
Min Cycle = 98							

AM PEAK: 100 sec Cycle		PHASE MOVEMENTS							
SPLIT 1		1	2	3	4	5	6	7	8
	in %	10	50	15	25	10	50	10	30
	in sec	9	50	15	26	10	50	10	30
NOON PEAK: 100 sec Cycle		PHASE MOVEMENTS							
SPLIT 2		1	2	3	4	5	6	7	8
	in %	11	44	17	28	11	44	17	28
	in sec	10	44	18	28	10	44	18	28
PM PEAK: 120 sec Cycle		PHASE MOVEMENTS							
SPLIT 3		1	2	3	4	5	6	7	8
	in %	12	50	13	25	12	50	13	25
	in sec	14	60	16	30	14	60	16	30
OFF PEAK: 100 sec Cycle		PHASE MOVEMENTS							
SPLIT 4		1	2	3	4	5	6	7	8
	in %	12	44	14	30	12	44	14	30
	in sec	11	44	14	31	11	44	14	31

**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

GROUP 1022

LEAD - PLAINS RD E

Effective Date: _____

INT DUP INTERSECTIONS

NO.	NAME
112	Plains Rd @ King Rd

ACT SCH FILE 1 (Sun)	MODE	CYCLE LENGTH	OFFSET NO.	SPLIT NO.	SPEC FUNC	DUP ISEC
INTERSECTION: 1022 TYPE? P	00:15					
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:	LO	101	10	10	10	
INTERSECTION: 1022 TYPE? P	6:00					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	CC	100	1	1	1	
INTERSECTION: 1022 TYPE? P	9:00					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	CC	100	2	2	2	
INTERSECTION: 1022 TYPE? P	15:30					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	CC	120	3	3	3	
INTERSECTION: 1022 TYPE? P	19:00					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	CC	100	4	4	4	
INTERSECTION: 1022 TYPE? P	22:00					
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:	LO	101	10	10	10	
INTERSECTION: 1022 TYPE? P						
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:						

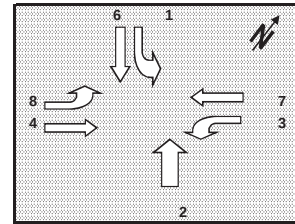
**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

INT: Waterdown @ South Ramp

INT: 105 EFFECTIVE DATE: October / 18 / 2011

GROUP NO: 1018

NEMA PHASE MOVEMENTS



CYCLE DEFINITION TABLE:

PHASE	VEH MIN	PED WLK	PED CLR	AMB	ALL RED	SP	MIN
1	6			3	0		10
2	8	8	14	4	2	C	29
3	8			4	3		16
4	8	8	14	4	3	E	32
5	0			0			0
6	8	8	14	4	2	C	29
7	8			4	3		16
8	8	8	14	4	3	E	32
Min Cycle =							87

AM PEAK: 90 sec Cycle

PHASE MOVEMENTS

SPLIT	1	2	3	4	5	6	7	8
1								
in %	15	40	20	25	0	55	20	25
in sec	12	36	19	23	0	50	18	22

NOON PEAK: 90 sec Cycle

PHASE MOVEMENTS

SPLIT	1	2	3	4	5	6	7	8
2								
in %	13	36	18	33	0	49	18	33
in sec	11	33	17	29	0	45	17	28

PM PEAK: 100 sec Cycle

PHASE MOVEMENTS

SPLIT	1	2	3	4	5	6	7	8
3								
in %	11	39	20	30	0	50	20	30
in sec	10	39	21	30	0	50	20	30

OFF PEAK: 80 sec Cycle

PHASE MOVEMENTS

SPLIT	1	2	3	4	5	6	7	8
4								
in %	14	40	19	27	0	54	19	27
in sec	10	32	16	22	0	44	16	20

Go Train 100 sec Cycle

PHASE MOVEMENTS

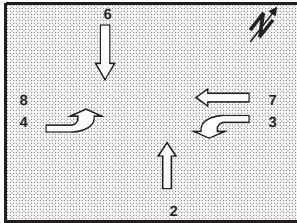
SPLIT	1	2	3	4	5	6	7	8
5								
in %	11	37	29	23	0	48	29	23
in sec	10	37	30	23	0	48	30	22

**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

INT: Waterdown Road @ North Ramp INT: 31 EFFECTIVE DATE: November / 1 / 2010

GROUP NO: 1018

NEMA PHASE MOVEMENTS



CYCLE DEFINITION TABLE:									
PHASE	VEH MIN	PED WLK	PED CLR	AMB	ALL RED	SP	MIN		
1	0			0			0		
2	8	8	16	4	2	C	31		
3	8			4	3		16		
4	8	0	0	4	3		17		
5	0			0			0		
6	8	8	16	4	2	C	31		
7	8			4	3		16		
8	8	0	0	4	3		17		
Min Cycle =							57		

AM PEAK: 90 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
1									
in %	0	55	27	18	0	55	27	18	
in sec	0	50	24	16	0	50	24	16	
NOON PEAK: 90 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
2									
in %	0	50	30	20	0	50	30	20	
in sec	0	45	27	18	0	45	27	18	
PM PEAK: 100 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
3									
in %	0	49	34	17	0	49	34	17	
in sec	0	49	35	16	0	49	35	16	
OFF PEAK: 80 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
4									
in %	0	50	30	20	0	50	30	20	
in sec	0	40	24	16	0	40	24	16	
Go Train 100 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
5									
in %	0	60	23	17	0	60	23	17	
in sec	0	60	24	16	0	60	24	16	

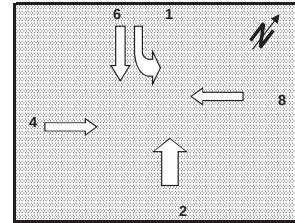
**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

INT: Waterdown @ Masonry

INT: 104 EFFECTIVE DATE: August / 28 / 2014

GROUP NO: 1018

NEMA PHASE MOVEMENTS



CYCLE DEFINITION TABLE:									
PHASE	VEH MIN	PED WLK	PED CLR	AMB	ALL RED	SP	MIN		
1	8			3			12		
2	8	15	14	4	2	C	36		
3	0			0			0		
4	8	8	8	4	3		26		
5	0			0			0		
6	8	15	14	4	2	C	36		
7	0			0			0		
8	8	8	8	4	3		26		
Min Cycle =							74		

AM PEAK: 100 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
1									
in %	18	42	0	40	0	60	0	40	
in sec	17	42	0	41	0	60	0	40	
NOON PEAK: 90 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
2									
in %	18	53	0	29	0	71	0	29	
in sec	15	48	0	27	0	64	0	26	
PM PEAK: 110 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
3									
in %	16	60	0	24	0	76	0	24	
in sec	17	66	0	27	0	84	0	26	
OFF PEAK: 70 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
4									
in %	18	42	0	40	0	60	0	40	
in sec	12	30	0	28	0	42	0	28	
GO TRAIN: 100 sec Cycle									
PHASE MOVEMENTS									
SPLIT	1	2	3	4	5	6	7	8	
5									
in %	16	42	0	42	0	58	0	42	
in sec	15	42	0	43	0	58	0	42	

**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

GROUP 1018

LEAD - WATERDOWN RD

Effective Date: _____

INT DUP INTERSECTIONS

NO.	NAME
104	Waterdown Rd @ Masonary Court

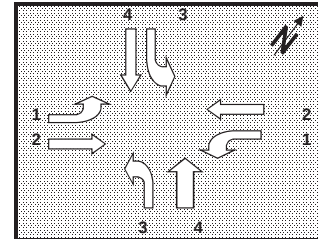
ACT SCH FILE 1 (Mon - Fri)	MODE	CYCLE LENGTH	OFFSET NO.	SPLIT NO.	SPEC FUNC	DUP ISEC
INTERSECTION: 1018 TYPE? P	00:15					
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:	LO	101	10	10	10	
INTERSECTION: 1018 TYPE? P	6:00					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	CC	110	1	1	1	
INTERSECTION: 1018 TYPE? P	9:00					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	LO	101	10	10	10	
INTERSECTION: 1018 TYPE? P	15:30					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	CC	110	3	3	3	
INTERSECTION: 1018 TYPE? P	19:00					
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:	LO	101	10	10	10	

**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

INT: Go Station Rd @ Bus Entrance INT: 32 EFFECTIVE DATE: ____ / ____ / ____

GROUP NO: 1018

NEMA PHASE MOVEMENTS



CYCLE DEFINITION TABLE:

PHASE	VEH MIN	PED WLK	PED CLR	AMB	ALL RED	SP	MIN
1	0			0			0
2	8	7	8	4	3	C	23
3	0			0			0
4	8	7	10	4	3	E	27
Min Cycle =							50

AM PEAK: 0 sec Cycle

PHASE MOVEMENTS

SPLIT	1	2	3	4
1				
in %	0	0	0	0
in sec	#####	0 #####	#####	#####

NOON PEAK: 0 sec Cycle

PHASE MOVEMENTS

SPLIT	1	2	3	4
2				
in %	0	0	0	0
in sec	#####	0 #####	#####	#####

PM PEAK: 0 sec Cycle

PHASE MOVEMENTS

SPLIT	1	2	3	4
3				
in %	0	0	0	0
in sec	#####	0 #####	#####	#####

OFF PEAK: 0 sec Cycle

PHASE MOVEMENTS

SPLIT	1	2	3	4
4				
in %	0	0	0	0
in sec	#####	0 #####	#####	#####

ACT SCH FILE 1 (Mon - Fri)	MODE	CYCLE LENGTH	OFFSET NO.	SPLIT NO.	SPEC FUNC	DUP ISEC
INTERSECTION: 1018 TYPE? P	00:15					
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:	LO	101	10	10	10	
INTERSECTION: 1018 TYPE? P						
SELECTION PLANS:						
ALTERNATES:						
INTERSECTION: 1018 TYPE? P						
SELECTION PLANS:						
ALTERNATES:						
INTERSECTION: 1018 TYPE? P						
SELECTION PLANS:						
ALTERNATES:						
INTERSECTION: 1018 TYPE? P						
SELECTION PLANS:						
ALTERNATES:						

**CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM**

TRAFFIC SIGNAL CONTROL SYSTEM

CONTROLLER TIMING

Intersection No. 33 - Go Access Road @ 403 On Ramp

Controller Group 10xx

Revision Date: November 1, 2010

Ped Signal Yes

Status: P

	RING 1				RING 2			
Direction	WLT	EB	NLT	SB	ELT	WB	SLT	NB
Phase	1	2	3	4	5	6	7	8
Min. Green	--	8	--	8	--	8	--	8
Passage	--	3	--	5	--	3	--	5
Yellow Cl.	--	4	--	4	--	4	--	4
Red Cl.	--	2	--	3	--	2	--	3
Max I	--	30	--	35	--	30	--	35
Max II	--	30	--	35	--	30	--	35
Walk	--	15	--	--	--	15	--	--
Ped Cl.	--	8	--	--	--	8	--	--
SA	--	--	--	--	--	--	--	--
TBR	--	--	--	--	--	--	--	--
TTR	--	--	--	--	--	--	--	--
MVI	--	--	--	--	--	--	--	--
MGP	--	--	--	--	--	--	--	--

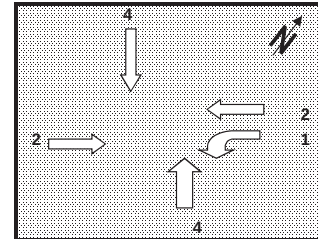
NOTES:

INT: North Service Rd @ King Rd

INT: 175 EFFECTIVE DATE: / /

GROUP NO: 1025

NEMA PHASE MOVEMENTS



CYCLE DEFINITION TABLE:

PHASE	VEH MIN	PED WLK	PED CLR	AMB	ALL RED	SP	MIN
1	6			3	0		10
2	8	8	10	4	2	C	25
4	15	0	0	4	3		25
Min Cycle =							60

AM PEAK: 80 sec Cycle

PHASE MOVEMENTS			
SPLIT	1	2	4
1			
in %	16	47	37
in sec	12	38	30

NOON PEAK: 80 sec Cycle

PHASE MOVEMENTS			
SPLIT	1	2	4
2			
in %	16	47	37
in sec	12	38	30

PM PEAK: 80 sec Cycle

PHASE MOVEMENTS			
SPLIT	1	2	4
3			
in %	16	47	37
in sec	12	38	30

OFF PEAK: 0 sec Cycle

PHASE MOVEMENTS			
SPLIT	1	2	4
4			
in %	0	0	100
in sec	0	0	0

CITY OF BURLINGTON
TRAFFIC SIGNAL CONTROL SYSTEM

INT DUP INTERSECTIONS

GROUP 1025

LEAD - NORTH SERVICE RD

Effective Date: December 17, 2008

[illegible]

ACT SCH FILE 1 (Mon - Fri)	MODE	CYCLE LENGTH	OFFSET NO.	SPLIT NO.	SPEC FUNC	DUP ISEC
INTERSECTION: 1025 TYPE? P	00:15					
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:	LO	101	10	10	10	
INTERSECTION: 1025 TYPE? P	7:00					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	CC	80	1	1	1	
INTERSECTION: 1025 TYPE? P	9:00					
SELECTION PLANS:	1	/	/	/	/	/
ALTERNATES:	CC	80	2	2	2	
INTERSECTION: 1025 TYPE? P	15:30					
SELECTION PLANS:	1/1	/	/	/	/	/
ALTERNATES:	CC	80	3	3	3	
INTERSECTION: 1025 TYPE? P	19:00					
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:	LO	101	10	10	10	
INTERSECTION: 1025 TYPE? P						
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:						
INTERSECTION: 1025 TYPE? P						
SELECTION PLANS:	/	/	/	/	/	/
ALTERNATES:						

Appendix C

Existing Traffic Operational Conditions

Timings

1: North Service Rd & Waterdown Rd

Existing AM
Mixed Use Development 1200 King Rd

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	62	88	36	176	284	164	545
Volume (vph)							
Turn Type	pm+pt		Perm	pm+pt		pm+pt	
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8	2		6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	11.0	30.0	11.0	30.0
Total Split (s)	27.0	27.0	27.0	19.0	41.0	22.0	44.0
Total Split (%)	30.0%	30.0%	30.0%	21.1%	45.6%	24.4%	48.9%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	1.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	23.0	23.0	23.0	59.0	47.1	47.9	40.0
Actuated g/C Ratio	0.26	0.26	0.26	0.66	0.52	0.53	0.44
v/c Ratio	0.16	0.19	0.09	0.34	0.37	0.36	0.40
Control Delay	27.5	27.6	9.3	4.7	5.2	8.9	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	27.6	9.3	4.7	5.2	8.9	17.1
LOS	C	C	A	A	A	A	B
Approach Delay		24.0			5.1		15.4
Approach LOS		C			A		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 19 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.40

Intersection Signal Delay: 11.4

Intersection LOS: B

Intersection Capacity Utilization 55.4%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: North Service Rd & Waterdown Rd

ø1	ø2	ø4
22 s	41 s	27 s
ø5	ø6	ø8
14 s	44 s	27 s

HCM Signalized Intersection Capacity Analysis

1: North Service Rd & Waterdown Rd

Existing AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				62	88	36	176	284	419	164	545	76
Volume (vph)	0	0	0	62	88	36	176	284	419	164	545	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	*1.00		1.00	*1.00	
Flpb, ped/bikes				1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt				1.00	1.00	0.85	1.00	0.91		1.00	0.98	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1556	1863	1503	1671	3360		1787	3625	
Flt Permitted				0.95	1.00	1.00	0.31	1.00		0.39	1.00	
Satd. Flow (perm)				1556	1863	1503	540	3360		728	3625	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	65	92	38	183	296	436	171	568	79
RTOR Reduction (vph)	0	0	0	0	0	28	0	208	0	0	13	0
Lane Group Flow (vph)	0	0	0	65	92	10	183	524	0	171	634	0
Confl. Peds. (#/hr)	1						1					1
Heavy Vehicles (%)	0%	0%	0%	16%	2%	6%	8%	3%	3%	1%	3%	1%
Turn Type				pm+pt		Perm	pm+pt			pm+pt		
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)				20.0	20.0	20.0	57.0	45.1		46.9	38.0	
Effective Green, g (s)				23.0	23.0	23.0	56.0	47.1		44.9	40.0	
Actuated g/C Ratio				0.26	0.26	0.26	0.62	0.52		0.50	0.44	
Clearance Time (s)				7.0	7.0	7.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				398	476	384	525	1758		456	1611	
v/s Ratio Prot				0.04	c0.05		c0.06	0.16		0.03	c0.17	
v/s Ratio Perm						0.01	0.16			0.15		
v/c Ratio				0.16	0.19	0.03	0.35	0.30		0.38	0.39	
Uniform Delay, d1				26.0	26.2	25.1	8.1	12.1		12.5	16.8	
Progression Factor				1.00	1.00	1.00	0.51	0.96		1.00	1.00	
Incremental Delay, d2				0.2	0.9	0.1	1.8	0.4		0.5	0.7	
Delay (s)				26.2	27.1	25.2	5.9	12.0		13.0	17.6	
Level of Service				C	C	C	A	B		B	B	
Approach Delay (s)		0.0			26.5			10.8			16.6	
Approach LOS		A			C			B			B	

Intersection Summary

HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings

2: Hwy 403 WB Off-Ramp & Waterdown Rd

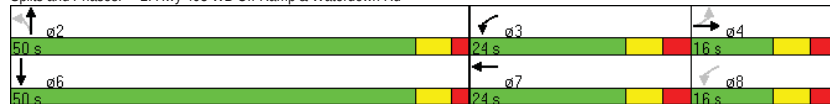
Existing AM
Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBT	ø8
Lane Configurations		↔	↔	↔		↔	↔	
Volume (vph)	1	0	197	0	3	681	607	
Turn Type	Perm		custom		Perm			
Protected Phases		4	3	7		2	6	8
Permitted Phases	4		8		2			
Detector Phase	4	4	3	7	2	2	6	
Switch Phase								
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0	31.0	11.0
Total Split (s)	16.0	16.0	24.0	24.0	50.0	50.0	50.0	16.0
Total Split (%)	17.8%	17.8%	26.7%	26.7%	55.6%	55.6%	55.6%	18%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lag	Lag	Lead	Lead				Lag
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	None
Act Effct Green (s)	8.9	13.9	16.7		65.3	65.3		
Actuated g/C Ratio	0.10	0.15	0.19		0.73	0.73		
v/c Ratio	0.04	0.39	0.38		0.29	0.24		
Control Delay	27.8	36.1	2.0		5.5	4.3		
Queue Delay	0.0	0.0	0.0		0.0	0.0		
Total Delay	27.8	36.1	2.0		5.5	4.3		
LOS	C	D	A		A	A		
Approach Delay	27.8		19.0		5.5	4.3		
Approach LOS	C		B		A	A		

Intersection Summary

Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 8.3
 Intersection Capacity Utilization 39.9%
 Analysis Period (min) 15

Splits and Phases: 2: Hwy 403 WB Off-Ramp & Waterdown Rd



HCM Signalized Intersection Capacity Analysis

2: Hwy 403 WB Off-Ramp & Waterdown Rd

Existing AM
Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (vph)	1	0	3	197	0	197	3	681	0	0	607	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00			*1.00	1.00			*1.00			*1.00	
Frpb, ped/bikes	1.00			1.00	0.99			1.00			1.00	
Flpb, ped/bikes	1.00			1.00	1.00			1.00			1.00	
Frt	0.90			1.00	0.85			1.00			1.00	
Flt Protected	0.99			0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1121			3406	1532			3614			3689	
Flt Permitted	0.85			0.00	1.00			0.95			1.00	
Satd. Flow (perm)	964			0	1532			3447			3689	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	0	3	207	0	207	3	717	0	0	639	0
RTOR Reduction (vph)	0	3	0	0	156	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1	0	207	51	0	0	720	0	0	639	0
Confl. Peds. (#/hr)	1						1	3				3
Heavy Vehicles (%)	0%	0%	67%	6%	0%	4%	33%	5%	0%	0%	3%	0%
Turn Type	Perm			custom			Perm					
Protected Phases		4		3	7			2			6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		1.4		10.9	19.3			57.7			57.7	
Effective Green, g (s)		4.4		13.9	22.3			59.7			59.7	
Actuated g/C Ratio		0.05		0.15	0.25			0.66			0.66	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		47		526	380			2287			2447	
v/s Ratio Prot				c0.06	c0.03						0.17	
v/s Ratio Perm		0.00						c0.21				
v/c Ratio		0.02		0.39	0.13			0.31			0.26	
Uniform Delay, d1		40.8		34.3	26.3			6.4			6.2	
Progression Factor		1.00		1.00	1.00			0.98			0.80	
Incremental Delay, d2		0.2		0.5	0.2			0.3			0.2	
Delay (s)		41.0		34.7	26.5			6.6			5.2	
Level of Service		D		C	C			A			A	
Approach Delay (s)		41.0		30.6	26.5			6.6			5.2	
Approach LOS		D		C	C			A			A	

Intersection Summary

HCM Average Control Delay 11.8
 HCM Volume to Capacity ratio 0.31
 Actuated Cycle Length (s) 90.0
 Intersection Capacity Utilization 39.9%
 Analysis Period (min) 15
 HCM Level of Service B
 Sum of lost time (s) 8.0
 ICU Level of Service A
 Critical Lane Group

Timings

3: Hwy 403 EB Off-Ramp/GO Access & Waterdown Rd

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations	229	223	235	22	53	402	396	411
Volume (vph)	229	223	235	22	53	402	396	411
Turn Type	Prot		Perm	Prot	custom		pm+pt	
Protected Phases	8	4		3		2	1	6
Permitted Phases			4		7		6	
Detector Phase	8	4	4	3	7	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	22.0	22.0	22.0	16.0	16.0	29.0	10.0	29.0
Total Split (s)	23.0	23.0	23.0	17.0	17.0	38.0	12.0	50.0
Total Split (%)	25.6%	25.6%	25.6%	18.9%	18.9%	42.2%	13.3%	55.6%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-3.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	18.8	22.7	22.7	11.0	12.0	34.0	53.3	53.3
Actuated g/C Ratio	0.21	0.25	0.25	0.12	0.13	0.38	0.59	0.59
v/c Ratio	0.65	0.49	0.62	0.07	0.29	0.57	1.00	0.21
Control Delay	41.9	32.7	37.9	35.6	39.3	14.9	77.5	17.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	32.7	37.9	35.6	39.3	14.9	77.5	17.6
LOS	D	C	D	D	D	B	E	B
Approach Delay		37.6				14.9		47.0
Approach LOS		D				B		D

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.00

Intersection Signal Delay: 33.2

Intersection LOS: C

Intersection Capacity Utilization 74.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 3: Hwy 403 EB Off-Ramp/GO Access & Waterdown Rd

12 s	38 s	17 s	23 s
51 s		17 s	23 s

HCM Signalized Intersection Capacity Analysis

3: Hwy 403 EB Off-Ramp/GO Access & Waterdown Rd

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	229	223	235	22	0	53	0	402	388	396	411	0
Volume (vph)	229	223	235	22	0	53	0	402	388	396	411	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00		1.00	*1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		0.93		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		0.95	1.00	
Satd. Flow (prot)	1752	1863	1553	2735		1417		3321		1736	3519	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.15	1.00	
Satd. Flow (perm)	1752	1863	1553	2735		1417		3321		273	3519	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	239	232	245	23	0	55	0	419	404	412	428	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	209	0	0	0	0
Lane Group Flow (vph)	239	232	245	23	0	55	0	614	0	412	428	0
Confl. Peds. (#/hr)							2					2
Heavy Vehicles (%)	3%	2%	4%	32%	0%	14%	0%	6%	6%	4%	8%	0%
Turn Type	Prot		Perm	Prot		custom				pm+pt		
Protected Phases	8	4		3				2		1	6	
Permitted Phases			4			7				6		
Actuated Green, G (s)	17.1	19.7	19.7	3.2		5.8		27.8		47.1	47.1	
Effective Green, g (s)	20.1	22.7	22.7	6.2		8.8		29.8		46.1	49.1	
Actuated g/C Ratio	0.22	0.25	0.25	0.07		0.10		0.33		0.51	0.55	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	391	470	392	188		139		1100		389	1920	
v/s Ratio Prot	0.14	0.12		0.01				0.18		c0.18	0.12	
v/s Ratio Perm			c0.16			c0.04				c0.36		
v/c Ratio	0.61	0.49	0.62	0.12		0.40		0.56		1.06	0.22	
Uniform Delay, d1	31.4	28.7	29.9	39.3		38.1		24.7		23.4	10.6	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.00		1.89	1.71	
Incremental Delay, d2	2.8	0.8	3.1	0.3		1.9		2.0		61.7	0.3	
Delay (s)	34.3	29.6	33.0	39.6		40.0		26.7		105.9	18.4	
Level of Service	C	C	C	D		D		C		F	B	
Approach Delay (s)		32.3			39.9			26.7			61.3	
Approach LOS		C			D			C			E	

Intersection Summary

HCM Average Control Delay	40.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Masonry Crt/Railway Rd & Waterdown Rd

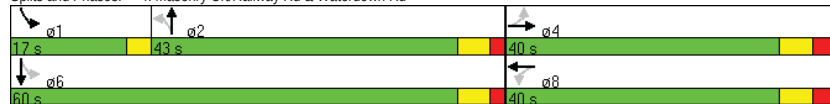
Existing AM
Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group								
Lane Configurations	27	0	8	0	8	724	116	531
Volume (vph)								
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	12.0	36.0
Total Split (s)	40.0	40.0	40.0	40.0	43.0	43.0	17.0	60.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	43.0%	43.0%	17.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	12.7	12.7	12.7	12.7	73.6	73.6	85.3	86.9
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.74	0.74	0.85	0.87
v/c Ratio	0.33	0.05	0.08	0.02	0.61	0.26	0.39	
Control Delay	38.1	37.2	0.3	6.8	11.0	3.5	3.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	38.1	37.2	0.3	6.8	11.0	3.5	3.6	
LOS	D	D	A	A	B	A	A	
Approach Delay	38.1		6.8		10.9		3.6	
Approach LOS	D		A		B		A	

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 17 (17%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 8.2
Intersection LOS: A
Intersection Capacity Utilization 65.5%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 4: Masonry Crt/Railway Rd & Waterdown Rd



HCM Signalized Intersection Capacity Analysis

4: Masonry Crt/Railway Rd & Waterdown Rd

Existing AM
Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	27	0	10	8	0	39	8	724	33	116	531	21
Volume (vph)												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Frt	0.96			1.00	0.85		1.00	0.99		1.00	0.99	
Flt Protected	0.97			0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1114			1805	1568		1444	1818		1787	1736	
Flt Permitted	0.76			0.82	1.00		0.44	1.00		0.24	1.00	
Satd. Flow (perm)	876			1558	1568		669	1818		449	1736	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	29	0	11	9	0	42	9	778	35	125	571	23
RTOR Reduction (vph)	0	10	0	0	38	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	30	0	9	4	0	9	812	0	125	593	0
Heavy Vehicles (%)	73%	0%	20%	0%	0%	3%	25%	0%	0%	1%	6%	79%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.5		6.5	6.5		68.8	68.8		80.5	80.5	
Effective Green, g (s)		9.5		9.5	9.5		70.8	70.8		79.5	82.5	
Actuated g/C Ratio		0.10		0.10	0.10		0.71	0.71		0.80	0.82	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		83		148	149		474	1287		460	1432	
v/s Ratio Prot					0.00			c0.45		0.02	c0.34	
v/s Ratio Perm		c0.03		0.01			0.01			0.20		
v/c Ratio		0.36		0.06	0.03		0.02	0.63		0.27	0.41	
Uniform Delay, d1		42.4		41.2	41.1		4.3	7.7		5.8	2.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.7		0.2	0.1		0.1	2.4		0.3	0.9	
Delay (s)		45.1		41.4	41.1		4.4	10.1		6.1	3.2	
Level of Service		D		D	D		A	B		A	A	
Approach Delay (s)		45.1			41.2			10.0			3.7	
Approach LOS		D			D			B			A	

Intersection Summary

HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Timings

5: South Service Rd & GO Bus Driveway

Existing AM
Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↔↔	↔↔	↔
Volume (vph)	988	61	14
Turn Type			
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	38.0	38.0	32.0
Total Split (%)	54.3%	54.3%	45.7%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	66.0	66.0	11.2
Actuated g/C Ratio	0.94	0.94	0.16
v/c Ratio	0.31	0.02	0.11
Control Delay	1.4	1.3	25.1
Queue Delay	0.0	0.0	0.0
Total Delay	1.4	1.3	25.1
LOS	A	A	C
Approach Delay	1.4	1.3	25.1
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.31
 Intersection Signal Delay: 1.8
 Intersection LOS: A
 Intersection Capacity Utilization 41.3%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: South Service Rd & GO Bus Driveway



HCM Signalized Intersection Capacity Analysis

5: South Service Rd & GO Bus Driveway

Existing AM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (vph)	988	19	0	61	14	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3631			3800	988	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3631			3800	988	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1029	20	0	64	15	2
RTOR Reduction (vph)	1	0	0	0	2	0
Lane Group Flow (vph)	1048	0	0	64	15	0
Confl. Peds. (#/hr)		2	2			
Heavy Vehicles (%)	3%	72%	0%	0%	92%	0%
Turn Type			Perm			
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	54.2			54.2	1.8	
Effective Green, g (s)	57.2			57.2	4.8	
Actuated g/C Ratio	0.82			0.82	0.07	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2967			3105	68	
v/s Ratio Prot	c0.29			0.02	c0.02	
v/s Ratio Perm						
v/c Ratio	0.35			0.02	0.22	
Uniform Delay, d1	1.6			1.2	30.8	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.3			0.0	1.7	
Delay (s)	2.0			1.2	32.5	
Level of Service	A			A	C	
Approach Delay (s)	2.0			1.2	32.5	
Approach LOS	A			A	C	

Intersection Summary

HCM Average Control Delay 2.4
 HCM Volume to Capacity ratio 0.34
 Actuated Cycle Length (s) 70.0
 Intersection Capacity Utilization 41.3%
 Analysis Period (min) 15
 HCM Level of Service A
 Sum of lost time (s) 8.0
 ICU Level of Service A
 Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 6: South Service Rd & West GO Driveway

Existing AM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (veh/h)	849	141	0	13	48	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	965	160	0	15	55	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.93		0.93	0.93
vC, conflicting volume			1125		1052	562
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			992		914	389
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		79	99
cM capacity (veh/h)			658		258	574
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	643	482	5	10	62	
Volume Left	0	0	0	0	55	
Volume Right	0	160	0	0	8	
cSH	1700	1700	658	1700	277	
Volume to Capacity	0.38	0.28	0.00	0.01	0.23	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	6.8	
Control Delay (s)	0.0	0.0	0.0	0.0	21.7	
Lane LOS					C	
Approach Delay (s)	0.0		0.0		21.7	
Approach LOS					C	
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			38.0%		ICU Level of Service	A
Analysis Period (min)			15			

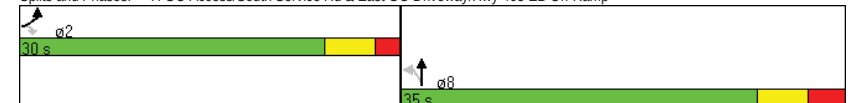
Timings

7: GO Access/South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp

Existing AM

			
Lane Group	EBL	EBR	NBT
Lane Configurations			
Volume (vph)	583	273	22
Turn Type	Perm		
Protected Phases	2		8
Permitted Phases		2	
Detector Phase	2	2	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	15.0
Total Split (s)	30.0	30.0	35.0
Total Split (%)	46.2%	46.2%	53.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	56.5	56.5	12.0
Actuated g/C Ratio	0.87	0.87	0.18
v/c Ratio	0.46	0.23	0.12
Control Delay	4.6	1.0	22.4
Queue Delay	0.0	0.0	0.0
Total Delay	4.6	1.0	22.4
LOS	A	A	C
Approach Delay	3.4		22.4
Approach LOS	A		C
Intersection Summary			
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 0 (0%), Referenced to phase 2:EBL and 6:, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.46			
Intersection Signal Delay: 4.2		Intersection LOS: A	
Intersection Capacity Utilization 45.6%		ICU Level of Service A	
Analysis Period (min) 15			
Description: Ped Signal			

Splits and Phases: 7: GO Access/South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp



HCM Signalized Intersection Capacity Analysis
7: GO Access/South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp

Existing AM

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	583	273	13	22	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0		
Lane Util. Factor	1.00	1.00		1.00		
Flpb, ped/bikes	1.00	0.98		1.00		
Flpb, ped/bikes	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.98		
Satd. Flow (prot)	1719	1578		1866		
Flt Permitted	0.95	1.00		0.98		
Satd. Flow (perm)	1719	1578		1866		
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	686	321	15	26	0	0
RTOR Reduction (vph)	0	75	0	0	0	0
Lane Group Flow (vph)	686	246	0	41	0	0
Confl. Peds. (#/hr)	2					
Heavy Vehicles (%)	5%	0%	0%	0%	0%	0%
Turn Type	Perm		Perm			
Protected Phases	2				8	
Permitted Phases	2		8			
Actuated Green, G (s)	47.9	47.9	4.1			
Effective Green, g (s)	49.9	49.9	7.1			
Actuated g/C Ratio	0.77	0.77	0.11			
Clearance Time (s)	6.0	6.0	7.0			
Vehicle Extension (s)	3.0	3.0	5.0			
Lane Grp Cap (vph)	1320	1211	204			
v/s Ratio Prot	0.40					
v/s Ratio Perm			0.16		0.02	
v/c Ratio	0.52	0.20	0.20			
Uniform Delay, d1	2.9	2.1	26.4			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	1.5	0.4	1.0			
Delay (s)	4.4	2.5	27.4			
Level of Service	A	A	C			
Approach Delay (s)	3.8		27.4		0.0	
Approach LOS	A		C		A	

Intersection Summary			
HCM Average Control Delay	4.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		
Description: Ped Signal			
c Critical Lane Group			

Timings
8: North Service Rd & King Rd

Existing AM

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	6	410	167	228	23	9	25	21	28	8
Turn Type	Perm		pm+pt		Perm	Perm		Perm		Perm
Protected Phases		2	1	2			4		4	
Permitted Phases	2		2		2	4		4		4
Detector Phase	2	2	1	2	2	4	4	4	4	4
Switch Phase										
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	38.0	38.0	12.0	38.0	38.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	47.5%	47.5%	15.0%	47.5%	47.5%	37.5%	37.5%	37.5%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-2.0	-3.0	-2.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	4.0	5.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	34.0	34.0	42.0	34.0	34.0		26.0		26.0	26.0
Actuated g/C Ratio	0.42	0.42	0.52	0.42	0.42		0.32		0.32	0.32
v/c Ratio	0.01	0.66	0.47	0.31	0.03		0.49		0.10	0.02
Control Delay	13.5	22.9	12.5	16.6	5.9		6.1		19.6	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	13.5	22.9	12.5	16.6	5.9		6.1		19.6	10.9
LOS	B	C	B	B	A		A		B	B
Approach Delay		22.8		14.4			6.1		18.4	
Approach LOS		C		B			A		B	
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 80										
Offset: 39 (49%), Referenced to phase 2:EBWB and 6:, Start of Green										
Natural Cycle: 60										
Control Type: Pretimed										
Maximum v/c Ratio: 0.66										
Intersection Signal Delay: 15.4										
Intersection LOS: B										
Intersection Capacity Utilization 73.2%										
ICU Level of Service D										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis 8: North Service Rd & King Rd

Existing AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱			↰	↱		↰	↱
Volume (vph)	6	410	69	167	228	23	9	25	319	21	28	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		0.88		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		1.00		0.98	1.00	
Satd. Flow (prot)	1805	1789		1735	1827	1615		1622		1860	1615	
Flt Permitted	0.55	1.00		0.26	1.00	1.00		0.99		0.82	1.00	
Satd. Flow (perm)	1053	1789		481	1827	1615		1615		1556	1615	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	432	73	176	240	24	9	26	336	22	29	8
RTOR Reduction (vph)	0	7	0	0	0	14	0	227	0	0	0	5
Lane Group Flow (vph)	6	498	0	176	240	10	0	144	0	0	51	3
Confl. Peds. (#/hr)			1	1								
Heavy Vehicles (%)	0%	4%	1%	4%	4%	0%	0%	0%	3%	0%	0%	0%
Turn Type	Perm			pm+pt		Perm	Perm			Perm		Perm
Protected Phases		2		1	2			4			4	
Permitted Phases	2			2		2	4			4		4
Actuated Green, G (s)	32.0	32.0		41.0	32.0	32.0		23.0		23.0	23.0	
Effective Green, g (s)	34.0	34.0		39.0	34.0	34.0		26.0		26.0	26.0	
Actuated g/C Ratio	0.42	0.42		0.49	0.42	0.42		0.32		0.32	0.32	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0		7.0		7.0	7.0	
Lane Grp Cap (vph)	448	760		360	776	686		525		506	525	
v/s Ratio Prot		c0.28		c0.05	0.13							
v/s Ratio Perm	0.01			0.19		0.01	c0.09			0.03	0.00	
v/c Ratio	0.01	0.65		0.49	0.31	0.01	0.27			0.10	0.00	
Uniform Delay, d1	13.3	18.3		13.2	15.2	13.3	20.0			18.8	18.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00			1.00	1.00	
Incremental Delay, d2	0.1	4.4		4.7	1.0	0.0	1.3			0.4	0.0	
Delay (s)	13.4	22.7		17.9	16.3	13.3	21.3			19.2	18.3	
Level of Service	B	C		B	B	B	C			B	B	
Approach Delay (s)		22.6			16.8		21.3			19.1		
Approach LOS		C			B		C			B		
Intersection Summary												
HCM Average Control Delay		20.2										
HCM Volume to Capacity ratio		0.49										
Actuated Cycle Length (s)		80.0						12.0				
Intersection Capacity Utilization		73.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 9: Hydro Ln & King Rd

Existing AM
Mixed Use Development 1200 King Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰			↱
Volume (veh/h)	12	5	348	18	8	256
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	5	378	20	9	278
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLT			None
Median storage (veh)			2			
Upstream signal (m)						278
pX, platoon unblocked	1.00					
vC, conflicting volume	684	388			398	
vC1, stage 1 conf vol	388					
vC2, stage 2 conf vol	296					
vCu, unblocked vol	680	388			398	
tC, single (s)	6.6	6.2			4.1	
tC, 2 stage (s)	5.6					
tF (s)	3.7	3.3			2.2	
p0 queue free %	98	99			99	
cM capacity (veh/h)	570	665			1172	
Direction, Lane #						
	WB 1	WB 2	NB 1	SB 1		
Volume Total	13	5	398	287		
Volume Left	13	0	0	9		
Volume Right	0	5	20	0		
cSH	570	665	1700	1172		
Volume to Capacity	0.02	0.01	0.23	0.01		
Queue Length 95th (m)	0.6	0.2	0.0	0.2		
Control Delay (s)	11.5	10.5	0.0	0.3		
Lane LOS	B	B		A		
Approach Delay (s)	11.2		0.0	0.3		
Approach LOS	B					
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			29.9%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

10: Plains Rd E & King Rd

Existing AM
Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	93	860	147	54	513	184	100	164	72	30
Volume (vph)										
Turn Type	pm+pt		Perm	pm+pt		pm+pt		pm+pt		Perm
Protected Phases	5	2		1	6	7	4	3	8	
Permitted Phases	2		2	6		4		8		8
Detector Phase	5	2	2	1	6	7	4	3	8	8
Switch Phase										
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	10.0	25.0	11.0	25.0	25.0
Total Split (s)	10.0	51.0	51.0	9.0	50.0	10.0	25.0	15.0	30.0	30.0
Total Split (%)	10.0%	51.0%	51.0%	9.0%	50.0%	10.0%	25.0%	15.0%	30.0%	30.0%
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)	0.0	2.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	-2.0	-2.0	-4.0	-2.0	0.0	-3.0	0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	0.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None	None
Act Effct Green (s)	57.7	52.2	52.2	63.3	51.4	24.7	17.2	28.8	21.1	21.1
Actuated g/C Ratio	0.58	0.52	0.52	0.63	0.51	0.25	0.17	0.29	0.21	0.21
v/c Ratio	0.23	0.49	0.19	0.15	0.36	0.55	0.61	0.57	0.21	0.10
Control Delay	10.8	17.8	5.0	8.6	15.8	34.7	39.0	33.8	31.9	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.8	17.8	5.0	8.6	15.8	34.7	39.0	33.8	31.9	10.5
LOS	B	B	A	A	B	C	D	C	C	B
Approach Delay	15.5			15.2			36.8		30.6	
Approach LOS	B			B			D		C	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 29 (29%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 85

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.61

Intersection Signal Delay: 20.3

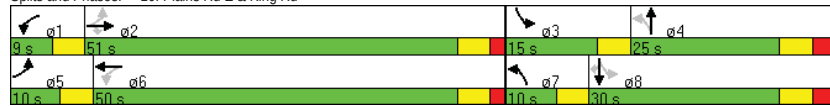
Intersection LOS: C

Intersection Capacity Utilization 65.0%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 10: Plains Rd E & King Rd



HCM Signalized Intersection Capacity Analysis

10: Plains Rd E & King Rd

Existing AM
Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	93	860	147	54	513	85	184	100	76	164	72	30
Volume (vph)												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	0.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	*1.00	1.00	1.00	*1.00		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1750	3619	1514	1734	3489		1745	1671		1725	1792	1481
Flt Permitted	0.35	1.00	1.00	0.24	1.00		0.71	1.00		0.38	1.00	1.00
Satd. Flow (perm)	642	3619	1514	439	3489		1297	1671		693	1792	1481
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	935	160	59	558	92	200	109	83	178	78	33
RTOR Reduction (vph)	0	0	63	0	13	0	28	0	0	0	0	27
Lane Group Flow (vph)	101	935	98	59	637	0	200	164	0	178	78	6
Confl. Peds. (#/hr)	7		9	9		7	4		16	16		4
Heavy Vehicles (%)	3%	5%	3%	4%	6%	7%	3%	2%	8%	4%	6%	7%
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6			4			8		8
Actuated Green, G (s)	53.5	48.0	48.0	51.9	47.2		25.4	15.6		27.2	16.5	16.5
Effective Green, g (s)	53.5	50.0	50.0	59.9	49.2		25.4	18.6		27.2	19.5	19.5
Actuated g/C Ratio	0.54	0.50	0.50	0.60	0.49		0.25	0.19		0.27	0.20	0.20
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	7.0		4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	404	1810	757	376	1717		373	311		299	349	289
v/s Ratio Prot	c0.01	c0.26		0.01	0.18		0.05	0.10		c0.06	0.04	
v/s Ratio Perm	0.12		0.06	0.08			0.08			c0.10		0.00
v/c Ratio	0.25	0.52	0.13	0.16	0.37		0.54	0.53		0.60	0.22	0.02
Uniform Delay, d1	11.8	16.9	13.4	9.2	15.8		31.4	36.7		29.8	33.9	32.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1	0.4	0.2	0.6		1.5	1.6		3.2	0.3	0.0
Delay (s)	12.2	17.9	13.7	9.4	16.4		32.9	38.3		33.0	34.2	32.6
Level of Service	B	B	B	A	B		C	D		C	C	C
Approach Delay (s)	16.9			15.8			35.6		33.3			
Approach LOS	B			B			D		C			

Intersection Summary

HCM Average Control Delay	21.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Queuing and Blocking Report
Existing AM

Existing AM
Mixed Use Development 1200 King Rd

Intersection: 1: North Service Rd & Waterdown Rd

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	40.9	34.7	15.8	32.4	47.6	81.1	48.4	89.6	70.4
Average Queue (m)	14.0	14.5	4.8	13.8	14.0	35.7	18.9	46.6	25.7
95th Queue (m)	30.1	28.4	13.1	27.4	33.9	67.0	35.7	76.5	53.5
Link Distance (m)	342.7			134.7		134.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	165.0	125.0		60.0			70.0	70.0	
Storage Blk Time (%)					0			1	0
Queuing Penalty (veh)					0			4	0

Intersection: 2: Hwy 403 WB Off-Ramp & Waterdown Rd

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	16.2	64.7	30.0	40.3	27.7	27.3	97.8	22.6
Average Queue (m)	1.2	31.2	8.4	17.5	8.0	8.2	39.0	4.4
95th Queue (m)	7.4	54.3	21.7	31.4	20.3	20.5	79.4	14.2
Link Distance (m)	65.6	439.5		167.8		167.8	134.7	134.7
Upstream Blk Time (%)							0	
Queuing Penalty (veh)							0	
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Hwy 403 EB Off-Ramp/GO Access & Waterdown Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	TR	L	T	T
Maximum Queue (m)	77.1	67.8	74.4	30.4	1.7	42.9	76.1	99.5	64.9	170.6	128.2
Average Queue (m)	40.3	32.3	38.7	6.7	0.1	14.3	38.3	52.4	55.7	92.0	29.2
95th Queue (m)	63.8	53.7	65.2	21.0	1.7	31.1	64.8	87.2	78.4	187.2	93.3
Link Distance (m)	327.4					197.9	197.9	115.0	115.0	167.8	167.8
Upstream Blk Time (%)								0	5		0
Queuing Penalty (veh)								0	22		0
Storage Bay Dist (m)	125.0	250.0		65.0					35.0		
Storage Blk Time (%)				0					46	7	
Queuing Penalty (veh)				0					94	29	

Queuing and Blocking Report
Existing AM

Existing AM
Mixed Use Development 1200 King Rd

Intersection: 4: Masonry Crt/Railway Rd & Waterdown Rd

Movement	EB	WB	WB	NB	NB	SB	SB
Directions Served	LR	L	TR	L	TR	L	TR
Maximum Queue (m)	41.6	12.5	16.0	17.8	117.4	31.7	75.2
Average Queue (m)	15.2	1.7	6.8	2.0	43.4	12.8	18.0
95th Queue (m)	33.4	7.6	14.6	10.7	105.0	25.0	51.9
Link Distance (m)	136.1	157.6		116.4		209.6	
Upstream Blk Time (%)					1		
Queuing Penalty (veh)					0		
Storage Bay Dist (m)	35.0		90.0		90.0		
Storage Blk Time (%)					2	0	
Queuing Penalty (veh)					0	0	

Intersection: 5: South Service Rd & GO Bus Driveway

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	52.6	42.8	5.4	7.3	36.0
Average Queue (m)	9.2	6.7	0.2	0.4	7.4
95th Queue (m)	36.1	28.9	2.5	3.5	24.9
Link Distance (m)	197.9	197.9	94.7	94.7	45.4
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: South Service Rd & West GO Driveway

Movement	EB	NB
Directions Served	T	LR
Maximum Queue (m)	1.8	21.4
Average Queue (m)	0.1	9.2
95th Queue (m)	1.3	17.6
Link Distance (m)	94.7	52.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
Existing AM

Existing AM
Mixed Use Development 1200 King Rd

Intersection: 7: GO Access/South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp

Movement	EB	EB	NB
Directions Served	L	R	LT
Maximum Queue (m)	67.1	14.9	23.1
Average Queue (m)	19.9	5.0	8.5
95th Queue (m)	52.0	13.2	19.5
Link Distance (m)	95.2	95.2	63.5
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: North Service Rd & King Rd

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (m)	22.2	112.6	37.1	48.0	9.0	77.2	22.0	7.7
Average Queue (m)	1.7	59.2	18.8	23.5	3.2	34.1	7.9	1.4
95th Queue (m)	12.3	99.7	33.2	40.2	9.9	65.1	18.0	6.0
Link Distance (m)		1981.5		334.7		255.5	168.3	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	45.0		80.0		40.0			25.0
Storage Blk Time (%)		15		1			0	
Queuing Penalty (veh)		1		2			0	

Intersection: 9: Hydro Ln & King Rd

Movement	WB	WB	SB
Directions Served	L	R	LT
Maximum Queue (m)	16.9	10.3	7.4
Average Queue (m)	2.8	1.6	0.8
95th Queue (m)	10.5	7.5	5.0
Link Distance (m)	74.4	74.4	255.5
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
Existing AM

Existing AM
Mixed Use Development 1200 King Rd

Intersection: 10: Plains Rd E & King Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (m)	30.0	257.7	256.1	64.0	31.8	55.1	61.8	68.9	99.4	59.8	42.1	17.9
Average Queue (m)	11.1	63.6	61.2	9.2	10.1	27.4	37.2	34.0	38.5	31.7	17.1	6.0
95th Queue (m)	22.2	176.7	155.3	32.8	22.6	50.1	59.2	63.1	77.0	54.8	33.5	14.9
Link Distance (m)		251.9	251.9			195.1	195.1		131.8		409.5	
Upstream Blk Time (%)		0	0									
Queuing Penalty (veh)		0	0									
Storage Bay Dist (m)	35.0			35.0	30.0			45.0		35.0		35.0
Storage Blk Time (%)	0	8	12		0	6		5	9	10	2	
Queuing Penalty (veh)	0	7	17		0	3		10	16	10	4	

Network Summary

Network wide Queuing Penalty: 220

Timings

1: North Service Rd & Waterdown Rd

Existing PM
Mixed Use Development 1200 King Rd

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↩	↩	↩	↩	↩	↩	↩
Volume (vph)	225	428	171	404	500	67	329
Turn Type	pm+pt		Perm	pm+pt		pm+pt	
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8	2		6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	11.0	30.0	11.0	30.0
Total Split (s)	39.0	39.0	39.0	24.0	46.0	15.0	37.0
Total Split (%)	39.0%	39.0%	39.0%	24.0%	46.0%	15.0%	37.0%
Yellow Time (s)	4.0	4.0	4.0	3.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	0.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	1.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	35.0	35.0	35.0	57.0	48.3	39.7	33.0
Actuated g/C Ratio	0.35	0.35	0.35	0.57	0.48	0.40	0.33
v/c Ratio	0.43	0.75	0.28	0.77	0.45	0.22	0.38
Control Delay	27.5	37.0	4.5	22.4	12.9	12.9	24.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	37.0	4.5	22.4	12.9	12.9	24.8
LOS	C	D	A	C	B	B	C
Approach Delay		27.7			16.4		23.1
Approach LOS		C			B		C

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 19 (19%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 21.6

Intersection LOS: C

Intersection Capacity Utilization 66.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: North Service Rd & Waterdown Rd

↩	↩	↩	↩
15 s	46 s	39 s	39 s
↩	↩	↩	↩
24 s	37 s	39 s	39 s

Mixed Use Development 1200 King Rd
PTSL

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HCM Signalized Intersection Capacity Analysis

1: North Service Rd & Waterdown Rd

Existing PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↩	↩	↩	↩	↩	↩	↩	↩	↩
Volume (vph)	0	0	0	225	428	171	404	500	183	67	329	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	1.00	*1.00		1.00	*1.00	
Flt				1.00	1.00	0.85	1.00	0.96		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1736	1881	1615	1787	3514		1805	3652	
Flt Permitted				0.95	1.00	1.00	0.35	1.00		0.37	1.00	
Satd. Flow (perm)				1736	1881	1615	654	3514		700	3652	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	0	0	0	259	492	197	464	575	210	77	378	92
RTOR Reduction (vph)	0	0	0	0	0	128	0	37	0	0	23	0
Lane Group Flow (vph)	0	0	0	259	492	69	464	748	0	77	447	0
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	1%	3%	6%	0%	1%	1%
Turn Type				pm+pt		Perm	pm+pt			pm+pt		
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8	2			6		
Actuated Green, G (s)				32.0	32.0	32.0	55.0	45.7		37.3	31.0	
Effective Green, g (s)				35.0	35.0	35.0	54.0	47.7		35.3	33.0	
Actuated g/C Ratio				0.35	0.35	0.35	0.54	0.48		0.35	0.33	
Clearance Time (s)				7.0	7.0	7.0	3.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				608	658	565	580	1676		306	1205	
v/s Ratio Prot				0.15	c0.26		c0.16	0.21		0.01	0.12	
v/s Ratio Perm						0.04	c0.27			0.08		
v/c Ratio				0.43	0.75	0.12	0.80	0.45		0.25	0.37	
Uniform Delay, d1				24.8	28.6	22.1	15.3	17.4		21.9	25.6	
Progression Factor				1.00	1.00	1.00	1.00	0.74		1.00	1.00	
Incremental Delay, d2				0.5	7.6	0.4	10.5	0.8		0.4	0.9	
Delay (s)				25.3	36.2	22.5	25.8	13.7		22.3	26.4	
Level of Service				C	D	C	C	B		C	C	
Approach Delay (s)		0.0			30.4			18.2			25.9	
Approach LOS		A			C			B			C	

Intersection Summary

HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Mixed Use Development 1200 King Rd
PTSL

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Timings

2: Hwy 403 WB Off-Ramp & Waterdown Rd

Existing PM
Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBT	SBT	ø8
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT	ø8
Lane Configurations		↔	↔	↔	↔	↔	
Volume (vph)	3	0	189	0	887	551	
Turn Type	Perm		custom				
Protected Phases		4	3	7	2	6	8
Permitted Phases	4		8				
Detector Phase	4	4	3	7	2	6	
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0	11.0
Total Split (s)	16.0	16.0	35.0	35.0	49.0	49.0	16.0
Total Split (%)	16.0%	16.0%	35.0%	35.0%	49.0%	49.0%	16%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-3.0	-2.0	-2.0	
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lag	Lag	Lead	Lead			Lag
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Max	C-Max	None
Act Effct Green (s)		9.0	14.8	17.7	74.3	74.3	
Actuated g/C Ratio		0.09	0.15	0.18	0.74	0.74	
v/c Ratio		0.05	0.43	0.52	0.38	0.25	
Control Delay		36.6	40.8	10.0	6.4	3.9	
Queue Delay		0.0	0.0	0.0	0.0	0.0	
Total Delay		36.6	40.8	10.0	6.4	3.9	
LOS		D	D	B	A	A	
Approach Delay		36.6		25.1	6.4	3.9	
Approach LOS		D		C	A	A	

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 9.7

Intersection LOS: A

Intersection Capacity Utilization 43.4%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Hwy 403 WB Off-Ramp & Waterdown Rd

↖ ø2	↗ ø3	→ ø4
49 s	35 s	16 s
↘ ø6	↖ ø7	↗ ø8
49 s	35 s	16 s

HCM Signalized Intersection Capacity Analysis

2: Hwy 403 WB Off-Ramp & Waterdown Rd

Existing PM
Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔		↔	↔	
Volume (vph)	3	0	2	189	0	197	0	887	0	0	551	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		*1.00	1.00			*1.00			*1.00	
Frt		0.95		1.00	0.85			1.00			1.00	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1727		3610	1615			3800			3701	
Flt Permitted		0.76		0.00	1.00			1.00			1.00	
Satd. Flow (perm)		1352		0	1615			3800			3701	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	4	0	2	230	0	240	0	1082	0	0	672	4
RTOR Reduction (vph)	0	2	0	0	167	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	4	0	230	73	0	0	1082	0	0	676	0
Heavy Vehicles (%)	0%	0%	5%	0%	2%	0%	7%	0%	4%	0%	2%	100%
Turn Type	Perm			custom			Perm					
Protected Phases		4		3	7			2			6	
Permitted Phases	4			8			2					
Actuated Green, G (s)		1.4		11.8	20.2			66.8			66.8	
Effective Green, g (s)		4.4		14.8	23.2			68.8			68.8	
Actuated g/C Ratio		0.04		0.15	0.23			0.69			0.69	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		59		534	375			2614			2546	
v/s Ratio Prot				c0.06	c0.05			c0.28			0.18	
v/s Ratio Perm		0.00										
v/c Ratio		0.07		0.43	0.20			0.41			0.27	
Uniform Delay, d1		45.8		38.8	30.9			6.8			6.0	
Progression Factor		1.00		1.00	1.00			1.09			0.74	
Incremental Delay, d2		0.5		0.6	0.3			0.3			0.2	
Delay (s)		46.3		39.3	31.1			7.7			4.7	
Level of Service		D		D	C			A			A	
Approach Delay (s)		46.3			35.2			7.7			4.7	
Approach LOS		D			D			A			A	

Intersection Summary

HCM Average Control Delay 12.7

HCM Level of Service

B

HCM Volume to Capacity ratio 0.39

Actuated Cycle Length (s) 100.0

Sum of lost time (s) 8.0

Intersection Capacity Utilization 43.4%

ICU Level of Service

A

Analysis Period (min) 15

c Critical Lane Group

Timings

3: Hwy 403 EB Off-Ramp/GO Access & Waterdown Rd

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	SBL	SBT
Lane Configurations	161	62	244	61	259	467	266	476
Volume (vph)	161	62	244	61	259	467	266	476
Turn Type	Prot		Perm	Prot	custom		pm+pt	
Protected Phases	8	4		3		2	1	6
Permitted Phases			4		7		6	
Detector Phase	8	4	4	3	7	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	6.0	8.0
Minimum Split (s)	22.0	22.0	22.0	16.0	16.0	29.0	10.0	29.0
Total Split (s)	30.0	30.0	30.0	20.0	20.0	40.0	10.0	50.0
Total Split (%)	30.0%	30.0%	30.0%	20.0%	20.0%	40.0%	10.0%	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)	3.0	3.0	3.0	3.0	3.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-3.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	None	C-Max	None	C-Max
Act Effct Green (s)	22.0	29.6	29.6	11.5	16.0	36.0	50.0	50.0
Actuated g/C Ratio	0.22	0.30	0.30	0.12	0.16	0.36	0.50	0.50
v/c Ratio	0.53	0.15	0.69	0.21	1.32	0.67	1.25	0.33
Control Delay	38.7	27.3	40.9	41.4	205.9	26.2	170.8	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	27.3	40.9	41.4	205.9	26.2	170.8	23.4
LOS	D	C	D	D	F	C	F	C
Approach Delay		38.3				26.2		76.2
Approach LOS		D				C		E

Intersection Summary

Cycle Length: 100

Actuated Cycle Length: 100

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.32

Intersection Signal Delay: 66.6

Intersection LOS: E

Intersection Capacity Utilization 60.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 3: Hwy 403 EB Off-Ramp/GO Access & Waterdown Rd

10 s	40 s	20 s	30 s
50 s	20 s	30 s	

HCM Signalized Intersection Capacity Analysis

3: Hwy 403 EB Off-Ramp/GO Access & Waterdown Rd

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	161	62	244	61	0	259	0	467	237	266	476	0
Volume (vph)	161	62	244	61	0	259	0	467	237	266	476	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0		4.0		4.0
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00		1.00		*1.00
Flpb, ped/bikes	1.00	1.00	0.98	1.00		1.00		1.00		1.00		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00		1.00		1.00
Frt	1.00	1.00	0.85	1.00		0.85		0.95		1.00		1.00
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00		0.95		1.00
Satd. Flow (prot)	1752	1776	1511	3252		1553		3491		1736		3689
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00		0.13		1.00
Satd. Flow (perm)	1752	1776	1511	3252		1553		3491		240		3689
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	204	78	309	77	0	328	0	591	300	337	603	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	76	0	0	0	0
Lane Group Flow (vph)	204	78	309	77	0	328	0	815	0	337	603	0
Confl. Peds. (#/hr)			3	3								
Heavy Vehicles (%)	3%	7%	5%	11%	0%	4%	0%	2%	6%	4%	3%	0%
Turn Type	Prot		Perm	Prot		custom				pm+pt		
Protected Phases	8	4		3				2		1	6	
Permitted Phases			4			7				6		
Actuated Green, G (s)	20.5	26.6	26.6	6.9		13.0		32.5		46.5	46.5	
Effective Green, g (s)	23.5	29.6	29.6	9.9		16.0		34.5		45.5	48.5	
Actuated g/C Ratio	0.24	0.30	0.30	0.10		0.16		0.34		0.46	0.48	
Clearance Time (s)	7.0	7.0	7.0	7.0		7.0		6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0		3.0	3.0	
Lane Grp Cap (vph)	412	526	447	322		248		1204		259	1789	
v/s Ratio Prot	0.12	0.04		0.02				0.23		c0.13	0.16	
v/s Ratio Perm			c0.20			c0.21				c0.46		
v/c Ratio	0.50	0.15	0.69	0.24		1.32		0.68		1.30	0.34	
Uniform Delay, d1	33.1	25.9	31.2	41.6		42.0		28.0		23.2	15.9	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.00		1.58	1.44	
Incremental Delay, d2	0.9	0.1	4.6	0.4		170.5		3.1		160.5	0.5	
Delay (s)	34.1	26.0	35.7	42.0		212.5		31.1		197.2	23.4	
Level of Service	C	C	D	D		F		C		F	C	
Approach Delay (s)		33.9			180.1			31.1			85.7	
Approach LOS		C			F			C			F	

Intersection Summary

HCM Average Control Delay	71.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Masonry Crt/Railway Rd & Waterdown Rd

Existing PM
Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	26	0	29	0	1	465	32	735
Volume (vph)	26	0	29	0	1	465	32	735
Turn Type	Perm		Perm		Perm		pm+pt	
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	12.0	36.0
Total Split (s)	26.0	26.0	26.0	26.0	67.0	67.0	17.0	84.0
Total Split (%)	23.6%	23.6%	23.6%	23.6%	60.9%	60.9%	15.5%	76.4%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-2.0	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	13.4	13.4	13.4	82.0	82.0	88.6	88.6	
Actuated g/C Ratio	0.12	0.12	0.12	0.75	0.75	0.81	0.81	
v/c Ratio	0.73	0.16	0.34	0.00	0.53	0.06	0.52	
Control Delay	106.3	43.9	1.5	6.0	8.7	2.8	5.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	106.3	43.9	1.5	6.0	8.7	2.8	5.4	
LOS	F	D	A	A	A	A	A	
Approach Delay	106.3		6.6		8.7		5.3	
Approach LOS	F		A		A		A	

Intersection Summary

Cycle Length: 110

Actuated Cycle Length: 110

Offset: 17 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 8.8

Intersection LOS: A

Intersection Capacity Utilization 69.4%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Masonry Crt/Railway Rd & Waterdown Rd

ø1	ø2	ø4	ø6	ø8
17 s	67 s	26 s	84 s	26 s

HCM Signalized Intersection Capacity Analysis

4: Masonry Crt/Railway Rd & Waterdown Rd

Existing PM
Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	26	0	8	29	0	213	1	465	213	32	735	14
Volume (vph)	26	0	8	29	0	213	1	465	213	32	735	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Frt	0.97			1.00	0.85		1.00	0.95		1.00	1.00	
Flt Protected	0.96			0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1216			1805	1615		902	1750		1805	1835	
Flt Permitted	0.26			0.80	1.00		0.35	1.00		0.31	1.00	
Satd. Flow (perm)	334			1519	1615		336	1750		587	1835	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	27	0	8	30	0	220	1	479	220	33	758	14
RTOR Reduction (vph)	0	7	0	0	193	0	0	9	0	0	0	0
Lane Group Flow (vph)	0	28	0	30	27	0	1	690	0	33	772	0
Heavy Vehicles (%)	52%	0%	25%	0%	0%	0%	100%	5%	0%	0%	2%	73%
Turn Type	Perm			Perm			Perm			pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		10.4		10.4	10.4		78.8	78.8		86.6	86.6	
Effective Green, g (s)		13.4		13.4	13.4		80.8	80.8		85.6	88.6	
Actuated g/C Ratio		0.12		0.12	0.12		0.73	0.73		0.78	0.81	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		41		185	197		247	1285		499	1478	
v/s Ratio Prot					0.02			0.39		0.00	c0.42	
v/s Ratio Perm		c0.08		0.02			0.00			0.05		
v/c Ratio		0.68		0.16	0.14		0.00	0.54		0.07	0.52	
Uniform Delay, d1		46.3		43.3	43.1		3.9	6.4		4.4	3.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		37.9		0.4	0.3		0.0	1.6		0.1	1.3	
Delay (s)		84.1		43.7	43.4		3.9	8.0		4.4	4.9	
Level of Service		F		D	D		A	A		A	A	
Approach Delay (s)		84.1			43.5			8.0			4.9	
Approach LOS		F			D			A			A	

Intersection Summary

HCM Average Control Delay 13.0

HCM Level of Service B

HCM Volume to Capacity ratio 0.54

Actuated Cycle Length (s) 110.0

Sum of lost time (s) 8.0

Intersection Capacity Utilization 69.4%

ICU Level of Service C

Analysis Period (min) 15

c Critical Lane Group

Timings

5: South Service Rd & GO Bus Driveway

Existing PM
Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↔↔	↔↔	↔
Volume (vph)	549	307	13
Turn Type			
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	38.0	38.0	32.0
Total Split (%)	54.3%	54.3%	45.7%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	62.1	62.1	11.3
Actuated g/C Ratio	0.89	0.89	0.16
v/c Ratio	0.26	0.13	0.13
Control Delay	2.1	1.8	24.7
Queue Delay	0.0	0.0	0.0
Total Delay	2.1	1.8	24.7
LOS	A	A	C
Approach Delay	2.1	1.8	24.7
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.26
 Intersection Signal Delay: 2.4
 Intersection LOS: A
 Intersection Capacity Utilization 29.0%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: South Service Rd & GO Bus Driveway



HCM Signalized Intersection Capacity Analysis

5: South Service Rd & GO Bus Driveway

Existing PM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (vph)	549	16	0	307	13	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3597			3800	996	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3597			3800	996	
Peak-hour factor, PHF	0.69	0.69	0.69	0.69	0.69	0.69
Adj. Flow (vph)	796	23	0	445	19	3
RTOR Reduction (vph)	1	0	0	0	3	0
Lane Group Flow (vph)	818	0	0	445	19	0
Heavy Vehicles (%)	3%	81%	0%	0%	92%	0%
Turn Type	Perm					
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	52.5			52.5	3.5	
Effective Green, g (s)	55.5			55.5	6.5	
Actuated g/C Ratio	0.79			0.79	0.09	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	2852			3013	92	
v/s Ratio Prot	c0.23			0.12	c0.02	
v/s Ratio Perm						
v/c Ratio	0.29			0.15	0.21	
Uniform Delay, d1	1.9			1.7	29.4	
Progression Factor	1.00			1.00	1.00	
Incremental Delay, d2	0.3			0.1	1.1	
Delay (s)	2.2			1.8	30.5	
Level of Service	A			A	C	
Approach Delay (s)	2.2			1.8	30.5	
Approach LOS	A			A	C	

Intersection Summary

HCM Average Control Delay 2.5
 HCM Level of Service A
 HCM Volume to Capacity ratio 0.28
 Actuated Cycle Length (s) 70.0
 Sum of lost time (s) 8.0
 Intersection Capacity Utilization 29.0%
 ICU Level of Service A
 Analysis Period (min) 15

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
6: South Service Rd & West GO Driveway

Existing PM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (veh/h)	417	134	0	177	130	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.68	0.68	0.68	0.68	0.68	0.68
Hourly flow rate (vph)	613	197	0	260	191	12
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.96		0.96	0.96
vC, conflicting volume			810		842	405
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			716		749	294
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		43	98
cM capacity (veh/h)			857		337	679
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	409	401	87	174	203	
Volume Left	0	0	0	0	191	
Volume Right	0	197	0	0	12	
cSH	1700	1700	857	1700	347	
Volume to Capacity	0.24	0.24	0.00	0.10	0.58	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	28.2	
Control Delay (s)	0.0	0.0	0.0	0.0	28.9	
Lane LOS					D	
Approach Delay (s)	0.0		0.0		28.9	
Approach LOS					D	
Intersection Summary						
Average Delay			4.6			
Intersection Capacity Utilization			30.2%		ICU Level of Service	A
Analysis Period (min)			15			

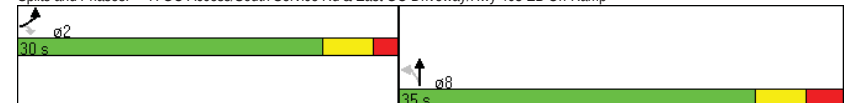
Timings

7: GO Access/South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp

Existing PM

Lane Group	EBL	EBR	NBT
Lane Configurations	↔	↔	↔
Volume (vph)	416	9	39
Turn Type	Perm		
Protected Phases	2		8
Permitted Phases		2	
Detector Phase	2	2	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	29.0	29.0	15.0
Total Split (s)	30.0	30.0	35.0
Total Split (%)	46.2%	46.2%	53.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	36.3	36.3	20.7
Actuated g/C Ratio	0.56	0.56	0.32
v/c Ratio	0.59	0.01	0.51
Control Delay	13.9	5.0	20.4
Queue Delay	0.0	0.0	0.0
Total Delay	13.9	5.0	20.4
LOS	B	A	C
Approach Delay	13.7		20.4
Approach LOS	B		C
Intersection Summary			
Cycle Length: 65			
Actuated Cycle Length: 65			
Offset: 0 (0%), Referenced to phase 2:EBL and 6:, Start of Green			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.59			
Intersection Signal Delay: 16.0			Intersection LOS: B
Intersection Capacity Utilization 41.6%			ICU Level of Service A
Analysis Period (min) 15			
Description: Ped Signal			

Splits and Phases: 7: GO Access/South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp



HCM Signalized Intersection Capacity Analysis
7: GO Access/South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp Development 1200 King Rd Existing PM

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	416	9	177	39	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0		
Lane Util. Factor	1.00	1.00		1.00		
Frt	1.00	0.85		1.00		
Flt Protected	0.95	1.00		0.96		
Satd. Flow (prot)	1736	1615		1825		
Flt Permitted	0.95	1.00		0.96		
Satd. Flow (perm)	1736	1615		1825		
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.73	0.73
Adj. Flow (vph)	570	12	242	53	0	0
RTOR Reduction (vph)	0	5	0	0	0	0
Lane Group Flow (vph)	570	7	0	295	0	0
Heavy Vehicles (%)	4%	0%	0%	0%	0%	0%
Turn Type	Perm		Perm			
Protected Phases	2		8			
Permitted Phases	2		8			
Actuated Green, G (s)	34.3	34.3	17.7			
Effective Green, g (s)	36.3	36.3	20.7			
Actuated g/C Ratio	0.56	0.56	0.32			
Clearance Time (s)	6.0	6.0	7.0			
Vehicle Extension (s)	3.0	3.0	5.0			
Lane Grp Cap (vph)	969	902	581			
v/s Ratio Prot	c0.33					
v/s Ratio Perm			0.16			
v/c Ratio	0.59	0.01	0.51			
Uniform Delay, d1	9.4	6.4	18.0			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	2.6	0.0	1.5			
Delay (s)	12.1	6.4	19.5			
Level of Service	B	A	B			
Approach Delay (s)	11.9		19.5		0.0	
Approach LOS	B		B		A	
Intersection Summary						
HCM Average Control Delay			14.5	HCM Level of Service		B
HCM Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			65.0	Sum of lost time (s)		8.0
Intersection Capacity Utilization			41.6%	ICU Level of Service		A
Analysis Period (min)			15			
Description: Ped Signal						
c Critical Lane Group						

Timings
8: North Service Rd & King Rd Existing PM

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	8	283	439	615	91	73	91	21	35	13
Turn Type	Perm		pm+pt		Perm	Perm		Perm		Perm
Protected Phases		2	1	2			4		4	
Permitted Phases	2		2		2	4		4		4
Detector Phase	2	2	1	2	2	4	4	4	4	4
Switch Phase										
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0	15.0	15.0	15.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Total Split (s)	38.0	38.0	12.0	38.0	38.0	30.0	30.0	30.0	30.0	30.0
Total Split (%)	47.5%	47.5%	15.0%	47.5%	47.5%	37.5%	37.5%	37.5%	37.5%	37.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-2.0	-3.0	-2.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	5.0	4.0	5.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead	Lag	Lag					
Lead-Lag Optimize?										
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	34.0	34.0	42.0	34.0	34.0		26.0		26.0	26.0
Actuated g/C Ratio	0.42	0.42	0.52	0.42	0.42		0.32		0.32	0.32
v/c Ratio	0.06	0.47	0.91	0.80	0.13		0.70		0.12	0.03
Control Delay	15.4	18.1	38.6	29.6	6.0		25.6		19.8	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0
Total Delay	15.4	18.1	38.6	29.6	6.0		25.6		19.8	9.5
LOS	B	B	D	C	A		C		B	A
Approach Delay	18.1		31.2				25.6		17.8	
Approach LOS	B		C				C		B	
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 80										
Offset: 39 (49%), Referenced to phase 2:EBWB and 6:, Start of Green										
Natural Cycle: 70										
Control Type: Pretimed										
Maximum v/c Ratio: 0.91										
Intersection Signal Delay: 27.2					Intersection LOS: C					
Intersection Capacity Utilization 83.2%					ICU Level of Service E					
Analysis Period (min) 15										
Splits and Phases: 8: North Service Rd & King Rd										

HCM Signalized Intersection Capacity Analysis 8: North Service Rd & King Rd

Existing PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱		↰	↱	↰	↱	↱
Volume (vph)	8	283	69	439	615	91	73	91	233	21	35	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85		0.92		1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.98	1.00	
Satd. Flow (prot)	1805	1797		1787	1881	1615		1716		1865	1615	
Flt Permitted	0.16	1.00		0.41	1.00	1.00		0.93		0.81	1.00	
Satd. Flow (perm)	296	1797		765	1881	1615		1612		1548	1615	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	8	295	72	457	641	95	76	95	243	22	36	14
RTOR Reduction (vph)	0	11	0	0	0	40	0	64	0	0	0	9
Lane Group Flow (vph)	8	356	0	457	641	55	0	350	0	0	58	5
Heavy Vehicles (%)	0%	3%	1%	1%	1%	0%	1%	0%	1%	0%	0%	0%
Turn Type	Perm			pm+pt		Perm	Perm			Perm		Perm
Protected Phases		2		1	2			4			4	
Permitted Phases	2			2		2	4			4		4
Actuated Green, G (s)	32.0	32.0		41.0	32.0	32.0		23.0		23.0	23.0	
Effective Green, g (s)	34.0	34.0		39.0	34.0	34.0		26.0		26.0	26.0	
Actuated g/C Ratio	0.42	0.42		0.49	0.42	0.42		0.32		0.32	0.32	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0		7.0		7.0	7.0	
Lane Grp Cap (vph)	126	764		475	799	686		524		503	525	
v/s Ratio Prot		0.20		c0.10	0.34							
v/s Ratio Perm	0.03			c0.37		0.03		c0.22		0.04	0.00	
v/c Ratio	0.06	0.47		0.96	0.80	0.08		0.67		0.12	0.01	
Uniform Delay, d1	13.6	16.5		18.8	20.1	13.7		23.3		18.9	18.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Incremental Delay, d2	1.0	2.0		32.9	8.4	0.2		6.6		0.5	0.0	
Delay (s)	14.6	18.5		51.7	28.4	13.9		29.9		19.4	18.3	
Level of Service	B	B		D	C	B		C		B	B	
Approach Delay (s)		18.4			36.2			29.9			19.2	
Approach LOS		B			D			C			B	
Intersection Summary												
HCM Average Control Delay		31.1							C			
HCM Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		80.0						12.0				
Intersection Capacity Utilization		83.2%							E			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 9: Hydro Ln & King Rd

Existing PM
Mixed Use Development 1200 King Rd

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↰			↱
Volume (veh/h)	15	4	393	2	0	543
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	17	5	457	2	0	631
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage (veh)			2			
Upstream signal (m)						278
pX, platoon unblocked	0.79					
vC, conflicting volume	1090	458			459	
vC1, stage 1 conf vol	458					
vC2, stage 2 conf vol	631					
vCu, unblocked vol	981	458			459	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	99			100	
cM capacity (veh/h)	449	607			1112	
Direction, Lane #						
	WB 1	WB 2	NB 1	SB 1		
Volume Total	17	5	459	631		
Volume Left	17	0	0	0		
Volume Right	0	5	2	0		
cSH	449	607	1700	1112		
Volume to Capacity	0.04	0.01	0.27	0.00		
Queue Length 95th (m)	1.0	0.2	0.0	0.0		
Control Delay (s)	13.3	11.0	0.0	0.0		
Lane LOS	B	B				
Approach Delay (s)	12.8		0.0	0.0		
Approach LOS	B					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			38.6%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

10: Plains Rd E & King Rd

Existing PM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations	102	994	88	100	1461	346	144	325	170	82
Volume (vph)	102	994	88	100	1461	346	144	325	170	82
Turn Type	pm+pt	Perm	pm+pt	pm+pt	pm+pt	pm+pt	Perm	pm+pt	Perm	pm+pt
Protected Phases	5	2	2	1	6	7	4	3	8	8
Permitted Phases	2	2	2	6	4	4	8	8	8	8
Detector Phase	5	2	2	1	6	7	4	3	8	8
Switch Phase										
Minimum Initial (s)	6.0	8.0	8.0	6.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	10.0	36.0	36.0	10.0	36.0	10.0	29.0	10.0	29.0	29.0
Total Split (s)	14.0	60.0	60.0	14.0	60.0	16.0	30.0	16.0	30.0	30.0
Total Split (%)	11.7%	50.0%	50.0%	11.7%	50.0%	13.3%	25.0%	13.3%	25.0%	25.0%
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)	0.0	2.0	2.0	0.0	2.0	0.0	3.0	0.0	3.0	3.0
Lost Time Adjust (s)	0.0	-2.0	-2.0	0.0	-2.0	0.0	-3.0	0.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?										
Recall Mode	None	C-Max	C-Max	None	C-Max	None	None	None	None	None
Act Effct Green (s)	69.6	61.0	61.0	69.2	60.8	34.6	22.6	34.6	22.6	22.6
Actuated g/C Ratio	0.58	0.51	0.51	0.58	0.51	0.29	0.19	0.29	0.19	0.19
v/c Ratio	0.60	0.58	0.12	0.38	0.89	1.17	0.72	1.32	0.53	0.25
Control Delay	31.9	23.0	9.0	14.3	34.7	140.4	54.1	197.9	48.9	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	23.0	9.0	14.3	34.7	140.4	54.1	197.9	48.9	9.6
LOS	C	C	A	B	C	F	D	F	D	A
Approach Delay	22.7				33.5		107.2		127.2	
Approach LOS	C				C		F		F	

Intersection Summary

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 29 (24%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green

Natural Cycle: 105

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.32

Intersection Signal Delay: 54.4

Intersection LOS: D

Intersection Capacity Utilization 96.3%

ICU Level of Service F

Analysis Period (min) 15

Splits and Phases: 10: Plains Rd E & King Rd

14 s	60 s	16 s	30 s
14 s	60 s	16 s	30 s

HCM Signalized Intersection Capacity Analysis

10: Plains Rd E & King Rd

Existing PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	102	994	88	100	1461	72	346	144	72	325	170	82
Volume (vph)	102	994	88	100	1461	72	346	144	72	325	170	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99	1.00	0.95	1.00	0.95	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1736	3689	1533	1787	3724	1802	1677	1757	1881	1554	1554	1554
Flt Permitted	0.07	1.00	1.00	0.18	1.00	0.40	1.00	0.28	1.00	1.00	1.00	1.00
Satd. Flow (perm)	124	3689	1533	330	3724	762	1677	509	1881	1554	1554	1554
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	112	1092	97	110	1605	79	380	158	79	357	187	90
RTOR Reduction (vph)	0	0	27	0	3	0	0	15	0	0	0	73
Lane Group Flow (vph)	112	1092	70	110	1681	0	380	222	0	357	187	17
Conf. Peds. (#/hr)	10		6	6		10	4		33	33		4
Heavy Vehicles (%)	4%	3%	2%	1%	1%	4%	0%	4%	8%	2%	1%	2%
Turn Type	pm+pt	Perm	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	pm+pt	Perm
Protected Phases	5	2	2	1	6	7	4	4	3	8	8	8
Permitted Phases	2	2	2	6	4	4	8	8	8	8	8	8
Actuated Green, G (s)	67.6	59.0	59.0	67.2	58.8	31.6	19.6	31.6	19.6	31.6	19.6	19.6
Effective Green, g (s)	67.6	61.0	61.0	67.2	60.8	31.6	22.6	31.6	22.6	31.6	22.6	22.6
Actuated g/C Ratio	0.56	0.51	0.51	0.56	0.51	0.26	0.19	0.26	0.19	0.26	0.19	0.19
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0	4.0	7.0	4.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	185	1875	779	287	1887	305	316	259	354	293	293	293
v/s Ratio Prot	c0.04	0.30	0.03	c0.45	0.12	0.13	c0.14	0.10	0.10	0.10	0.10	0.01
v/s Ratio Perm	0.30	0.05	0.19	0.20	0.20	0.23	0.23	0.23	0.23	0.23	0.23	0.01
v/c Ratio	0.61	0.58	0.09	0.38	0.89	1.25	0.70	1.38	0.53	0.66	0.66	0.66
Uniform Delay, d1	23.8	20.6	15.2	14.8	26.6	42.4	45.5	41.2	43.9	40.0	40.0	40.0
Progression 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
Incremental Delay, d2	5.5	1.3	0.2	0.9	6.8	135.1	6.9	192.6	1.4	0.1	0.1	0.1
Delay (s)	29.3	21.9	15.4	15.7	33.5	177.5	52.4	233.9	45.3	40.0	40.0	40.0
Level of Service	C	C	B	B	C	F	D	F	D	D	D	D
Approach Delay (s)	22.1			32.4		129.5		150.7				
Approach LOS	C			C		F		F				

Intersection Summary

HCM Average Control Delay	60.3	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Queuing and Blocking Report
Existing PM

Existing PM
Mixed Use Development 1200 King Rd

Intersection: 1: North Service Rd & Waterdown Rd

Movement	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	65.0	126.0	26.8	80.8	73.8	79.1	21.7	62.9	43.0
Average Queue (m)	33.9	70.4	13.0	40.7	27.5	37.9	10.2	33.3	22.4
95th Queue (m)	58.3	109.8	21.8	71.5	56.2	63.2	19.4	54.0	40.9
Link Distance (m)	342.7			134.7			130.7		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	165.0	125.0		60.0	70.0			70.0	
Storage Blk Time (%)	0		2	0	0			0	
Queuing Penalty (veh)	1		5	1	0			0	

Intersection: 2: Hwy 403 WB Off-Ramp & Waterdown Rd

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	11.4	51.0	23.0	34.3	43.8	34.8	67.2	17.5
Average Queue (m)	1.9	28.5	8.0	16.4	15.4	13.5	23.6	3.0
95th Queue (m)	8.4	46.2	18.7	28.1	34.5	29.4	51.3	11.0
Link Distance (m)	65.6	439.5		167.8		167.8	134.7	134.7
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Intersection: 3: Hwy 403 EB Off-Ramp/GO Access & Waterdown Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	TR	L	T	T
Maximum Queue (m)	65.6	32.2	84.1	30.4	221.6	215.2	66.7	78.4	64.9	129.2	77.2
Average Queue (m)	31.5	12.2	45.3	14.1	142.4	187.7	41.4	48.8	42.3	51.8	21.7
95th Queue (m)	54.5	26.6	73.6	27.8	288.0	234.3	62.5	76.3	71.4	94.8	54.6
Link Distance (m)	327.4					197.9	197.9	115.0	115.0	167.8	
Upstream Blk Time (%)					20	33					
Queuing Penalty (veh)					32	52					
Storage Bay Dist (m)	125.0	250.0		65.0					35.0		
Storage Blk Time (%)									18	12	
Queuing Penalty (veh)									43	31	

Queuing and Blocking Report
Existing PM

Existing PM
Mixed Use Development 1200 King Rd

Intersection: 4: Masonry Crt/Railway Rd & Waterdown Rd

Movement	EB	WB	WB	NB	NB	SB	SB	B15
Directions Served	LR	L	TR	L	TR	L	TR	T
Maximum Queue (m)	33.3	23.1	40.1	2.9	110.6	17.9	98.4	27.5
Average Queue (m)	12.1	7.9	17.4	0.1	36.8	5.4	28.9	0.9
95th Queue (m)	28.2	19.4	31.2	2.1	86.3	13.4	75.6	19.4
Link Distance (m)	136.1	157.6		116.4		209.6		115.0
Upstream Blk Time (%)					0			0
Queuing Penalty (veh)					0			0
Storage Bay Dist (m)	35.0		90.0		90.0			
Storage Blk Time (%)	0		1	1		0		
Queuing Penalty (veh)	0		0	0		0		

Intersection: 5: South Service Rd & GO Bus Driveway

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	73.0	57.5	87.2	92.0	34.8
Average Queue (m)	13.2	8.3	24.1	26.3	10.3
95th Queue (m)	46.9	35.4	70.2	74.4	25.9
Link Distance (m)	197.9	197.9	94.7	94.7	45.4
Upstream Blk Time (%)			1	2	0
Queuing Penalty (veh)			2	3	0
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: South Service Rd & West GO Driveway

Movement	EB	WB	WB	NB
Directions Served	T	LT	T	LR
Maximum Queue (m)	25.0	5.9	6.7	35.4
Average Queue (m)	0.9	0.4	0.4	14.8
95th Queue (m)	11.7	5.1	5.6	27.9
Link Distance (m)	94.7	95.2	95.2	52.2
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Queuing and Blocking Report
Existing PM

Existing PM
Mixed Use Development 1200 King Rd

Intersection: 7: GO Access/South Service Rd & East GO Driveway/Hwy 403 EB On-Ramp

Movement	EB	EB	NB
Directions Served	L	R	LT
Maximum Queue (m)	91.6	8.2	65.7
Average Queue (m)	34.0	0.8	33.0
95th Queue (m)	70.4	4.8	54.1
Link Distance (m)	95.2	95.2	63.5
Upstream Blk Time (%)	0		0
Queuing Penalty (veh)	1		0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: North Service Rd & King Rd

Movement	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	TR	L	T	R	LTR	LT	R
Maximum Queue (m)	10.8	93.1	109.9	330.3	54.9	109.2	25.8	10.3
Average Queue (m)	1.6	42.5	81.0	153.2	19.0	55.1	10.1	1.9
95th Queue (m)	7.1	74.3	127.8	304.2	53.0	95.0	21.8	7.5
Link Distance (m)		1981.5		334.7		255.5	168.3	
Upstream Blk Time (%)				1				
Queuing Penalty (veh)				0				
Storage Bay Dist (m)	45.0		80.0		40.0			25.0
Storage Blk Time (%)		7	13	34			1	
Queuing Penalty (veh)		1	92	179			0	

Intersection: 9: Hydro Ln & King Rd

Movement	WB	WB	SB
Directions Served	L	R	LT
Maximum Queue (m)	21.2	9.0	71.0
Average Queue (m)	4.5	1.2	13.0
95th Queue (m)	16.1	6.0	90.1
Link Distance (m)	74.4	74.4	255.5
Upstream Blk Time (%)			0
Queuing Penalty (veh)			1
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
Existing PM

Existing PM
Mixed Use Development 1200 King Rd

Intersection: 10: Plains Rd E & King Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	L	T	R
Maximum Queue (m)	64.6	257.7	257.5	64.9	59.7	202.0	200.1	74.9	145.0	64.8	434.4	57.8
Average Queue (m)	22.6	86.2	77.5	12.8	22.5	173.3	174.4	74.0	135.8	63.9	334.4	11.8
95th Queue (m)	46.1	207.4	167.9	46.3	50.9	233.6	231.4	80.5	153.1	70.2	552.5	30.7
Link Distance (m)		251.9	251.9			195.1	195.1		131.8			409.5
Upstream Blk Time (%)		1	0			16	17		59			27
Queuing Penalty (veh)		0	0			0	0		0			150
Storage Bay Dist (m)	35.0			35.0	30.0			45.0		35.0		35.0
Storage Blk Time (%)	3	15	22		2	43		80	25	81	19	0
Queuing Penalty (veh)	17	15	19		14	43		172	85	204	79	2

Intersection: 10: Plains Rd E & King Rd

Movement	B21
Directions Served	T
Maximum Queue (m)	199.7
Average Queue (m)	99.2
95th Queue (m)	364.8
Link Distance (m)	423.4
Upstream Blk Time (%)	5
Queuing Penalty (veh)	31
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 1278

Appendix D

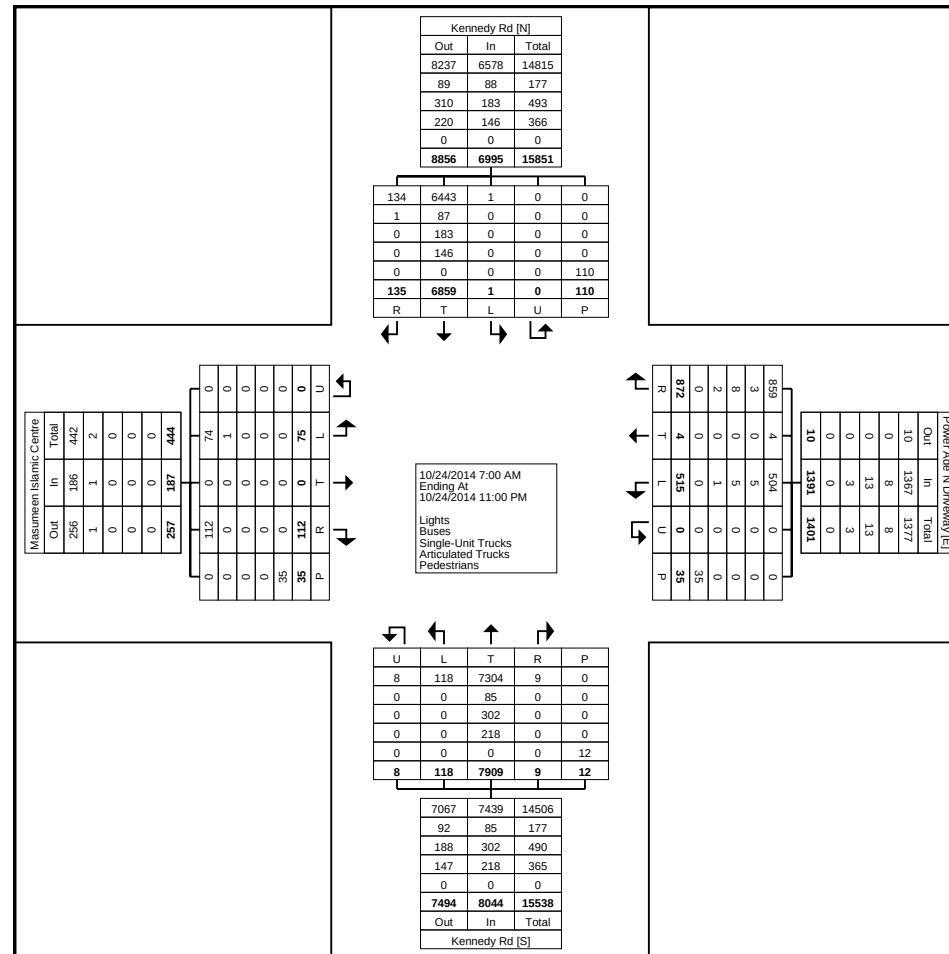
Powerade Centre Data

Turning Movement Data

Start Time	Kennedy Rd Southbound						Power Ade N Driveway Westbound						Kennedy Rd Northbound						Masumeen Islamic Centre Exit Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:00 AM	0	244	0	0	0	244	3	0	0	0	0	3	0	85	0	0	0	85	0	0	0	0	1	0	332
7:15 AM	0	253	0	0	0	253	1	0	3	0	0	4	0	86	0	0	0	86	0	0	0	0	1	0	343
7:30 AM	0	310	0	0	0	310	1	0	3	0	0	4	0	89	0	0	0	89	0	0	0	0	0	0	403
7:45 AM	1	347	0	0	0	348	4	0	5	0	0	9	0	108	0	0	0	108	0	0	0	0	0	0	465
Hourly Total	1	1154	0	0	0	1155	9	0	11	0	0	20	0	368	0	0	0	368	0	0	0	0	2	0	1543
8:00 AM	5	291	0	0	1	296	2	0	8	0	0	10	1	104	8	0	0	113	7	0	2	0	0	9	428
8:15 AM	20	327	0	0	0	347	1	0	1	0	0	2	0	85	12	0	0	97	13	0	11	0	0	24	470
8:30 AM	7	266	0	0	0	273	0	0	11	0	0	11	0	79	2	0	0	81	5	0	7	0	0	12	377
8:45 AM	0	226	0	0	0	226	3	0	0	0	0	3	0	96	0	0	0	96	1	0	0	0	0	1	326
Hourly Total	32	1110	0	0	1	1142	6	0	20	0	0	26	1	364	22	0	0	387	26	0	20	0	0	46	1601
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	0	85	0	0	0	85	7	0	3	0	0	10	0	101	0	0	0	101	0	0	0	0	0	0	196
11:15 AM	0	85	0	0	0	85	3	0	6	0	0	9	0	76	0	0	0	76	0	0	1	0	0	1	171
11:30 AM	0	91	0	0	0	91	6	0	4	0	0	10	1	107	0	0	0	108	0	0	0	0	0	0	209
11:45 AM	1	85	0	0	0	86	8	0	3	0	0	11	0	113	2	0	0	115	0	0	0	0	0	0	212
Hourly Total	1	346	0	0	0	347	24	0	16	0	0	40	1	397	2	0	0	400	0	0	1	0	0	1	788
12:00 PM	3	89	0	0	0	92	6	0	2	0	0	8	0	140	0	0	0	140	1	0	1	0	0	2	242
12:15 PM	8	103	0	0	1	111	0	0	3	0	1	3	0	142	3	0	0	145	2	0	1	0	13	3	262
12:30 PM	8	101	0	0	10	109	6	0	0	0	1	6	0	136	5	0	0	141	0	0	0	0	0	0	256
12:45 PM	20	121	0	0	0	141	7	0	2	0	0	9	0	121	24	1	0	146	1	0	1	0	0	2	298
Hourly Total	39	414	0	0	11	453	19	0	7	0	2	26	0	539	32	1	0	572	4	0	3	0	13	7	1058
1:00 PM	21	106	0	0	12	127	3	0	5	0	0	8	0	134	28	1	0	163	12	0	0	0	1	12	310
1:15 PM	7	130	0	0	42	137	3	0	6	0	1	9	0	118	7	1	1	126	11	0	1	0	1	12	284
1:30 PM	0	113	0	0	20	113	5	0	4	0	2	9	0	128	1	1	4	130	3	0	0	0	0	3	255
1:45 PM	1	101	0	0	6	102	4	0	6	0	2	10	0	126	1	0	0	127	10	0	4	0	1	14	253
Hourly Total	29	450	0	0	80	479	15	0	21	0	5	36	0	506	37	3	5	546	36	0	5	0	3	41	1102
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	11	146	0	0	0	157	5	2	1	0	0	8	0	207	6	0	0	213	16	0	16	0	2	32	410
3:15 PM	2	160	0	0	0	162	6	0	1	0	0	7	0	252	1	0	0	253	7	0	4	0	1	11	433
3:30 PM	1	117	0	0	0	118	4	0	3	0	1	7	0	276	1	0	0	277	2	0	2	0	0	4	406
3:45 PM	0	115	0	0	0	115	4	0	3	0	0	7	0	277	0	0	0	277	1	0	0	0	0	1	400
Hourly Total	14	538	0	0	0	552	19	2	8	0	1	29	0	1012	8	0	0	1020	26	0	22	0	3	48	1649
4:00 PM	0	145	0	0	0	145	5	0	4	0	0	9	0	252	1	0	0	253	1	0	1	0	0	2	409
4:15 PM	1	142	0	0	0	143	4	1	2	0	1	7	0	374	1	0	0	375	1	0	2	0	2	3	528
4:30 PM	1	132	0	0	2	133	7	0	6	0	0	13	0	347	0	0	4	347	0	0	1	0	5	1	494
4:45 PM	3	149	0	0	0	152	4	0	1	0	1	5	0	390	1	0	0	391	2	0	2	0	0	4	552
Hourly Total	5	568	0	0	2	573	20	1	13	0	2	34	0	1363	3	0	4	1366	4	0	6	0	7	10	1983
5:00 PM	2	152	0	0	0	154	6	0	1	0	2	7	0	417	2	0	0	419	1	0	6	0	2	7	587
5:15 PM	0	108	0	0	3	108	4	0	6	0	3	10	1	409	0	0	0	410	2	0	0	0	0	2	530
5:30 PM	1	151	0	0	1	152	9	0	22	0	1	31	1	371	1	0	0	373	1	0	1	0	0	2	558

5:45 PM	1	157	0	0	4	158	10	0	5	0	6	15	0	273	0	0	2	273	0	0	1	0	3	1	447
Hourly Total	4	568	0	0	8	572	29	0	34	0	12	63	2	1470	3	0	2	1475	4	0	8	0	5	12	2122
6:00 PM	3	131	0	0	1	134	16	0	11	0	1	27	0	214	0	0	0	214	3	0	1	0	0	4	379
6:15 PM	2	162	0	0	5	164	10	0	6	0	4	16	0	196	0	0	0	196	0	0	1	0	1	1	377
6:30 PM	0	163	0	0	0	163	12	0	27	0	0	39	2	160	0	0	0	162	1	0	0	0	0	1	365
6:45 PM	1	167	0	0	1	168	9	0	6	0	1	15	0	120	3	0	0	123	2	0	1	0	0	3	309
Hourly Total	6	623	0	0	7	629	47	0	50	0	6	97	2	690	3	0	0	695	6	0	3	0	1	9	1430
7:00 PM	2	186	0	0	0	188	41	0	12	0	2	53	2	164	4	1	0	171	1	0	2	0	0	3	415
7:15 PM	1	149	0	0	0	150	27	0	8	0	0	35	0	148	0	0	0	148	0	0	0	0	0	0	333
7:30 PM	0	99	1	0	0	100	9	0	5	0	0	14	1	94	1	1	0	97	1	0	0	0	0	1	212
7:45 PM	0	67	0	0	0	67	10	1	16	0	0	27	0	87	0	0	0	87	0	0	1	0	0	1	182
Hourly Total	3	501	1	0	0	505	87	1	41	0	2	129	3	493	5	2	0	503	2	0	3	0	0	5	1142
8:00 PM	0	67	0	0	0	67	8	0	18	0	0	26	0	77	0	0	1	77	0	0	0	0	0	0	170
8:15 PM	0	75	0	0	0	75	8	0	3	0	0	11	0	74	1	0	0	75	0	0	0	0	0	0	161
8:30 PM	1	43	0	0	1	44	8	0	8	0	1	16	0	72	0	0	0	72	0	0	0	0	0	0	132
8:45 PM	0	44	0	0	0	44	18	0	21	0	0	39	0	44	0	0	0	44	1	0	0	0	0	1	128
Hourly Total	1	229	0	0	1	230	42	0	50	0	1	92	0	267	1	0	1	268	1	0	0	0	0	1	591
9:00 PM	0	38	0	0	0	38	18	0	5	0	0	23	0	58	0	0	0	58	0	0	0	0	0	0	119
9:15 PM	0	50	0	0	0	50	19	0	9	0	0	28	0	69	0	0	0	69	0	0	2	0	0	2	149
9:30 PM	0	44	0	0	0	44	15	0	7	0	0	22	0	56	2	1	0	59	3	0	1	0	1	4	129
9:45 PM	0	66	0	0	0	66	45	0	10	0	0	55	0	48	0	1	0	49	0	0	1	0	0	1	171
Hourly Total	0	198	0	0	0	198	97	0	31	0	0	128	0	231	2	2	0	235	3	0	4	0	1	7	568
10:00 PM	0	25	0	0	0	25	98	0	45	0	1	143	0	69	0	0	0	69	0	0	0	0	0	0	237
10:15 PM	0	55	0	0	0	55	250	0	90	0	1	340	0	66	0	0	0	66	0	0	0	0	0	0	461
10:30 PM	0	39	0	0	0	39	72	0	44	0	2	116	0	38	0	0	0	38	0	0	0	0	0	0	193
10:45 PM	0	41	0	0	0	41	38	0	34	0	0	72	0	36	0	0	0	36	0	0	0	0	0	0	149
Hourly Total	0	160	0	0	0	160	458	0	213	0	4	671	0	209	0	0	0	209	0	0	0	0	0	0	1040
Grand Total	135	6859	1	0	110	6995	872	4	515	0	35	1391	9	7909	118	8	12	8044	112	0	75	0	35	187	16617
Approach %	1.9	98.1	0.0	0.0	-	-	62.7	0.3	37.0	0.0	-	-	0.1	98.3	1.5	0.1	-	-	59.9	0.0	40.1	0.0	-	-	-
Total %	0.8	41.3	0.0	0.0	-	42.1	5.2	0.0	3.1	0.0	-	8.4	0.1	47.6	0.7	0.0	-	48.4	0.7	0.0	0.5	0.0	-	1.1	-
Lights	134	6443	1	0	-	6578	859	4	504	0	-	1367	9	7304	118	8	-	7439	112	0	74	0	-	186	15570
% Lights	99.3	93.9	100.0	-	-	94.0	98.5	100.0	97.9	-	-	98.3	100.0	92.4	100.0	100.0	-	92.5	100.0	-	98.7	-	-	99.5	93.7
Buses	1	87	0	0	-	88	3	0	5	0	-	8	0	85	0	0	-	85	0	0	1	0	-	1	182
% Buses	0.7	1.3	0.0	-	-	1.3	0.3	0.0	1.0	-	-	0.6	0.0	1.1	0.0	0.0	-	1.1	0.0	-	1.3	-	-	0.5	1.1
Single-Unit Trucks	0	183	0	0	-	183	8	0	5	0	-	13	0	302	0	0	-	302	0	0	0	0	-	0	498
% Single-Unit Trucks	0.0	2.7	0.0	-	-	2.6	0.9	0.0	1.0	-	-	0.9	0.0	3.8	0.0	0.0	-	3.8	0.0	-	0.0	-	-	0.0	3.0
Articulated Trucks	0	146	0	0	-	146	2	0	1	0	-	3	0	218	0	0	-	218	0	0	0	0	-	0	367
% Articulated Trucks	0.0	2.1	0.0	-	-	2.1	0.2	0.0	0.2	-	-	0.2	0.0	2.8	0.0	0.0	-	2.7	0.0	-	0.0	-	-	0.0	2.2
Pedestrians	-	-	-	-	110	-	-	-	-	-	35	-	-	-	-	-	12	-	-	-	-	-	35	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Count Name: KENNEDY RD & POWERADE
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Turning Movement Data Plot

Count Name: KENNEDY RD & POWERADE
CENTRE N DRIVEWAY
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Turning Movement Peak Hour Data (7:30 AM)

Start Time	Kennedy Rd Southbound						Power Ade N Driveaway Westbound						Kennedy Rd Northbound						Masumeen Islamic Centre Exit Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:30 AM	0	310	0	0	0	310	1	0	3	0	0	4	0	89	0	0	0	89	0	0	0	0	0	0	403
7:45 AM	1	347	0	0	0	348	4	0	5	0	0	9	0	108	0	0	0	108	0	0	0	0	0	0	465
8:00 AM	5	291	0	0	1	296	2	0	8	0	0	10	1	104	8	0	0	113	7	0	2	0	0	9	428
8:15 AM	20	327	0	0	0	347	1	0	1	0	0	2	0	85	12	0	0	97	13	0	11	0	0	24	470
Total	26	1275	0	0	1	1301	8	0	17	0	0	25	1	386	20	0	0	407	20	0	13	0	0	33	1766
Approach %	2.0	98.0	0.0	0.0	-	-	32.0	0.0	68.0	0.0	-	-	0.2	94.8	4.9	0.0	-	-	60.6	0.0	39.4	0.0	-	-	-
Total %	1.5	72.2	0.0	0.0	-	73.7	0.5	0.0	1.0	0.0	-	1.4	0.1	21.9	1.1	0.0	-	23.0	1.1	0.0	0.7	0.0	-	1.9	-
PHF	0.325	0.919	0.000	0.000	-	0.935	0.500	0.000	0.531	0.000	-	0.625	0.250	0.894	0.417	0.000	-	0.900	0.385	0.000	0.295	0.000	-	0.344	0.939
Lights	26	1226	0	0	-	1252	7	0	16	0	-	23	1	335	20	0	-	356	20	0	13	0	-	33	1664
% Lights	100.0	96.2	-	-	-	96.2	87.5	-	94.1	-	-	92.0	100.0	86.8	100.0	-	-	87.5	100.0	-	100.0	-	-	100.0	94.2
Buses	0	12	0	0	-	12	0	0	0	0	-	0	0	9	0	0	-	9	0	0	0	0	-	0	21
% Buses	0.0	0.9	-	-	-	0.9	0.0	-	0.0	-	-	0.0	0.0	2.3	0.0	-	-	2.2	0.0	-	0.0	-	-	0.0	1.2
Single-Unit Trucks	0	22	0	0	-	22	0	0	1	0	-	1	0	27	0	0	-	27	0	0	0	0	-	0	50
% Single-Unit Trucks	0.0	1.7	-	-	-	1.7	0.0	-	5.9	-	-	4.0	0.0	7.0	0.0	-	-	6.6	0.0	-	0.0	-	-	0.0	2.8
Articulated Trucks	0	15	0	0	-	15	1	0	0	0	-	1	0	15	0	0	-	15	0	0	0	0	-	0	31
% Articulated Trucks	0.0	1.2	-	-	-	1.2	12.5	-	0.0	-	-	4.0	0.0	3.9	0.0	-	-	3.7	0.0	-	0.0	-	-	0.0	1.8
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Turning Movement Peak Hour Data (11:00 AM)

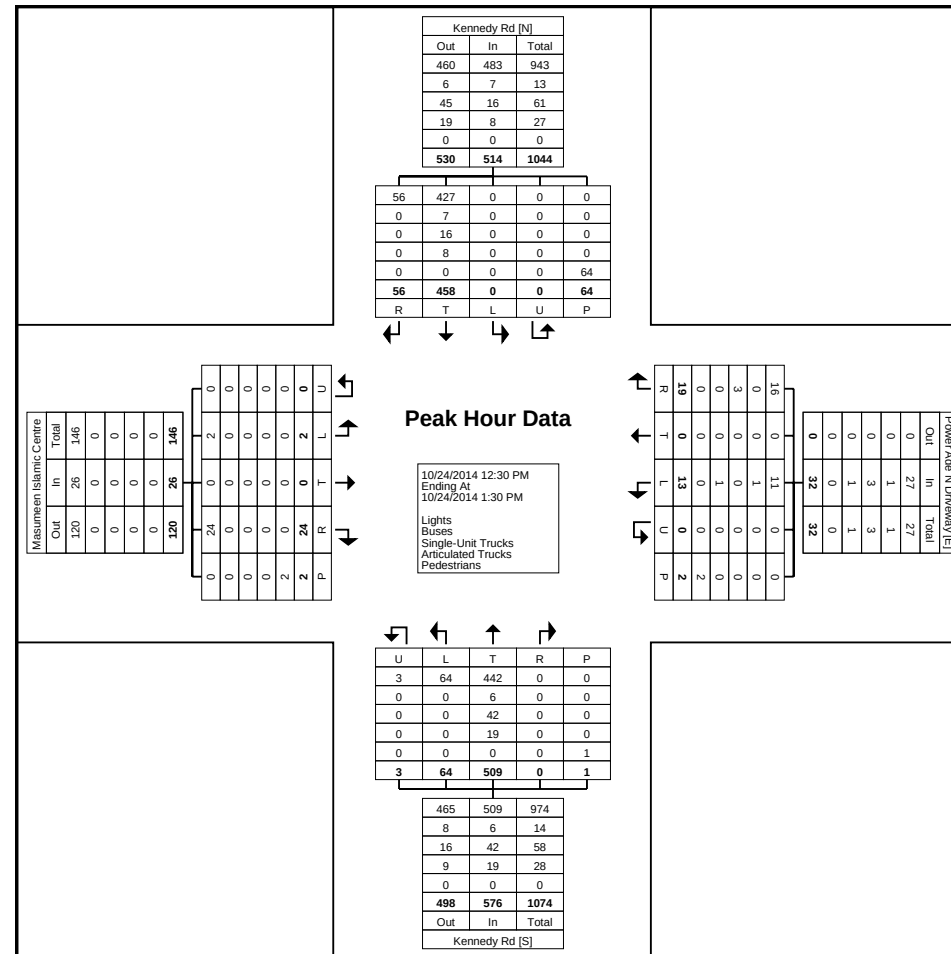
[illegible]

Count Name: KENNEDY RD & POWERADE
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Turning Movement Peak Hour Data (12:30 PM)

Start Time	Kennedy Rd Southbound						Power Ade N Driveway Westbound						Kennedy Rd Northbound						Masumeen Islamic Centre Exit Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
12:30 PM	8	101	0	0	10	109	6	0	0	0	1	6	0	136	5	0	0	141	0	0	0	0	0	0	256
12:45 PM	20	121	0	0	0	141	7	0	2	0	0	9	0	121	24	1	0	146	1	0	1	0	0	2	298
1:00 PM	21	106	0	0	12	127	3	0	5	0	0	8	0	134	28	1	0	163	12	0	0	0	1	12	310
1:15 PM	7	130	0	0	42	137	3	0	6	0	1	9	0	118	7	1	1	126	11	0	1	0	1	12	284
Total	56	458	0	0	64	514	19	0	13	0	2	32	0	509	64	3	1	576	24	0	2	0	2	26	1148
Approach %	10.9	89.1	0.0	0.0	-	-	59.4	0.0	40.6	0.0	-	-	0.0	88.4	11.1	0.5	-	-	92.3	0.0	7.7	0.0	-	-	-
Total %	4.9	39.9	0.0	0.0	-	44.8	1.7	0.0	1.1	0.0	-	2.8	0.0	44.3	5.6	0.3	-	50.2	2.1	0.0	0.2	0.0	-	2.3	-
PHF	0.667	0.881	0.000	0.000	-	0.911	0.679	0.000	0.542	0.000	-	0.889	0.000	0.936	0.571	0.750	-	0.883	0.500	0.000	0.500	0.000	-	0.542	0.926
Lights	56	427	0	0	-	483	16	0	11	0	-	27	0	442	64	3	-	509	24	0	2	0	-	26	1045
% Lights	100.0	93.2	-	-	-	94.0	84.2	-	84.6	-	-	84.4	-	86.8	100.0	100.0	-	88.4	100.0	-	100.0	-	-	100.0	91.0
Buses	0	7	0	0	-	7	0	0	1	0	-	1	0	6	0	0	-	6	0	0	0	0	-	0	14
% Buses	0.0	1.5	-	-	-	1.4	0.0	-	7.7	-	-	3.1	-	1.2	0.0	0.0	-	1.0	0.0	-	0.0	-	-	0.0	1.2
Single-Unit Trucks	0	16	0	0	-	16	3	0	0	0	-	3	0	42	0	0	-	42	0	0	0	0	-	0	61
% Single-Unit Trucks	0.0	3.5	-	-	-	3.1	15.8	-	0.0	-	-	9.4	-	8.3	0.0	0.0	-	7.3	0.0	-	0.0	-	-	0.0	5.3
Articulated Trucks	0	8	0	0	-	8	0	0	1	0	-	1	0	19	0	0	-	19	0	0	0	0	-	0	28
% Articulated Trucks	0.0	1.7	-	-	-	1.6	0.0	-	7.7	-	-	3.1	-	3.7	0.0	0.0	-	3.3	0.0	-	0.0	-	-	0.0	2.4
Pedestrians	-	-	-	-	64	-	-	-	-	-	2	-	-	-	-	-	1	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

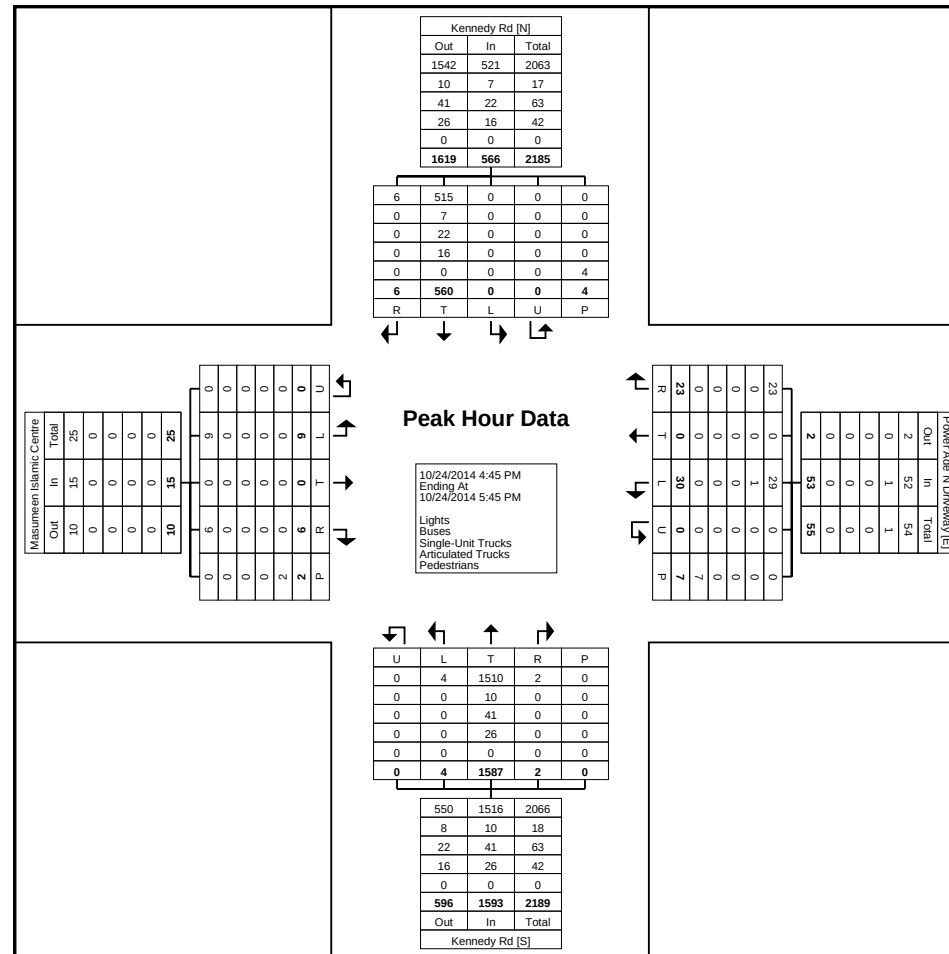


Turning Movement Peak Hour Data Plot (12:30 PM)

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Kennedy Rd Southbound						Power Ade N Driveway Westbound						Kennedy Rd Northbound						Masumeen Islamic Centre Exit Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:45 PM	3	149	0	0	0	152	4	0	1	0	1	5	0	390	1	0	0	391	2	0	2	0	0	4	552
5:00 PM	2	152	0	0	0	154	6	0	1	0	2	7	0	417	2	0	0	419	1	0	6	0	2	7	587
5:15 PM	0	108	0	0	3	108	4	0	6	0	3	10	1	409	0	0	0	410	2	0	0	0	0	2	530
5:30 PM	1	151	0	0	1	152	9	0	22	0	1	31	1	371	1	0	0	373	1	0	1	0	0	2	558
Total	6	560	0	0	4	566	23	0	30	0	7	53	2	1587	4	0	0	1593	6	0	9	0	2	15	2227
Approach %	1.1	98.9	0.0	0.0	-	-	43.4	0.0	56.6	0.0	-	-	0.1	99.6	0.3	0.0	-	-	40.0	0.0	60.0	0.0	-	-	-
Total %	0.3	25.1	0.0	0.0	-	25.4	1.0	0.0	1.3	0.0	-	2.4	0.1	71.3	0.2	0.0	-	71.5	0.3	0.0	0.4	0.0	-	0.7	-
PHF	0.500	0.921	0.000	0.000	-	0.919	0.639	0.000	0.341	0.000	-	0.427	0.500	0.951	0.500	0.000	-	0.950	0.750	0.000	0.375	0.000	-	0.536	0.948
Lights	6	515	0	0	-	521	23	0	29	0	-	52	2	1510	4	0	-	1516	6	0	9	0	-	15	2104
% Lights	100.0	92.0	-	-	-	92.0	100.0	-	96.7	-	-	98.1	100.0	95.1	100.0	-	-	95.2	100.0	-	100.0	-	-	100.0	94.5
Buses	0	7	0	0	-	7	0	0	1	0	-	1	0	10	0	0	-	10	0	0	0	0	-	0	18
% Buses	0.0	1.3	-	-	-	1.2	0.0	-	3.3	-	-	1.9	0.0	0.6	0.0	-	-	0.6	0.0	-	0.0	-	-	0.0	0.8
Single-Unit Trucks	0	22	0	0	-	22	0	0	0	0	-	0	0	41	0	0	-	41	0	0	0	0	-	0	63
% Single-Unit Trucks	0.0	3.9	-	-	-	3.9	0.0	-	0.0	-	-	0.0	0.0	2.6	0.0	-	-	2.6	0.0	-	0.0	-	-	0.0	2.8
Articulated Trucks	0	16	0	0	-	16	0	0	0	0	-	0	0	26	0	0	-	26	0	0	0	0	-	0	42
% Articulated Trucks	0.0	2.9	-	-	-	2.8	0.0	-	0.0	-	-	0.0	0.0	1.6	0.0	-	-	1.6	0.0	-	0.0	-	-	0.0	1.9
Pedestrians	-	-	-	-	4	-	-	-	-	-	7	-	-	-	-	-	0	-	-	-	-	-	2	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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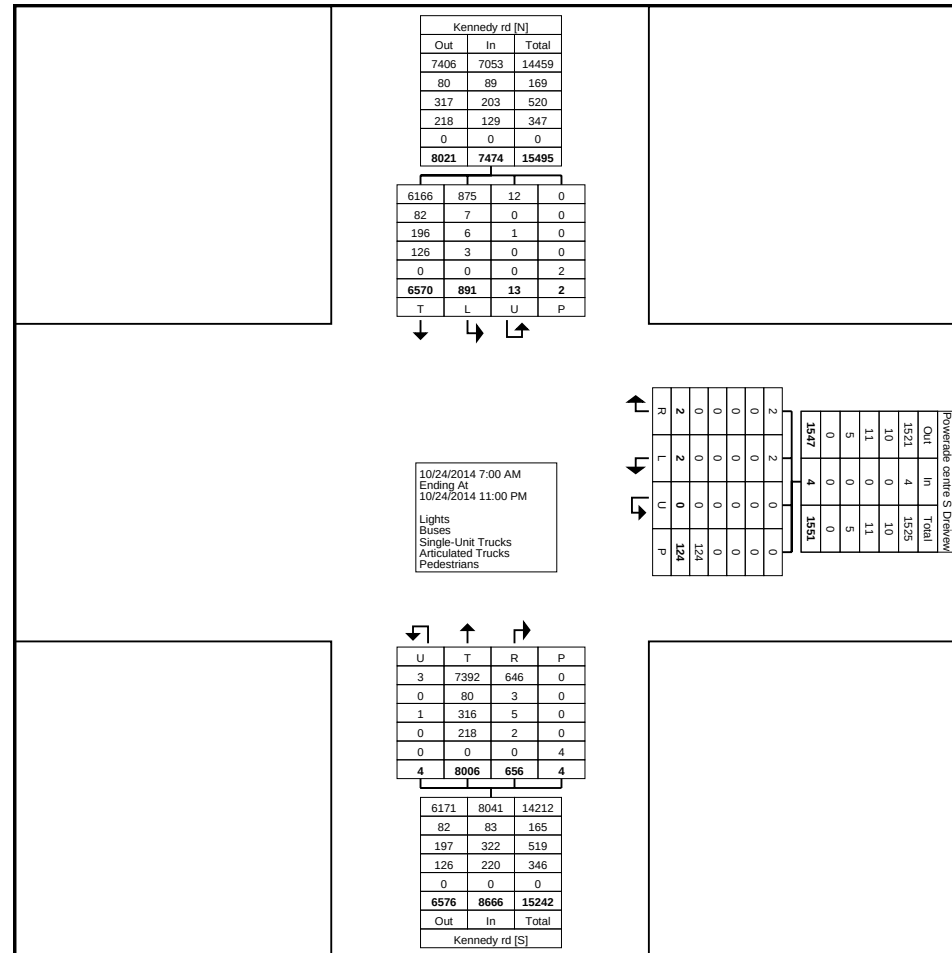


Turning Movement Data

Start Time	Kennedy rd Southbound					Powerade centre S Driveway Westbound					Kennedy rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:00 AM	220	3	0	0	223	0	0	0	0	0	0	87	0	0	87	310
7:15 AM	251	3	0	0	254	0	0	0	0	0	1	81	0	0	82	336
7:30 AM	323	0	0	0	323	0	0	0	0	0	0	87	0	0	87	410
7:45 AM	346	5	0	0	351	0	0	0	0	0	1	111	0	0	112	463
Hourly Total	1140	11	0	0	1151	0	0	0	0	0	2	366	0	0	368	1519
8:00 AM	327	6	1	0	334	0	0	0	0	0	2	117	0	0	119	453
8:15 AM	338	6	1	0	345	0	0	0	0	0	2	91	0	0	93	438
8:30 AM	278	4	0	0	282	0	0	0	0	0	8	85	0	0	93	375
8:45 AM	215	7	0	0	222	0	0	0	0	0	6	90	0	0	96	318
Hourly Total	1158	23	2	0	1183	0	0	0	0	0	18	383	0	0	401	1584
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11:00 AM	86	2	0	0	88	0	0	0	0	0	2	93	0	0	95	183
11:15 AM	86	1	0	0	87	0	0	0	0	0	4	87	0	0	91	178
11:30 AM	93	4	2	0	99	0	0	0	0	0	3	95	0	0	98	197
11:45 AM	89	3	0	0	92	1	0	0	0	1	3	119	0	0	122	215
Hourly Total	354	10	2	0	366	1	0	0	0	1	12	394	0	0	406	773
12:00 PM	84	4	0	0	88	0	0	0	0	0	6	156	0	0	162	250
12:15 PM	98	8	0	0	106	0	0	0	0	0	2	138	0	0	140	246
12:30 PM	106	3	0	1	109	0	0	0	2	0	4	143	0	0	147	256
12:45 PM	118	5	0	0	123	0	0	0	0	0	1	158	0	0	159	282
Hourly Total	406	20	0	1	426	0	0	0	2	0	13	595	0	0	608	1034
1:00 PM	111	13	0	0	124	0	0	0	0	0	5	156	0	0	161	285
1:15 PM	111	26	1	0	138	0	0	0	0	0	20	126	0	0	146	284
1:30 PM	118	12	0	0	130	0	0	0	0	0	10	138	0	0	148	278
1:45 PM	103	3	0	0	106	0	0	0	0	0	3	120	0	0	123	229
Hourly Total	443	54	1	0	498	0	0	0	0	0	38	540	0	0	578	1076
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3:00 PM	158	6	0	0	164	0	0	0	0	0	5	223	0	0	228	392
3:15 PM	161	4	0	0	165	0	0	0	1	0	5	244	0	0	249	414
3:30 PM	119	4	0	0	123	0	0	0	0	0	6	283	0	0	289	412
3:45 PM	113	9	0	0	122	0	0	0	0	0	6	269	0	0	275	397
Hourly Total	551	23	0	0	574	0	0	0	1	0	22	1019	0	0	1041	1615
4:00 PM	146	8	0	0	154	0	0	0	0	0	16	275	0	0	291	445
4:15 PM	123	12	0	0	135	0	0	0	0	0	9	359	0	0	368	503
4:30 PM	129	7	0	0	136	0	0	0	0	0	12	379	0	0	391	527
4:45 PM	145	15	0	0	160	0	0	0	0	0	23	378	0	0	401	561
Hourly Total	543	42	0	0	585	0	0	0	0	0	60	1391	0	0	1451	2036
5:00 PM	138	12	0	1	150	0	0	0	0	0	22	415	0	0	437	587
5:15 PM	97	14	0	0	111	0	0	0	1	0	17	411	1	0	429	540
5:30 PM	155	25	0	0	180	1	0	0	0	1	31	365	1	0	397	578
5:45 PM	111	40	0	0	151	0	0	0	6	0	40	268	0	1	308	459

Hourly Total	501	91	0	1	592	1	0	0	7	1	110	1459	2	1	1571	2164
6:00 PM	116	43	0	0	159	0	0	0	12	0	57	211	0	0	268	427
6:15 PM	109	49	0	0	158	0	1	0	19	1	34	190	0	0	224	383
6:30 PM	115	71	1	0	187	0	0	0	21	0	30	153	0	0	183	370
6:45 PM	71	104	0	0	175	0	0	0	17	0	35	117	0	0	152	327
Hourly Total	411	267	1	0	679	0	1	0	69	1	156	671	0	0	827	1507
7:00 PM	100	92	3	0	195	0	0	0	42	0	67	173	1	3	241	436
7:15 PM	73	79	1	0	153	0	0	0	0	0	30	147	1	0	178	331
7:30 PM	76	38	0	0	114	0	0	0	0	0	22	83	0	0	105	219
7:45 PM	64	18	1	0	83	0	0	0	0	0	23	80	0	0	103	186
Hourly Total	313	227	5	0	545	0	0	0	42	0	142	483	2	3	627	1172
8:00 PM	57	22	0	0	79	0	0	0	0	0	20	76	0	0	96	175
8:15 PM	60	14	0	0	74	0	0	0	0	0	8	76	0	0	84	158
8:30 PM	46	9	0	0	55	0	0	0	0	0	4	65	0	0	69	124
8:45 PM	56	6	0	0	62	0	0	0	0	0	1	46	0	0	47	109
Hourly Total	219	51	0	0	270	0	0	0	0	0	33	263	0	0	296	566
9:00 PM	43	5	0	0	48	0	0	0	0	0	4	64	0	0	68	116
9:15 PM	50	6	0	0	56	0	0	0	0	0	3	66	0	0	69	125
9:30 PM	43	7	1	0	51	0	0	0	0	0	3	58	0	0	61	112
9:45 PM	57	21	0	0	78	0	0	0	0	0	9	50	0	0	59	137
Hourly Total	193	39	1	0	233	0	0	0	0	0	19	238	0	0	257	490
10:00 PM	65	10	0	0	75	0	0	0	3	0	5	73	0	0	78	153
10:15 PM	131	11	1	0	143	0	1	0	0	1	9	61	0	0	70	214
10:30 PM	72	9	0	0	81	0	0	0	0	0	7	37	0	0	44	125
10:45 PM	70	3	0	0	73	0	0	0	0	0	10	33	0	0	43	116
Hourly Total	338	33	1	0	372	0	1	0	3	1	31	204	0	0	235	608
Grand Total	6570	891	13	2	7474	2	2	0	124	4	656	8006	4	4	8666	16144
Approach %	87.9	11.9	0.2	-	-	50.0	50.0	0.0	-	-	7.6	92.4	0.0	-	-	-
Total %	40.7	5.5	0.1	-	46.3	0.0	0.0	0.0	-	0.0	4.1	49.6	0.0	-	53.7	-
Lights	6166	875	12	-	7053	2	2	0	-	4	646	7392	3	-	8041	15098
% Lights	93.9	98.2	92.3	-	94.4	100.0	100.0	-	-	100.0	98.5	92.3	75.0	-	92.8	93.5
Buses	82	7	0	-	89	0	0	0	-	0	3	80	0	-	83	172
% Buses	1.2	0.8	0.0	-	1.2	0.0	0.0	-	-	0.0	0.5	1.0	0.0	-	1.0	1.1
Single-Unit Trucks	196	6	1	-	203	0	0	0	-	0	5	316	1	-	322	525
% Single-Unit Trucks	3.0	0.7	7.7	-	2.7	0.0	0.0	-	-	0.0	0.8	3.9	25.0	-	3.7	3.3
Articulated Trucks	126	3	0	-	129	0	0	0	-	0	2	218	0	-	220	349
% Articulated Trucks	1.9	0.3	0.0	-	1.7	0.0	0.0	-	-	0.0	0.3	2.7	0.0	-	2.5	2.2
Pedestrians	-	-	-	2	-	-	-	-	124	-	-	-	-	4	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	100.0	-	-

Count Name: KENNEDY RD & POWERADE
CENTRE S DRIVEWAY
Site Code:
Start Date: 10/24/2014
Page No: 3



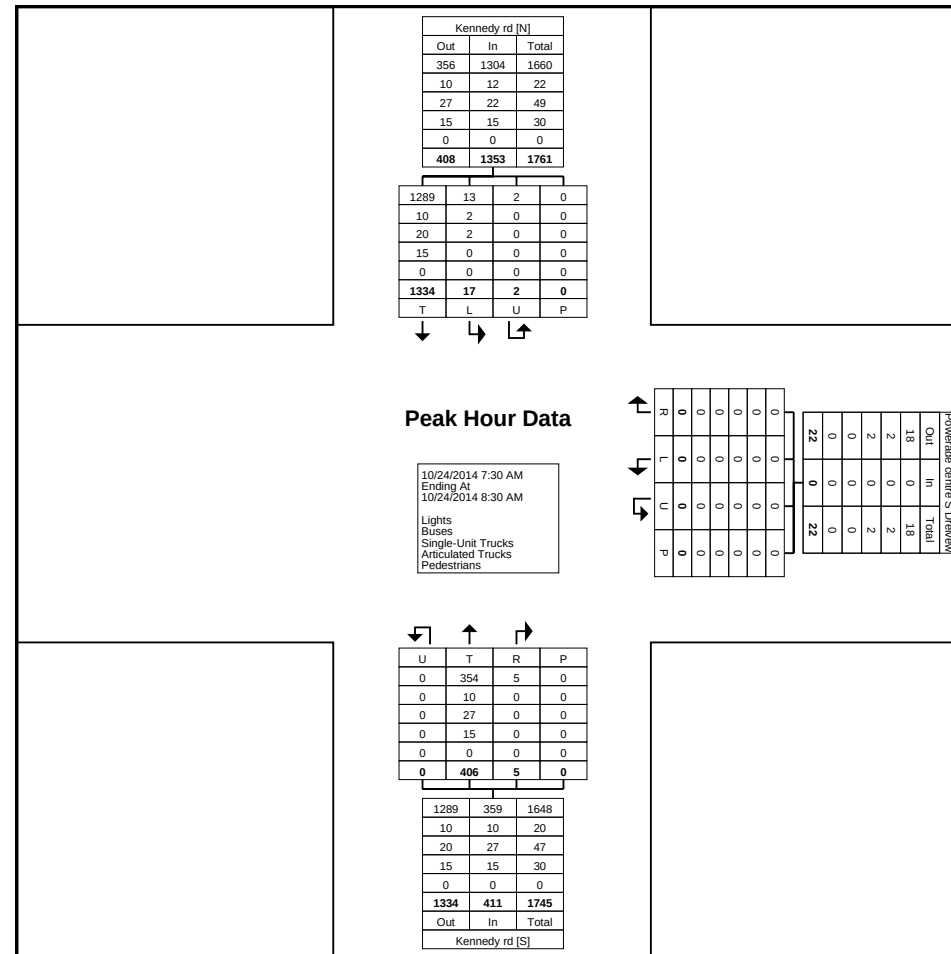
Turning Movement Data Plot

Count Name: KENNEDY RD & POWERADE
CENTRE S DRIVEWAY
Site Code:
Start Date: 10/24/2014
Page No: 4

Turning Movement Peak Hour Data (7:30 AM)

Start Time	Kennedy rd Southbound					Powerade centre S Driveway Westbound					Kennedy rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
7:30 AM	323	0	0	0	323	0	0	0	0	0	0	87	0	0	87	410
7:45 AM	346	5	0	0	351	0	0	0	0	0	1	111	0	0	112	463
8:00 AM	327	6	1	0	334	0	0	0	0	0	2	117	0	0	119	453
8:15 AM	338	6	1	0	345	0	0	0	0	0	2	91	0	0	93	438
Total	1334	17	2	0	1353	0	0	0	0	0	5	406	0	0	411	1764
Approach %	98.6	1.3	0.1	-	-	NaN	NaN	NaN	-	-	1.2	98.8	0.0	-	-	-
Total %	75.6	1.0	0.1	-	76.7	0.0	0.0	0.0	-	0.0	0.3	23.0	0.0	-	23.3	-
PHF	0.964	0.708	0.500	-	0.964	0.000	0.000	0.000	-	0.000	0.625	0.868	0.000	-	0.863	0.952
Lights	1289	13	2	-	1304	0	0	0	-	0	5	354	0	-	359	1663
% Lights	96.6	76.5	100.0	-	96.4	-	-	-	-	-	100.0	87.2	-	-	87.3	94.3
Buses	10	2	0	-	12	0	0	0	-	0	0	10	0	-	10	22
% Buses	0.7	11.8	0.0	-	0.9	-	-	-	-	-	0.0	2.5	-	-	2.4	1.2
Single-Unit Trucks	20	2	0	-	22	0	0	0	-	0	0	27	0	-	27	49
% Single-Unit Trucks	1.5	11.8	0.0	-	1.6	-	-	-	-	-	0.0	6.7	-	-	6.6	2.8
Articulated Trucks	15	0	0	-	15	0	0	0	-	0	0	15	0	-	15	30
% Articulated Trucks	1.1	0.0	0.0	-	1.1	-	-	-	-	-	0.0	3.7	-	-	3.6	1.7
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Count Name: KENNEDY RD & POWERADE
CENTRE S DRIVEWAY
Site Code:
Start Date: 10/24/2014
Page No: 5



Count Name: KENNEDY RD & POWERADE
CENTRE S DRIVEWAY
Site Code:
Start Date: 10/24/2014
Page No: 6

Turning Movement Peak Hour Data (11:00 AM)

[illegible]

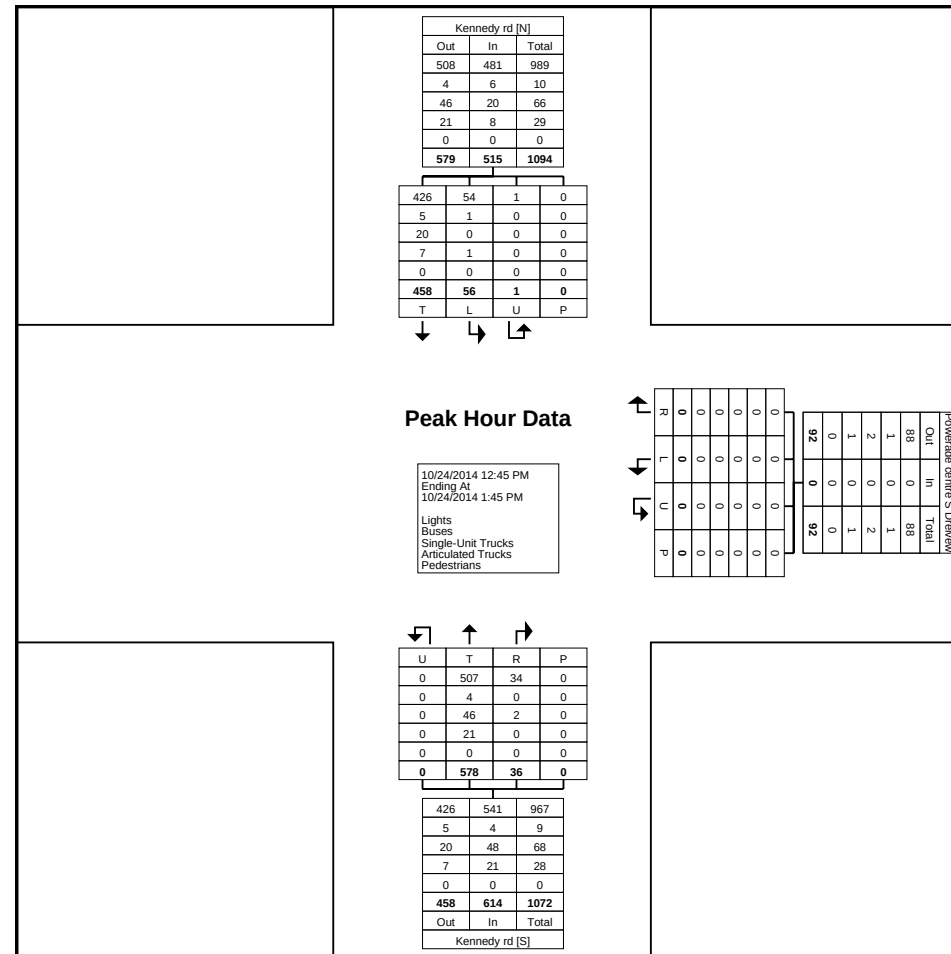
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CENTRE S DRIVEWAY
Site Code:
Start Date: 10/24/2014
Page No: 7



Count Name: KENNEDY RD & POWERADE
CENTRE S DRIVEWAY
Site Code:
Start Date: 10/24/2014
Page No: 8

Turning Movement Peak Hour Data (12:45 PM)

[illegible]

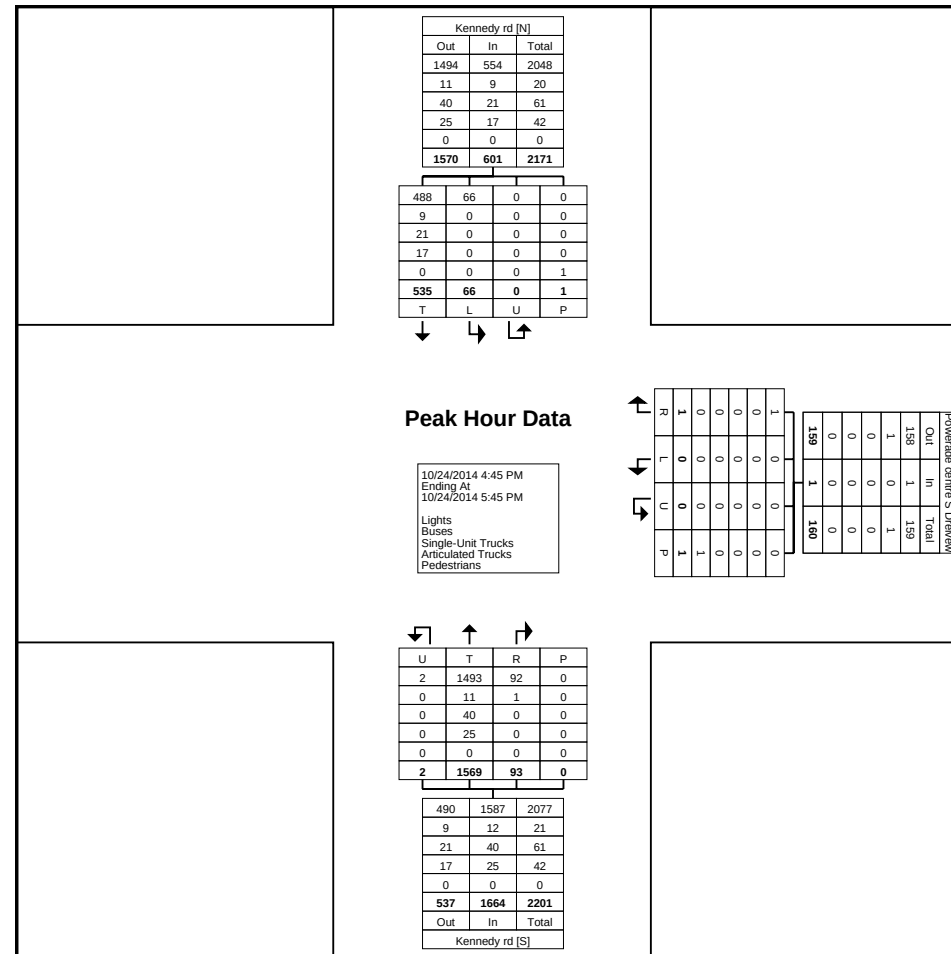


Turning Movement Peak Hour Data Plot (12:45 PM)

Turning Movement Peak Hour Data (4:45 PM)

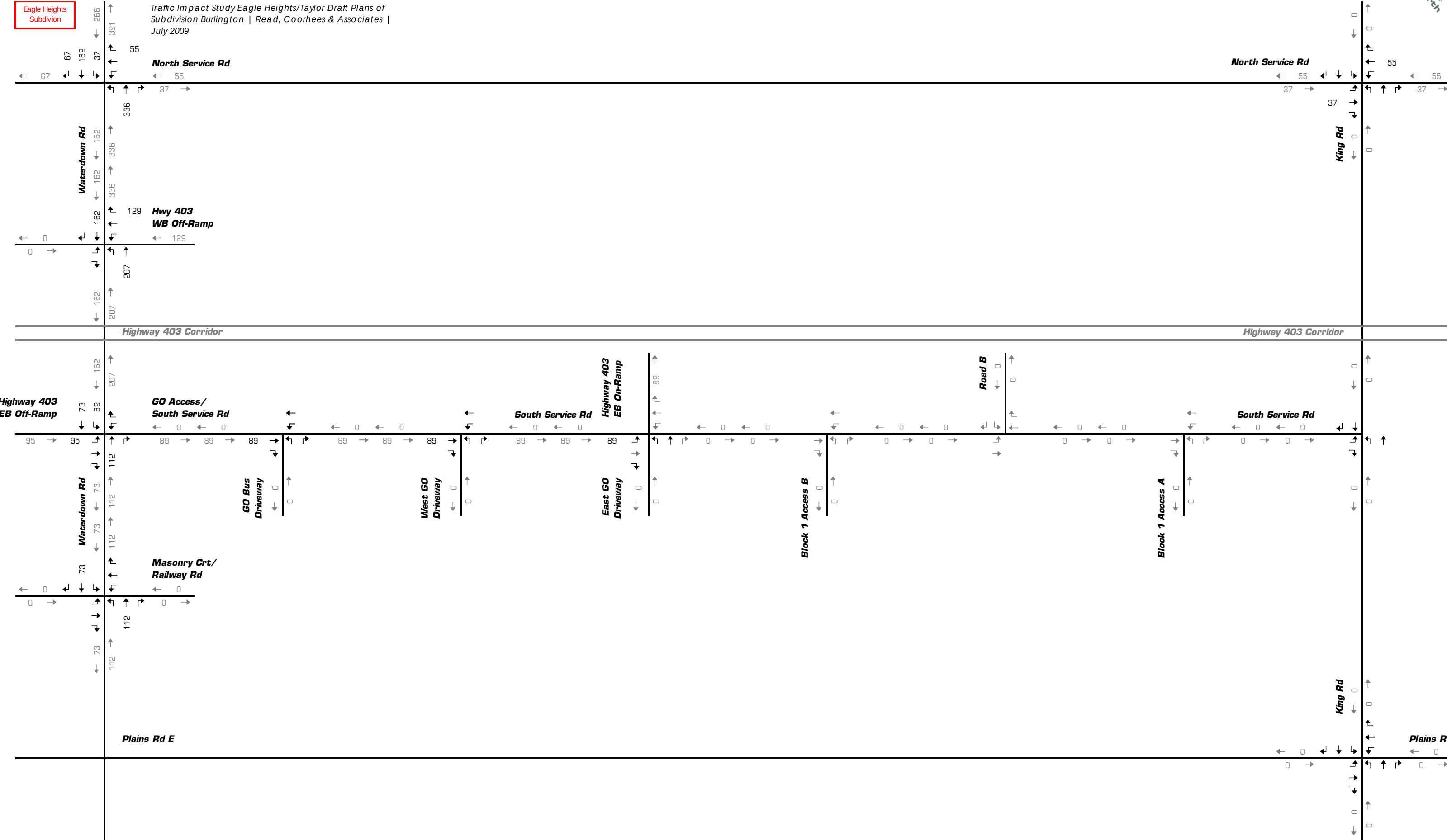
Start Time	Kennedy rd Southbound					Powerade centre S Driveway Westbound					Kennedy rd Northbound					Int. Total
	Thru	Left	U-Turn	Peds	App. Total	Right	Left	U-Turn	Peds	App. Total	Right	Thru	U-Turn	Peds	App. Total	
4:45 PM	145	15	0	0	160	0	0	0	0	0	23	378	0	0	401	561
5:00 PM	138	12	0	1	150	0	0	0	0	0	22	415	0	0	437	587
5:15 PM	97	14	0	0	111	0	0	0	1	0	17	411	1	0	429	540
5:30 PM	155	25	0	0	180	1	0	0	0	1	31	365	1	0	397	578
Total	535	66	0	1	601	1	0	0	1	1	93	1569	2	0	1664	2266
Approach %	89.0	11.0	0.0	-	-	100.0	0.0	0.0	-	-	5.6	94.3	0.1	-	-	-
Total %	23.6	2.9	0.0	-	26.5	0.0	0.0	0.0	-	0.0	4.1	69.2	0.1	-	73.4	-
PHF	0.863	0.660	0.000	-	0.835	0.250	0.000	0.000	-	0.250	0.750	0.945	0.500	-	0.952	0.965
Lights	488	66	0	-	554	1	0	0	-	1	92	1493	2	-	1587	2142
% Lights	91.2	100.0	-	-	92.2	100.0	-	-	-	100.0	98.9	95.2	100.0	-	95.4	94.5
Buses	9	0	0	-	9	0	0	0	-	0	1	11	0	-	12	21
% Buses	1.7	0.0	-	-	1.5	0.0	-	-	-	0.0	1.1	0.7	0.0	-	0.7	0.9
Single-Unit Trucks	21	0	0	-	21	0	0	0	-	0	0	40	0	-	40	61
% Single-Unit Trucks	3.9	0.0	-	-	3.5	0.0	-	-	-	0.0	0.0	2.5	0.0	-	2.4	2.7
Articulated Trucks	17	0	0	-	17	0	0	0	-	0	0	25	0	-	25	42
% Articulated Trucks	3.2	0.0	-	-	2.8	0.0	-	-	-	0.0	0.0	1.6	0.0	-	1.5	1.9
Pedestrians	-	-	-	1	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-

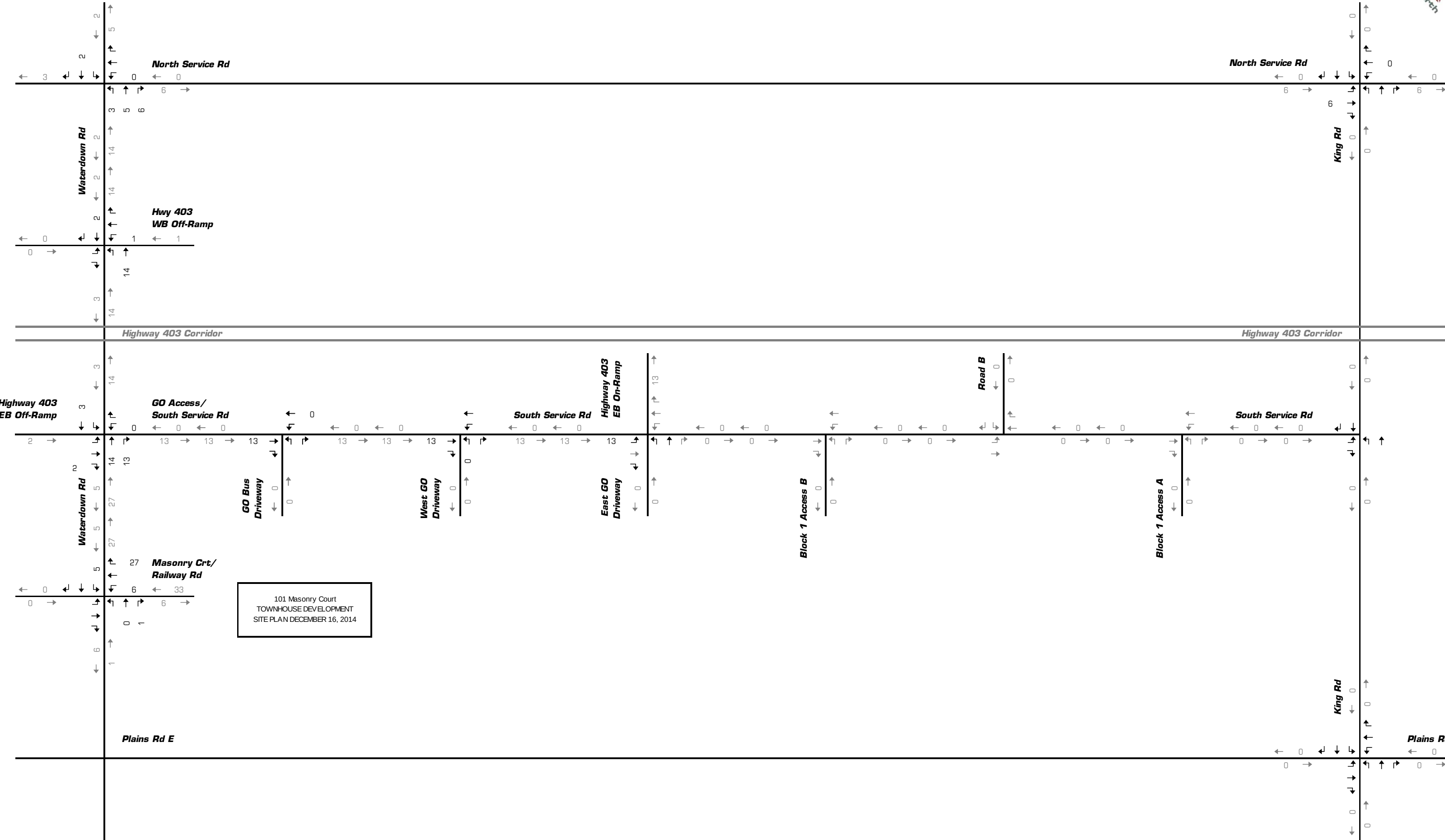
Count Name: KENNEDY RD & POWERADE
CENTRE S DRIVEWAY
Site Code:
Start Date: 10/24/2014
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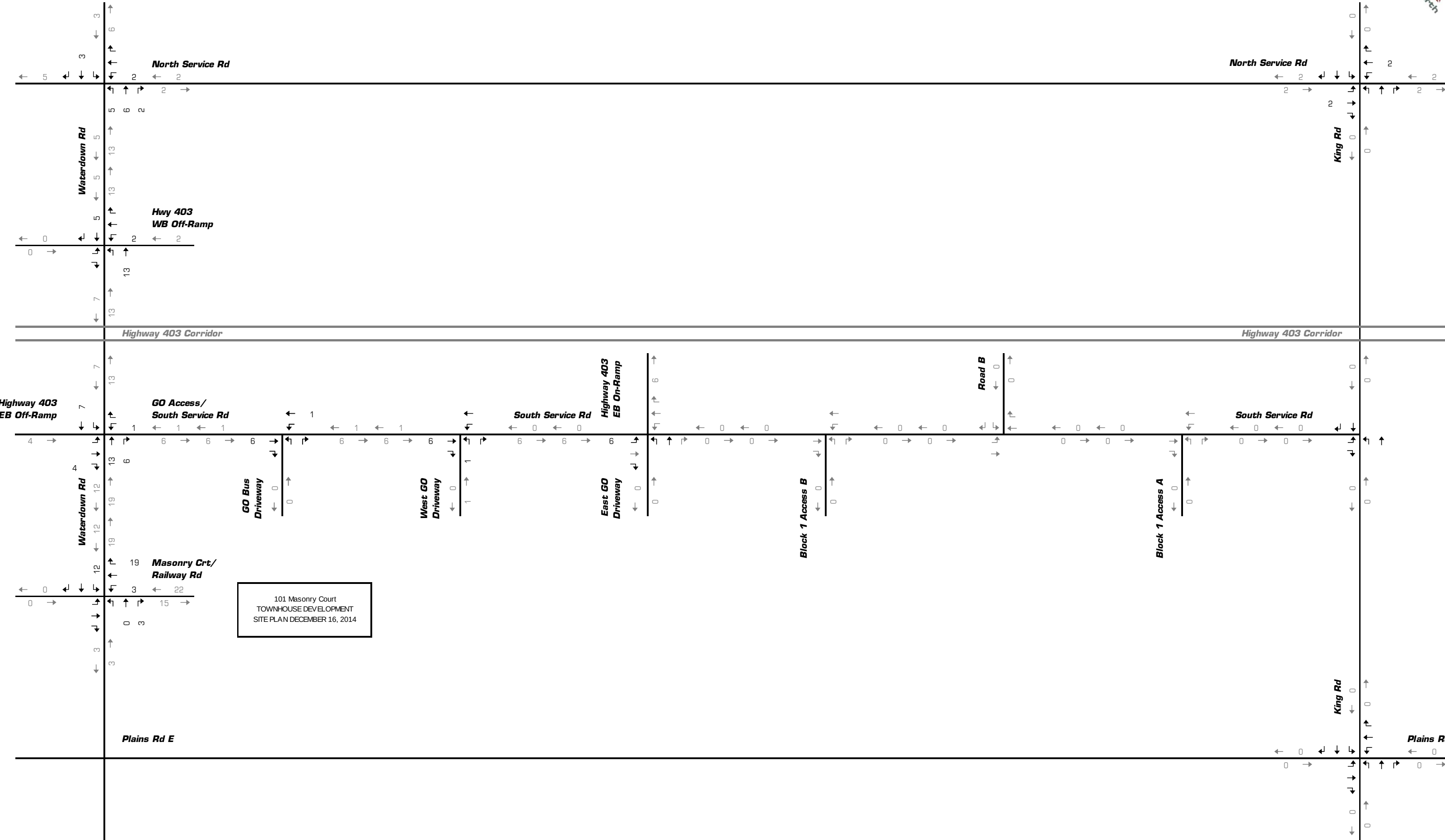


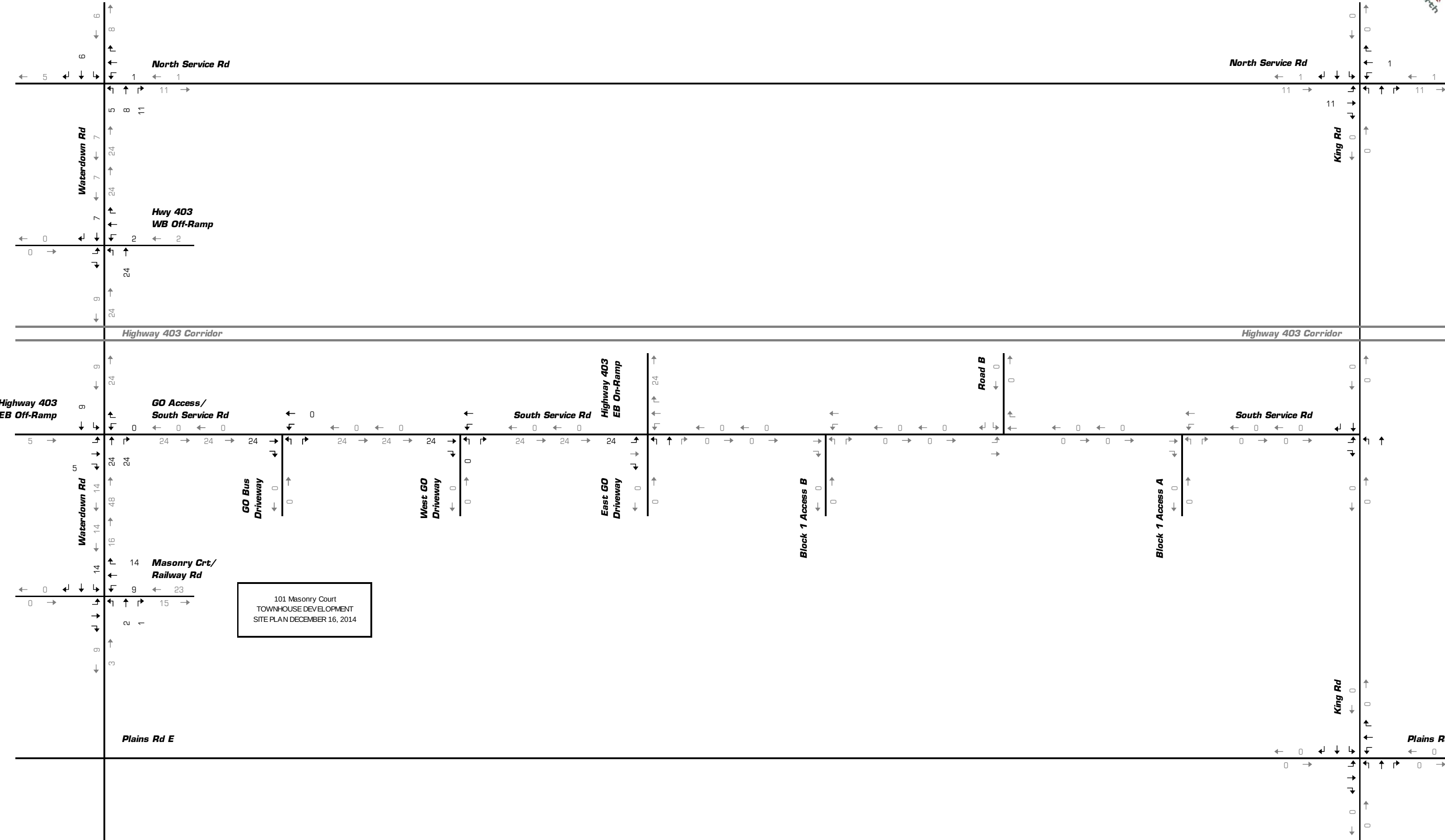
Appendix E

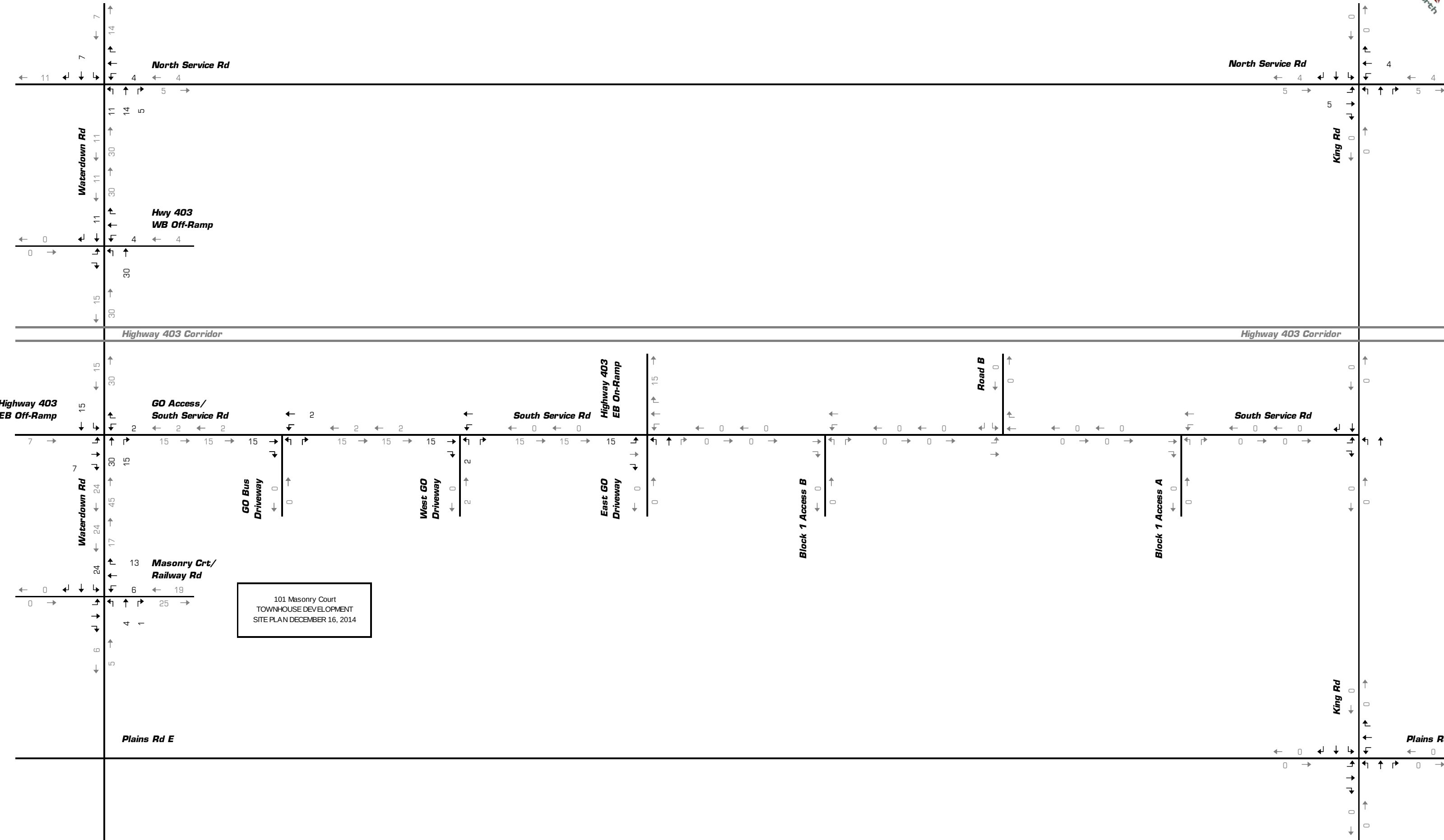
Background Traffic Forecast

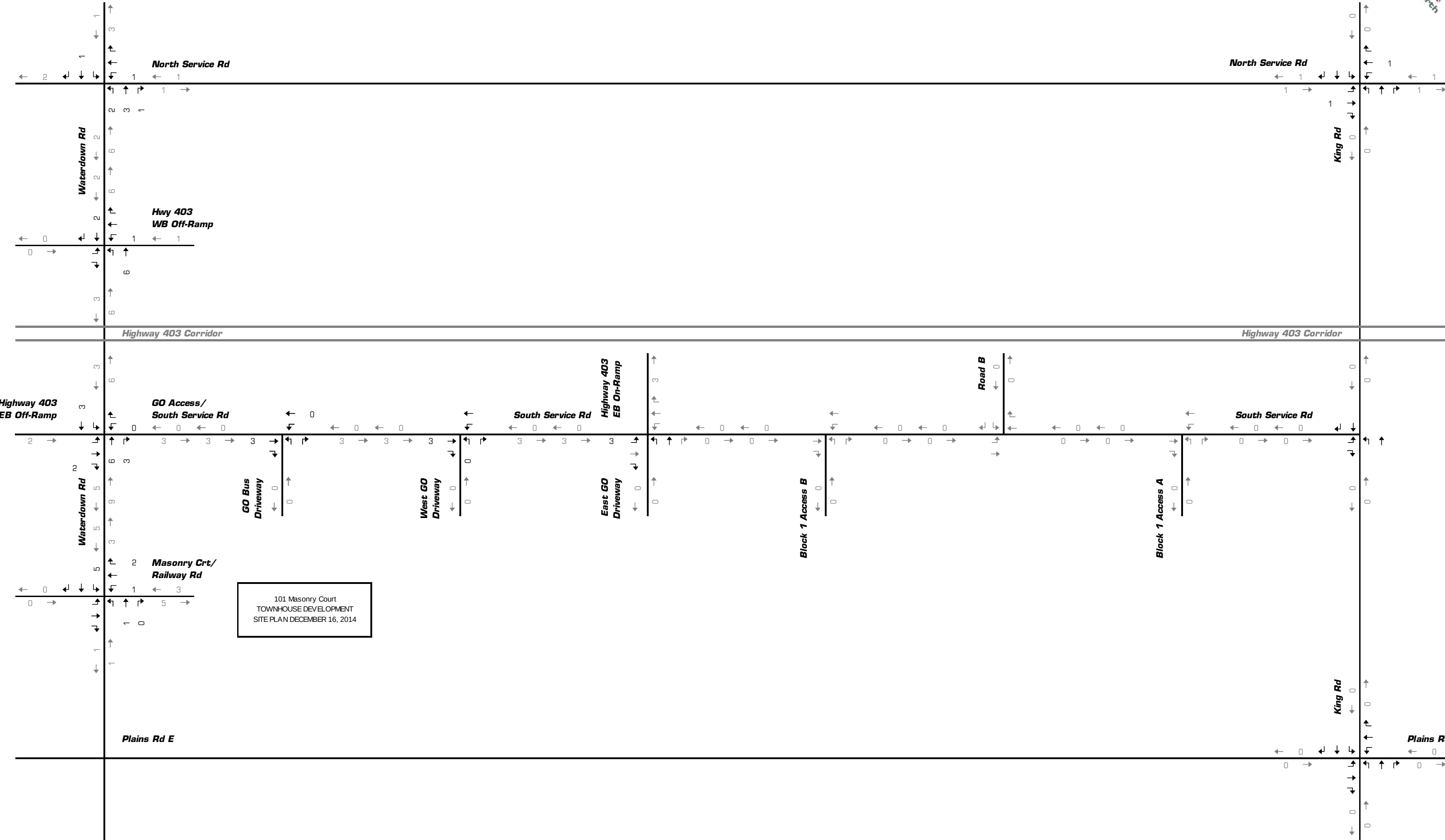


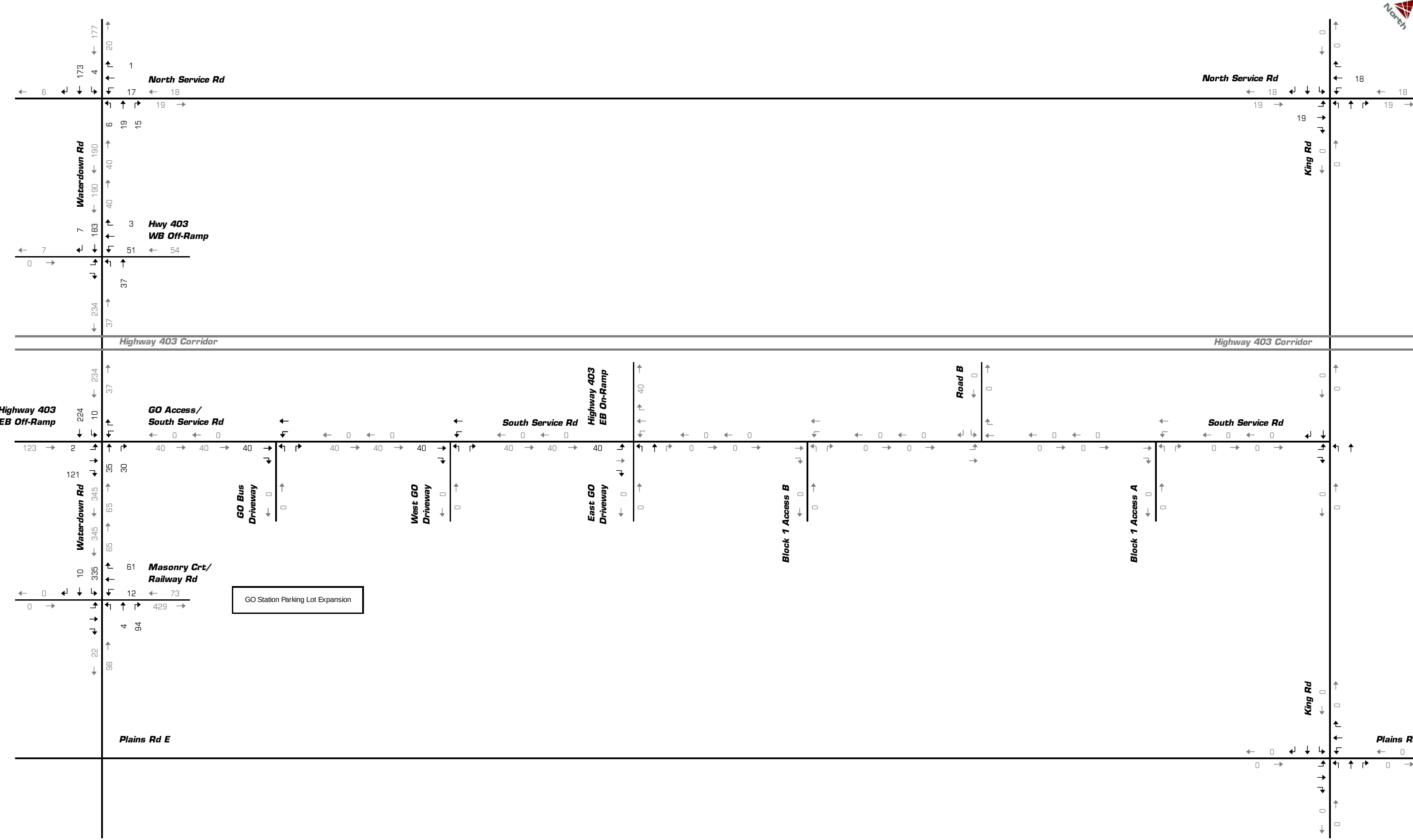


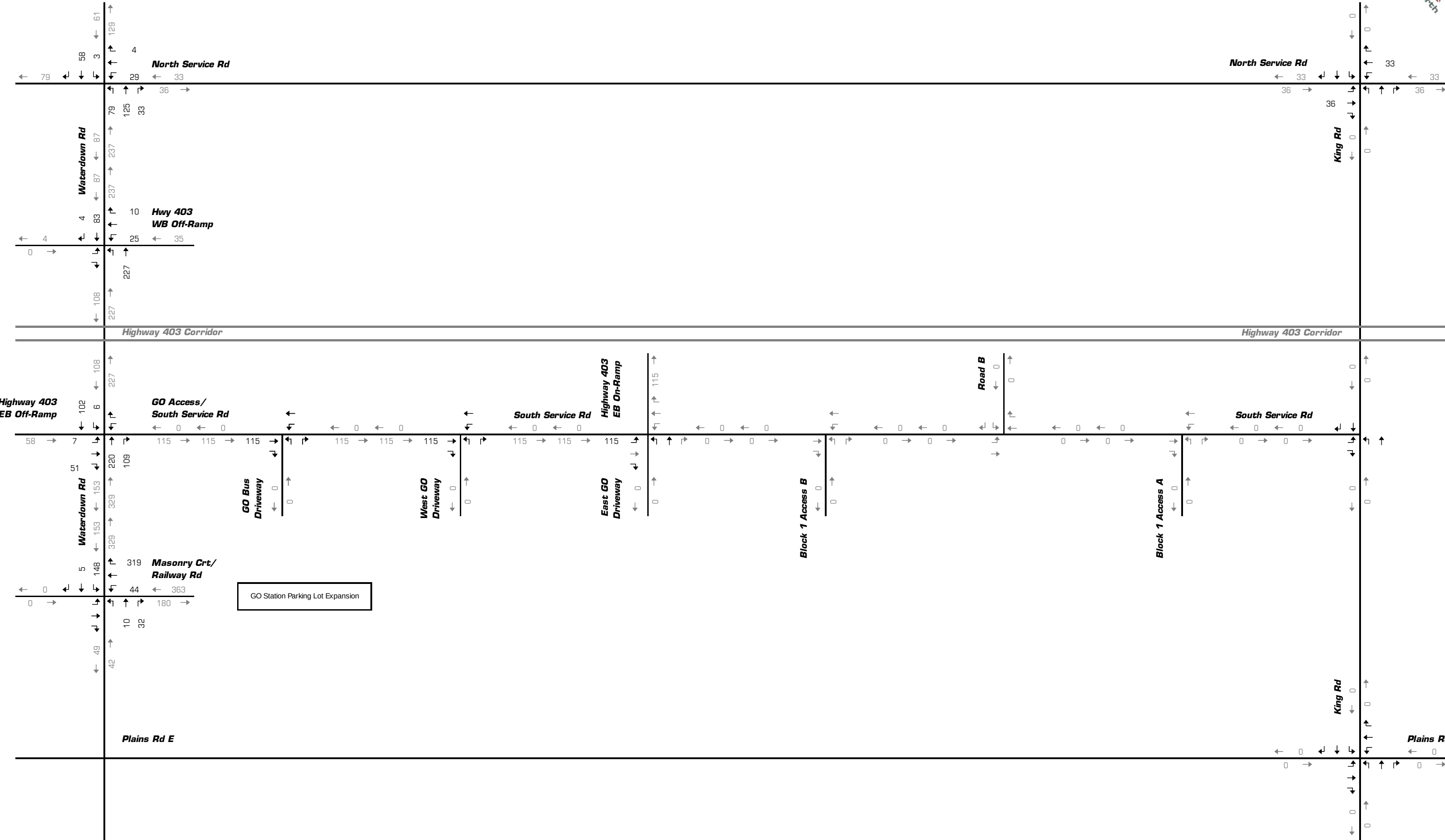


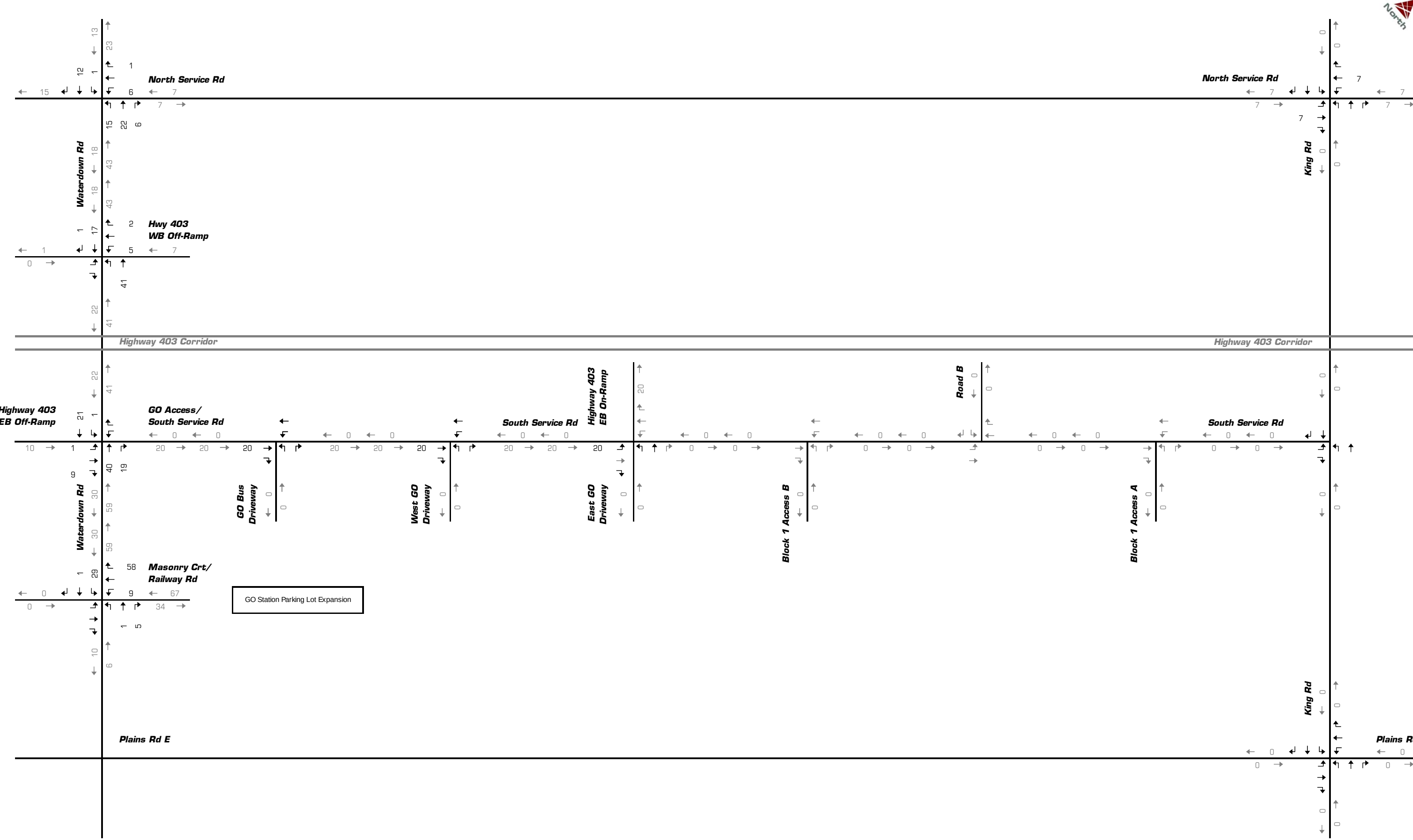


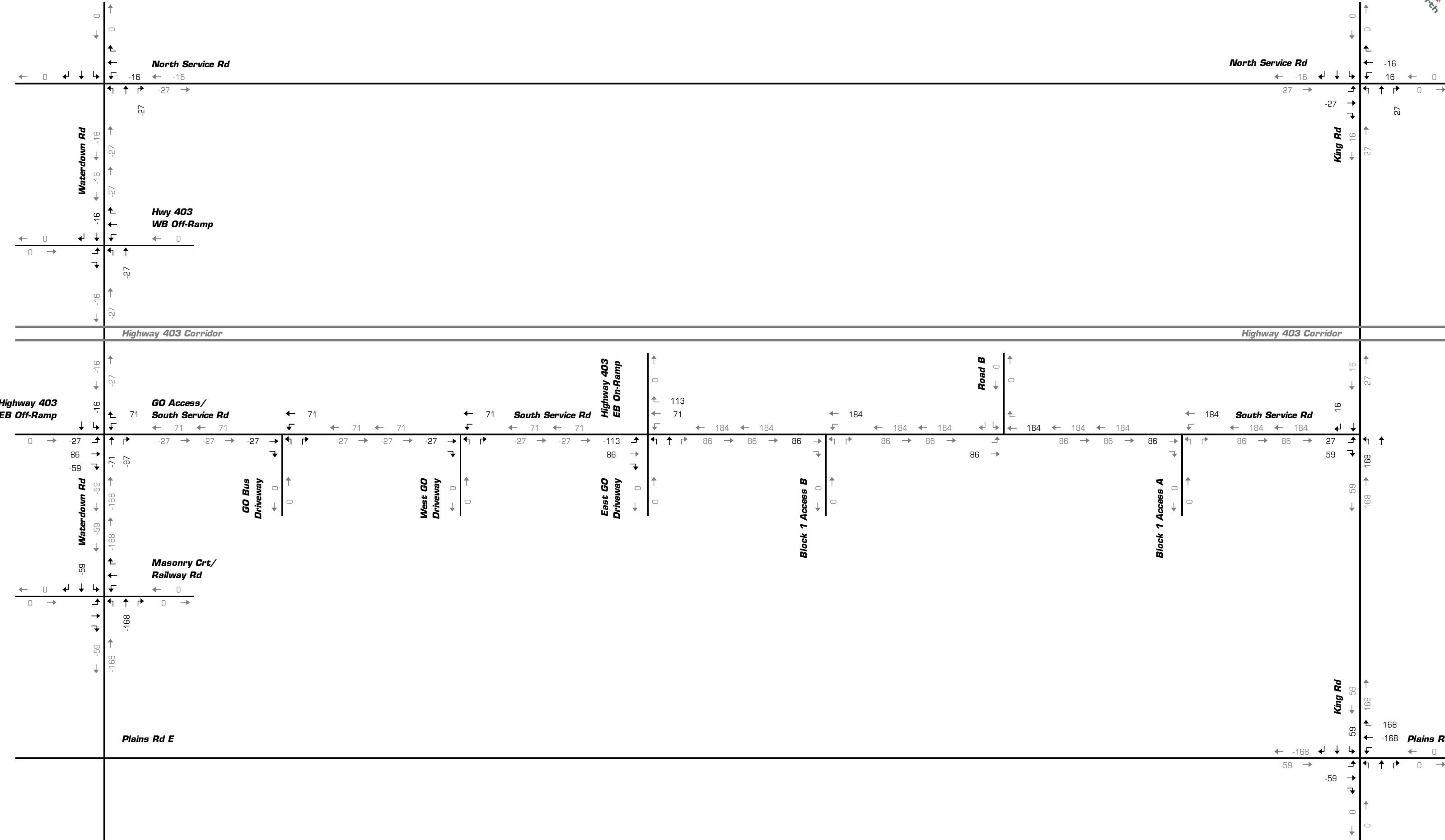


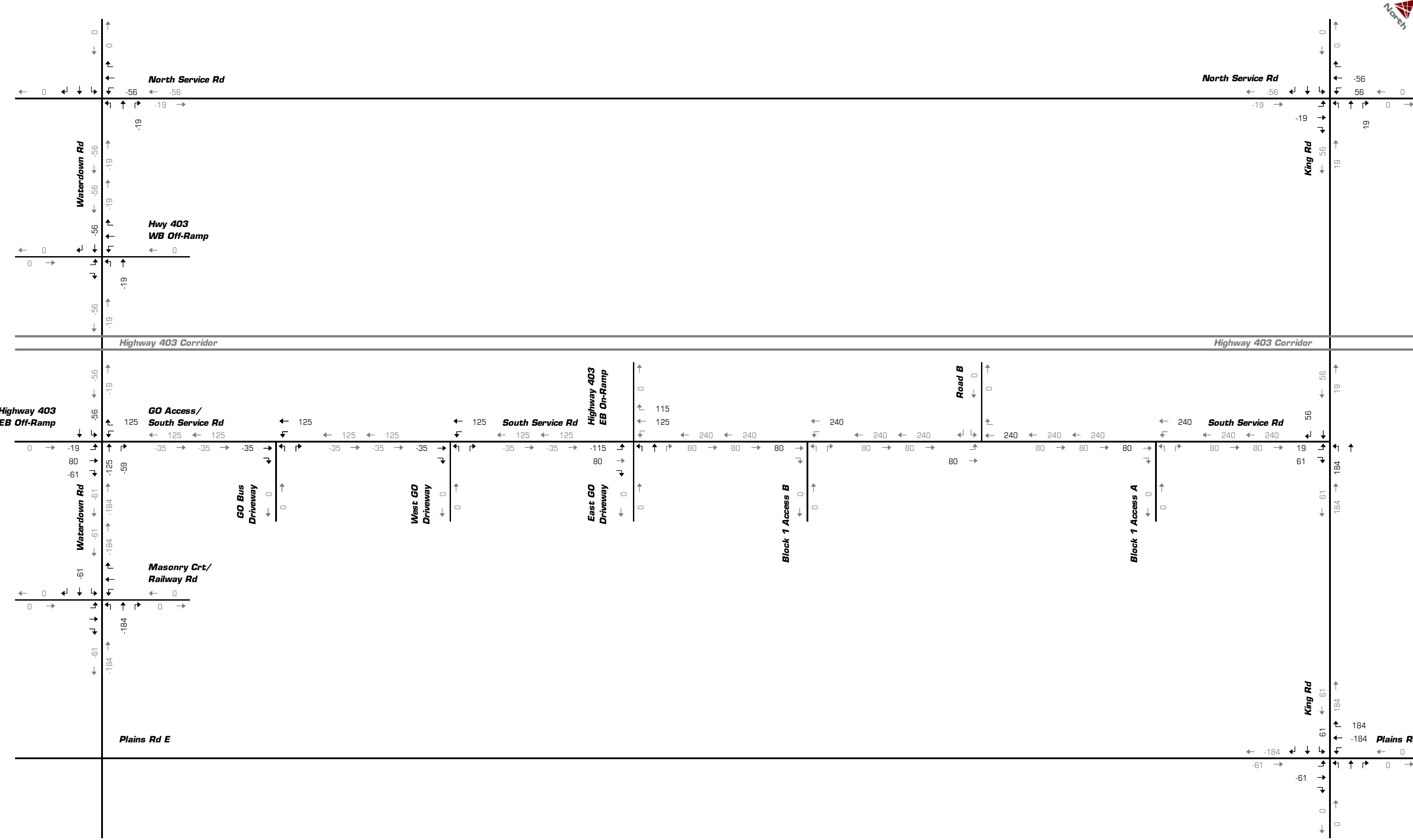


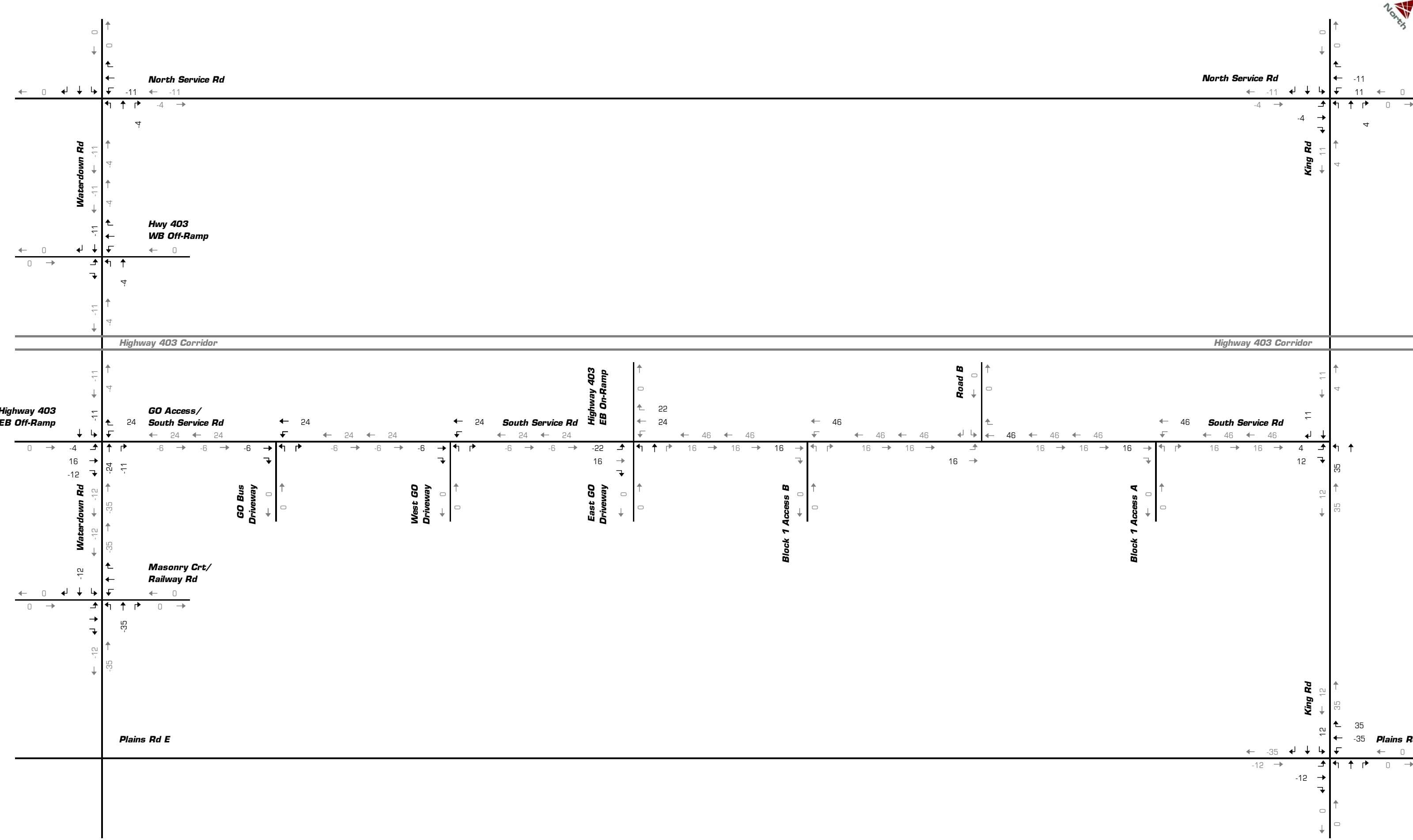












Appendix F

Background Traffic Operational Conditions

Timings

1: Waterdown Rd & North Service Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	64	88	56	187	430	225	970
Volume (vph)	64	88	56	187	430	225	970
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	27.0	27.0	27.0	15.0	42.0	21.0	48.0
Total Split (%)	30.0%	30.0%	30.0%	16.7%	46.7%	23.3%	53.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	23.0	23.0	23.0	11.0	45.9	53.1	44.0
Actuated g/C Ratio	0.26	0.26	0.26	0.12	0.51	0.59	0.49
v/c Ratio	0.14	0.18	0.11	0.43	0.44	0.52	0.64
Control Delay	27.0	27.5	0.4	50.3	4.2	10.9	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	27.5	0.4	50.3	4.2	10.9	18.6
LOS	C	C	A	D	A	B	B
Approach Delay		20.1			12.5		17.3
Approach LOS		C			B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 68 (76%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.64

Intersection Signal Delay: 15.6

Intersection LOS: B

Intersection Capacity Utilization 63.3%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				64	88	56	187	430	418	225	970	177
Volume (vph)	0	0	0	64	88	56	187	430	418	225	970	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Flpb, ped/bikes				1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.98	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1562	3539	3450		1770	3632	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.28	1.00	
Satd. Flow (perm)				1770	1863	1562	3539	3450		526	3632	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	64	88	56	187	430	418	225	970	177
RTOR Reduction (vph)	0	0	0	0	0	42	0	165	0	0	18	0
Lane Group Flow (vph)	0	0	0	64	88	14	187	683	0	225	1129	0
Confl. Peds. (#/hr)	1						1	1				1
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				20.0	20.0	20.0	9.0	43.9		52.1	42.0	
Effective Green, g (s)				23.0	23.0	23.0	11.0	45.9		50.1	44.0	
Actuated g/C Ratio				0.26	0.26	0.26	0.12	0.51		0.56	0.49	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				452	476	399	432	1759		418	1775	
v/s Ratio Prot				0.04	c0.05		0.05	0.20		c0.05	c0.31	
v/s Ratio Perm						0.01				0.24		
v/c Ratio				0.14	0.18	0.04	0.43	0.39		0.54	0.64	
Uniform Delay, d1				25.9	26.2	25.2	36.6	13.5		10.6	17.1	
Progression Factor				1.00	1.00	1.00	1.28	0.42		1.00	1.00	
Incremental Delay, d2				0.1	0.9	0.2	3.0	0.6		1.3	1.8	
Delay (s)				26.0	27.0	25.3	49.9	6.3		12.0	18.8	
Level of Service				C	C	C	D	A		B	B	
Approach Delay (s)		0.0			26.3			14.2			17.7	
Approach LOS		A			C			B			B	

Intersection Summary

HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Background AM Peak Hour

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	1	0	250	0	3	788	1027
Volume (vph)	1	0	250	0	3	788	1027
Turn Type	Perm	NA	custom	NA	Perm	NA	NA
Protected Phases	4	4	3	7	2	2	6
Permitted Phases	4	4	3	7	2	2	6
Detector Phase	4	4	3	7	2	2	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0	31.0
Total Split (s)	12.0	12.0	21.0	33.0	57.0	57.0	57.0
Total Split (%)	13.3%	13.3%	23.3%	36.7%	63.3%	63.3%	63.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	8.4	14.5	16.9		65.1	65.1	
Actuated g/C Ratio	0.09	0.16	0.19		0.72	0.72	
v/c Ratio	0.02	0.44	0.55		0.31	0.38	
Control Delay	0.2	36.3	13.0		6.5	1.5	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	0.2	36.3	13.0		6.5	1.6	
LOS	A	D	B		A	A	
Approach Delay	0.3		24.7		6.5	1.6	
Approach LOS	A		C		A	A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 65 (72%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.55

Intersection Signal Delay: 8.2

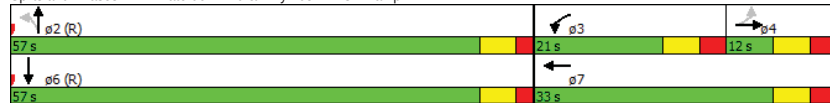
Intersection LOS: A

Intersection Capacity Utilization 50.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Background AM Peak Hour

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	0	3	250	0	246	3	788	0	0	1027	7
Volume (vph)	1	0	3	250	0	246	3	788	0	0	1027	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00			*1.00	1.00			*1.00			*1.00	
Frpb, ped/bikes	1.00			1.00	0.99			1.00			1.00	
Flpb, ped/bikes	1.00			1.00	1.00			1.00			1.00	
Frt	0.90			1.00	0.85			1.00			1.00	
Flt Protected	0.99			0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1651			3539	1562			3725			3721	
Flt Permitted	0.84			0.95	1.00			0.95			1.00	
Satd. Flow (perm)	1399			3539	1562			3548			3721	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	3	250	0	246	3	788	0	0	1027	7
RTOR Reduction (vph)	0	4	0	0	142	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	250	104	0	0	791	0	0	1034	0
Confl. Peds. (#/hr)	1					1	3					3
Turn Type	Perm	NA		custom	NA		Perm	NA			NA	
Protected Phases		4		3	7			2			6	
Permitted Phases	4			3			2					
Actuated Green, G (s)		1.0		11.5	19.5			57.5			57.5	
Effective Green, g (s)		4.0		14.5	22.5			59.5			59.5	
Actuated g/C Ratio		0.04		0.16	0.25			0.66			0.66	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		62		570	390			2345			2459	
v/s Ratio Prot				c0.07	c0.07						c0.28	
v/s Ratio Perm		0.00						0.22				
v/c Ratio		0.00		0.44	0.27			0.34			0.42	
Uniform Delay, d1		41.1		34.1	27.1			6.7			7.2	
Progression Factor		1.00		1.00	1.00			1.17			0.21	
Incremental Delay, d2		0.0		0.5	0.4			0.4			0.4	
Delay (s)		41.1		34.6	27.5			8.1			1.9	
Level of Service		D		C	C			A			A	
Approach Delay (s)		41.1			31.1			8.1			1.9	
Approach LOS		D			C			A			A	

Intersection Summary

HCM 2000 Control Delay 10.3

HCM 2000 Level of Service

B

HCM 2000 Volume to Capacity ratio 0.42

Actuated Cycle Length (s) 90.0

Sum of lost time (s)

12.0

Intersection Capacity Utilization 50.6%

ICU Level of Service

A

Analysis Period (min) 15

c Critical Lane Group

Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

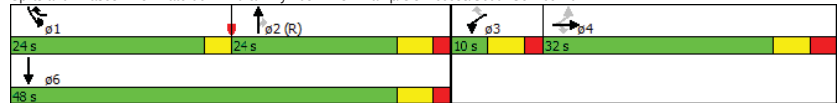
Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	237	309	302	22	124	430	345	524	756
Volume (vph)	237	309	302	22	124	430	345	524	756
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3		2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	32.0	32.0	32.0	10.0	24.0	24.0	24.0	24.0	48.0
Total Split (%)	35.6%	35.6%	35.6%	11.1%	26.7%	26.7%	26.7%	26.7%	53.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	24.5	24.5	24.5	6.0	19.7	32.2	32.2	17.3	53.5
Actuated g/C Ratio	0.27	0.27	0.27	0.07	0.22	0.36	0.36	0.19	0.59
v/c Ratio	0.49	0.61	0.70	0.09	0.36	0.32	0.47	0.80	0.34
Control Delay	30.6	33.6	38.4	40.5	23.5	16.7	4.4	37.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	33.6	38.4	40.5	23.5	16.7	4.4	37.3	5.1
LOS	C	C	D	D	C	B	A	D	A
Approach Delay		34.5				11.2			18.3
Approach LOS		C				B			B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 36 (40%), Referenced to phase 2:NBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.80
Intersection Signal Delay: 21.3
Intersection Capacity Utilization 62.6%
Analysis Period (min) 15

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Background AM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	237	309	302	22	0	124	0	430	345	524	756	0
Volume (vph)	237	309	302	22	0	124	0	430	345	524	756	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	*1.00	0.97	*1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3539		1583		3725	1583	3433	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3539		1583		3725	1583	3433	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	237	309	302	22	0	124	0	430	345	524	756	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	175	0	0	0
Lane Group Flow (vph)	237	309	302	22	0	124	0	430	170	524	756	0
Confl. Peds. (#/hr)							2					2
Turn Type	Perm	NA	Perm	Prot		pm+ov		NA	Perm	Prot	NA	
Protected Phases		4		3		1		2		1	6	
Permitted Phases	4		4			3			2			
Actuated Green, G (s)	21.5	21.5	21.5	1.6		19.9		26.6	26.6	18.3	47.9	
Effective Green, g (s)	24.5	24.5	24.5	3.6		17.9		28.6	28.6	17.3	49.9	
Actuated g/C Ratio	0.27	0.27	0.27	0.04		0.20		0.32	0.32	0.19	0.55	
Clearance Time (s)	7.0	7.0	7.0	6.0		3.0		6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	481	507	430	141		314		1183	503	659	2065	
v/s Ratio Prot		0.17		c0.01		0.08		0.12		c0.15	c0.20	
v/s Ratio Perm	0.13		c0.19			0.00		0.11				
v/c Ratio	0.49	0.61	0.70	0.16		0.39		0.36	0.34	0.80	0.37	
Uniform Delay, d1	27.5	28.6	29.5	41.7		31.3		23.7	23.5	34.7	11.2	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.67	0.27	0.82	0.43	
Incremental Delay, d2	0.8	2.1	5.1	0.5		0.8		0.8	1.8	6.2	0.5	
Delay (s)	28.3	30.7	34.6	42.3		32.2		16.6	8.2	34.6	5.3	
Level of Service	C	C	C	D		C		B	A	C	A	
Approach Delay (s)		31.4			33.7			12.8			17.3	
Approach LOS		C			C			B			B	

Intersection Summary

HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Waterdown Rd & Masonry Crt/Railway Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔	↔	↔	↔	↔	↔	↔
Volume (vph)	27	0	29	0	8	602	465	594
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	12.0	36.0
Total Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	28.0	64.0
Total Split (%)	28.9%	28.9%	28.9%	28.9%	40.0%	40.0%	31.1%	71.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	11.5	11.5	11.5	54.2	54.2	73.5	74.3	
Actuated g/C Ratio	0.13	0.13	0.13	0.60	0.60	0.82	0.83	
v/c Ratio	0.18	0.14	0.17	0.02	0.33	0.68	0.20	
Control Delay	4.1	36.4	0.5	12.6	11.3	14.2	2.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.1	36.4	0.5	12.6	11.3	14.2	2.0	
LOS	A	D	A	B	B	B	A	
Approach Delay	4.1		7.8		11.3		7.3	
Approach LOS	A		A		B		A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 19 (21%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.68

Intersection Signal Delay: 8.7

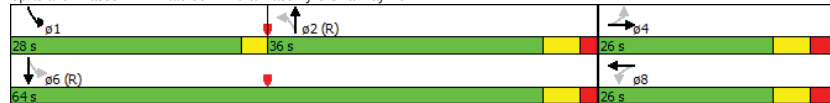
Intersection LOS: A

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd



HCM Signalized Intersection Capacity Analysis

4: Waterdown Rd & Masonry Crt/Railway Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔		↔	↔		↔	↔	
Volume (vph)	27	0	10	29	0	114	8	602	128	465	594	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	*1.00		1.00	*1.00	
Frt		0.96		1.00	0.85		1.00	0.97		1.00	0.99	
Flt Protected		0.96		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1732		1770	1583		1770	3628		1770	3706	
Flt Permitted		0.61		0.84	1.00		0.43	1.00		0.32	1.00	
Satd. Flow (perm)		1096		1567	1583		804	3628		596	3706	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	0	10	29	0	114	8	602	128	465	594	21
RTOR Reduction (vph)	0	33	0	0	101	0	0	14	0	0	2	0
Lane Group Flow (vph)	0	4	0	29	13	0	8	716	0	465	613	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.9		6.9	6.9		50.8	50.8		70.1	70.1	
Effective Green, g (s)		9.9		9.9	9.9		52.8	52.8		69.1	72.1	
Actuated g/C Ratio		0.11		0.11	0.11		0.59	0.59		0.77	0.80	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		120		172	174		471	2128		657	2968	
v/s Ratio Prot				0.01			0.20			c0.12	0.17	
v/s Ratio Perm	0.00			c0.02			0.01			c0.42		
v/c Ratio	0.03			0.17	0.07		0.02	0.34		0.71	0.21	
Uniform Delay, d1	35.8			36.3	35.9		7.8	9.6		4.7	2.1	
Progression Factor	1.00			1.00	1.00		1.00	1.00		2.84	0.83	
Incremental Delay, d2	0.1			0.5	0.2		0.1	0.4		3.2	0.1	
Delay (s)	35.9			36.8	36.1		7.8	10.0		16.5	1.9	
Level of Service	D			D	D		A	B		B	A	
Approach Delay (s)	35.9			36.2			10.0			8.2		
Approach LOS	D			D			A			A		

Intersection Summary

HCM 2000 Control Delay 11.4

HCM 2000 Level of Service B

HCM 2000 Volume to Capacity ratio 0.64

Actuated Cycle Length (s) 90.0

Sum of lost time (s) 12.0

Intersection Capacity Utilization 65.3%

ICU Level of Service C

Analysis Period (min) 15

c Critical Lane Group

Timings

5: GO Bus Driveway & South Service Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↑↑	↑↑	↑
Volume (vph)	1159	132	14
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.33	0.04	0.07
Control Delay	1.2	0.8	28.4
Queue Delay	0.0	0.0	0.0
Total Delay	1.2	0.8	28.4
LOS	A	A	C
Approach Delay	1.2	0.8	28.4
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 63 (79%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.33
Intersection Signal Delay: 1.5
Intersection Capacity Utilization 46.0%
Analysis Period (min) 15
Intersection LOS: A
ICU Level of Service A

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Volume (vph)	1159	19	0	132	14	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3715			3725	1755	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3715			3725	1755	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1159	19	0	132	14	2
RTOR Reduction (vph)	1	0	0	0	2	0
Lane Group Flow (vph)	1177	0	0	132	14	0
Confl. Peds. (#/hr)		2	2			
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3129			3138	100	
v/s Ratio Prot	c0.32			0.04	c0.01	
v/s Ratio Perm						
v/c Ratio	0.38			0.04	0.14	
Uniform Delay, d1	1.5			1.0	35.8	
Progression Factor	1.00			0.90	1.00	
Incremental Delay, d2	0.3			0.0	0.6	
Delay (s)	1.8			1.0	36.5	
Level of Service	A			A	D	
Approach Delay (s)	1.8			1.0	36.5	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay	2.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (veh/h)	1020	141	0	84	48	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1020	141	0	84	48	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.92		0.92	0.92
vC, conflicting volume			1161		1132	580
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1007		976	377
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		79	99
cM capacity (veh/h)			631		229	572
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	680	481	28	56	55	
Volume Left	0	0	0	0	48	
Volume Right	0	141	0	0	7	
cSH	1700	1700	631	1700	248	
Volume to Capacity	0.40	0.28	0.00	0.03	0.22	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	6.6	
Control Delay (s)	0.0	0.0	0.0	0.0	23.6	
Lane LOS					C	
Approach Delay (s)	0.0		0.0		23.6	
Approach LOS					C	
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			42.7%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

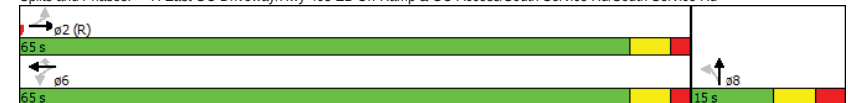
7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	668	86	71	113	22
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	65.0	65.0	65.0	65.0	15.0
Total Split (%)	81.3%	81.3%	81.3%	81.3%	18.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	68.6	68.6	68.6	68.6	11.0
Actuated g/C Ratio	0.86	0.86	0.86	0.86	0.14
v/c Ratio	0.59	0.25	0.04	0.08	0.14
Control Delay	5.2	0.7	2.2	0.7	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	5.2	0.7	2.2	0.7	32.0
LOS	A	A	A	A	C
Approach Delay		3.6	1.2		32.0
Approach LOS		A	A		C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 66 (83%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.59					
Intersection Signal Delay: 4.1					Intersection LOS: A
Intersection Capacity Utilization 60.7%					ICU Level of Service B
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South 500th St

Background AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	668	86	273	0	71	113	13	22	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	0.98			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flt	1.00	0.89			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.98				
Satd. Flow (prot)	1770	1621			1863	1583		1829				
Flt Permitted	0.71	1.00			1.00	1.00		0.98				
Satd. Flow (perm)	1324	1621			1863	1583		1829				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	668	86	273	0	71	113	13	22	0	0	0	0
RTOR Reduction (vph)	0	54	0	0	0	22	0	0	0	0	0	0
Lane Group Flow (vph)	668	305	0	0	71	91	0	35	0	0	0	0
Confl. Peds. (#/hr)	2											
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2											
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	62.2	62.2			62.2	62.2	4.8					
Effective Green, g (s)	64.2	64.2			64.2	64.2	7.8					
Actuated g/C Ratio	0.80	0.80			0.80	0.80	0.10					
Clearance Time (s)	6.0	6.0			6.0	6.0	7.0					
Vehicle Extension (s)	3.0	3.0			3.0	3.0	5.0					
Lane Grp Cap (vph)	1062	1300			1495	1270	178					
v/s Ratio Prot	0.19											
v/s Ratio Perm	0.50											
v/c Ratio	0.63	0.23			0.05	0.07	0.20					
Uniform Delay, d1	3.2	1.9			1.6	1.7	33.2					
Progression Factor	0.76	0.47			1.00	1.00	1.00					
Incremental Delay, d2	2.7	0.4			0.1	0.1	1.1					
Delay (s)	5.1	1.3			1.7	1.8	34.4					
Level of Service	A	A			A	A	C					
Approach Delay (s)	3.8											
Approach LOS	A											
Intersection Summary												
HCM 2000 Control Delay	4.3											
HCM 2000 Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	60.7%											
ICU Level of Service	B											
Analysis Period (min)	15											
c Critical Lane Group												

Timings

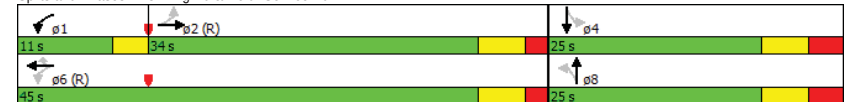
8: King Rd & North Service Rd

Background AM Peak Hour

Mixed Use Development 1200 King Rd

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	6	470	183	250	23	9	25	21	28
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2	1	6			8		4
Permitted Phases			6		6	8		4	
Detector Phase	2	2	1	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0
Total Split (s)	34.0	34.0	11.0	45.0	45.0	25.0	25.0	25.0	25.0
Total Split (%)	48.6%	48.6%	15.7%	64.3%	64.3%	35.7%	35.7%	35.7%	35.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	32.5	32.5	44.0	44.0	44.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.46	0.46	0.63	0.63	0.63	0.26	0.26	0.26	0.26
v/c Ratio	0.01	0.63	0.43	0.21	0.02	0.03	0.36	0.10	0.04
Control Delay	11.2	18.5	8.7	6.1	0.2	17.6	2.9	21.3	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.2	18.5	8.7	6.1	0.2	17.6	2.9	21.3	16.6
LOS	B	B	A	A	A	B	A	C	B
Approach Delay		18.4		6.9			3.3		18.3
Approach LOS		B		A			A		B
Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 41 (59%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green									
Natural Cycle: 60									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.63									
Intersection Signal Delay: 10.7					Intersection LOS: B				
Intersection Capacity Utilization 66.5%					ICU Level of Service C				
Analysis Period (min) 15									

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	6	470	69	183	250	23	9	25	346	21	28	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.86		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1824		1769	1863	1583	1770	3044		1770	3421	
Flt Permitted	0.60	1.00		0.24	1.00	1.00	0.73	1.00		0.46	1.00	
Satd. Flow (perm)	1125	1824		450	1863	1583	1364	3044		861	3421	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	6	470	69	183	250	23	9	25	346	21	28	8
RTOR Reduction (vph)	0	7	0	0	0	9	0	257	0	0	6	0
Lane Group Flow (vph)	6	532	0	183	250	14	9	114	0	21	30	0
Confl. Peds. (#/hr)			1	1								
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6		8			4		
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	30.5	30.5		42.0	42.0	42.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	32.5	32.5		41.0	44.0	44.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.46	0.46		0.59	0.63	0.63	0.26	0.26		0.26	0.26	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	522	846		404	1171	995	350	782		221	879	
v/s Ratio Prot		c0.29		c0.05	0.13			c0.04			0.01	
v/s Ratio Perm	0.01			0.22		0.01	0.01			0.02		
v/c Ratio	0.01	0.63		0.45	0.21	0.01	0.03	0.15		0.10	0.03	
Uniform Delay, d1	10.1	14.2		9.0	5.6	4.9	19.4	20.1		19.8	19.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.88	0.55		1.00	1.00	
Incremental Delay, d2	0.0	3.5		0.8	0.4	0.0	0.0	0.1		0.2	0.0	
Delay (s)	10.1	17.7		9.8	6.0	4.9	17.2	11.1		20.0	19.5	
Level of Service	B	B		A	A	A	B	B		B	B	
Approach Delay (s)		17.6			7.5			11.2			19.7	
Approach LOS		B			A			B			B	

Intersection Summary

HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings 9: King Rd & Plains Rd E

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	93	801	147	54	345	253	184	100	223	72	30
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	39.0	39.0	8.0	39.0	39.0	11.0	25.0	13.0	27.0	27.0
Total Split (%)	9.4%	45.9%	45.9%	9.4%	45.9%	45.9%	12.9%	29.4%	15.3%	31.8%	31.8%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	39.1	36.9	36.9	38.3	35.2	35.2	23.3	14.8	9.1	16.4	16.4
Actuated g/C Ratio	0.51	0.48	0.48	0.49	0.45	0.45	0.30	0.19	0.12	0.21	0.21
v/c Ratio	0.17	0.45	0.18	0.17	0.20	0.30	0.43	0.48	0.56	0.18	0.07
Control Delay	10.6	15.8	3.8	10.7	14.1	3.2	22.4	25.9	39.4	26.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	15.8	3.8	10.7	14.1	3.2	22.4	25.9	39.4	26.1	0.3
LOS	B	B	A	B	B	A	C	C	D	C	A
Approach Delay		13.6			9.6			24.1		32.9	
Approach LOS		B			A			C		C	

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 77.4

Natural Cycle: 85

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.56

Intersection Signal Delay: 16.7

Intersection Capacity Utilization 62.3%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service B

HCM Signalized Intersection Capacity Analysis
9: King Rd & Plains Rd E

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰	↰↱	↰	↰	↰	↰	↰↱	↰	↰
Volume (vph)	93	801	147	54	345	253	184	100	76	223	72	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	*1.00	1.00	1.00	*1.00	*1.00	1.00	1.00		0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1765	3725	1533	1768	3725	1537	1765	1717		3433	1863	1556
Flt Permitted	0.53	1.00	1.00	0.28	1.00	1.00	0.60	1.00		0.95	1.00	1.00
Satd. Flow (perm)	977	3725	1533	523	3725	1537	1108	1717		3433	1863	1556
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	93	801	147	54	345	253	184	100	76	223	72	30
RTOR Reduction (vph)	0	0	77	0	0	140	0	34	0	0	0	25
Lane Group Flow (vph)	93	801	70	54	345	113	184	142	0	223	72	5
Confl. Peds. (#/hr)	7		9	9		7	4		16	16		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	38.7	34.8	34.8	36.7	33.8	33.8	25.5	13.5		6.0	11.5	11.5
Effective Green, g (s)	36.7	36.8	36.8	34.7	35.8	35.8	23.5	16.5		9.0	14.5	14.5
Actuated g/C Ratio	0.46	0.46	0.46	0.43	0.45	0.45	0.29	0.21		0.11	0.18	0.18
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	475	1709	703	255	1662	686	414	353		385	336	281
v/s Ratio Prot	c0.01	c0.22		0.01	0.09		c0.06	c0.08		c0.06	0.04	
v/s Ratio Perm	0.08		0.05	0.09		0.07	0.07					0.00
v/c Ratio	0.20	0.47	0.10	0.21	0.21	0.16	0.44	0.40		0.58	0.21	0.02
Uniform Delay, d1	12.5	15.0	12.3	13.7	13.5	13.3	22.4	27.6		33.8	28.0	27.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9	0.3	0.4	0.3	0.5	0.8	0.8		2.1	0.3	0.0
Delay (s)	12.7	15.9	12.6	14.1	13.8	13.8	23.2	28.3		35.9	28.3	27.0
Level of Service	B	B	B	B	B	B	C	C		D	C	C
Approach Delay (s)		15.1			13.8			25.7			33.4	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		18.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.47										
Actuated Cycle Length (s)		80.2			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		62.3%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

Timings
10: King Rd & South Service Rd

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	27	59	168	366	268
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	25.0	25.0	12.0	45.0	33.0
Total Split (%)	35.7%	35.7%	17.1%	64.3%	47.1%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	8.7	8.7	57.9	59.5	47.9
Actuated g/C Ratio	0.12	0.12	0.83	0.85	0.68
v/c Ratio	0.12	0.24	0.19	0.23	0.22
Control Delay	28.0	10.9	2.6	2.5	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.0	10.9	2.6	2.5	2.9
LOS	C	B	A	A	A
Approach Delay	16.3			2.5	2.9
Approach LOS	B			A	A
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 70					
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBT, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.24					
Intersection Signal Delay: 3.9			Intersection LOS: A		
Intersection Capacity Utilization 37.7%			ICU Level of Service A		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (vph)	27	59	168	366	268	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1849	
Flt Permitted	0.95	1.00	0.53	1.00	1.00	
Satd. Flow (perm)	1770	1583	983	1863	1849	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	59	168	366	268	16
RTOR Reduction (vph)	0	54	0	0	2	0
Lane Group Flow (vph)	27	5	168	366	282	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	4.5	4.5	53.5	53.5	43.5	
Effective Green, g (s)	6.5	6.5	52.5	55.5	45.5	
Actuated g/C Ratio	0.09	0.09	0.75	0.79	0.65	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	164	146	804	1477	1201	
v/s Ratio Prot			0.02	c0.20	0.15	
v/s Ratio Perm	c0.02	0.00	0.14			
v/c Ratio	0.16	0.04	0.21	0.25	0.24	
Uniform Delay, d1	29.2	28.9	2.6	1.9	5.1	
Progression Factor	1.00	1.00	1.00	1.00	0.43	
Incremental Delay, d2	0.5	0.1	0.1	0.4	0.4	
Delay (s)	29.7	29.0	2.7	2.3	2.6	
Level of Service	C	C	A	A	A	
Approach Delay (s)	29.2			2.4	2.6	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			5.0	HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio			0.26			
Actuated Cycle Length (s)			70.0	Sum of lost time (s)		14.0
Intersection Capacity Utilization			37.7%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (veh/h)	86	0	0	184	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	86	0	0	184	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			86		270	86
vC1, stage 1 conf vol					86	
vC2, stage 2 conf vol					184	
vCu, unblocked vol			86		270	86
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1510		805	973
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	86	184	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1510	1700			
Volume to Capacity	0.05	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			13.0%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↙	↘
Volume (veh/h)	0	86	184	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	86	184	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	184				270	184
vC1, stage 1 conf vol					184	
vC2, stage 2 conf vol					86	
vCu, unblocked vol	184				270	184
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1391				805	858
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	86	184	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1391	1700	1700			
Volume to Capacity	0.00	0.11	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		19.7%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↘	↙	↘
Volume (veh/h)	86	0	0	184	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	86	0	0	184	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage (veh)	2			2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			86		270	86
vC1, stage 1 conf vol					86	
vC2, stage 2 conf vol					184	
vCu, unblocked vol			86		270	86
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1510		805	973
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	86	184	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1510	1700			
Volume to Capacity	0.05	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		19.7%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Background AM Peak Hour

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	T	R	L	L	T	TR	L	T	TR	
Maximum Queue (m)	30.6	42.8	17.4	32.8	40.7	49.0	68.1	70.1	117.9	98.1	
Average Queue (m)	11.4	16.3	7.3	14.2	21.0	15.6	29.9	28.0	58.8	69.1	
95th Queue (m)	24.0	33.1	15.9	26.9	33.1	34.6	52.9	50.4	103.8	98.1	
Link Distance (m)	341.1				135.0		135.0	130.8			
Upstream Blk Time (%)									0		
Queuing Penalty (veh)									0		
Storage Bay Dist (m)	165.0	125.0		60.0	60.0			70.0	70.0		
Storage Blk Time (%)						0				1	9
Queuing Penalty (veh)						0				12	62

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	7.0	39.4	48.9	45.8	37.2	47.1	19.1	28.8
Average Queue (m)	1.0	20.0	24.2	22.2	9.9	13.7	4.1	7.2
95th Queue (m)	5.5	35.3	41.3	38.1	27.7	35.5	12.8	20.7
Link Distance (m)	62.7	438.5			168.5	168.5	135.0	135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Background AM Peak Hour

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	T	R	L	L	T
Maximum Queue (m)	61.9	82.4	85.0	12.0	14.3	42.5	49.9	54.9	57.9	63.8	90.2	53.7
Average Queue (m)	35.4	46.4	45.1	3.2	3.2	17.8	25.6	28.7	24.9	34.3	36.4	18.6
95th Queue (m)	56.7	75.7	72.2	10.3	10.6	33.2	42.9	48.7	47.0	57.4	66.8	38.2
Link Distance (m)	326.8			195.9			195.9	115.0	115.0	168.5		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	125.0	250.0		65.0					30.0	35.0		
Storage Blk Time (%)							8		4	9	10	
Queuing Penalty (veh)							27		8	23	26	

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB
Directions Served	T
Maximum Queue (m)	39.5
Average Queue (m)	12.5
95th Queue (m)	29.9
Link Distance (m)	168.5
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	25.8	25.7	26.6	8.6	67.1	84.5	92.0	27.1	39.1
Average Queue (m)	8.5	7.3	12.9	1.2	21.6	39.0	41.6	7.9	13.2
95th Queue (m)	20.3	18.5	21.8	5.9	46.3	71.9	74.1	21.4	30.0
Link Distance (m)	132.4	154.0		115.7		115.7		209.5	209.5
Upstream Blk Time (%)						0			
Queuing Penalty (veh)						0			
Storage Bay Dist (m)	35.0		90.0				90.0		
Storage Blk Time (%)	0			0		0			
Queuing Penalty (veh)	0			0		1			

Queuing and Blocking Report
Background AM Peak Hour

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	54.4	52.8	5.5	18.5	18.0
Average Queue (m)	10.3	8.8	0.2	2.1	4.1
95th Queue (m)	37.5	33.3	2.3	10.1	12.4
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	EB	EB	NB
Directions Served	T	TR	LR
Maximum Queue (m)	17.8	4.7	25.5
Average Queue (m)	0.8	0.2	10.0
95th Queue (m)	8.6	3.3	20.0
Link Distance (m)	94.7	94.7	52.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	90.8	32.9	14.6	20.1	20.4
Average Queue (m)	41.2	9.7	2.1	4.8	7.2
95th Queue (m)	77.6	26.2	9.2	14.0	16.3
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	1				
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
Background AM Peak Hour

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	21.4	87.0	40.9	41.3	10.2	9.1	13.3	66.4	15.3	13.6	6.6
Average Queue (m)	1.2	48.1	17.7	14.1	2.0	1.7	3.6	29.6	4.5	3.3	1.0
95th Queue (m)	11.7	79.3	33.2	30.6	7.8	6.9	10.4	51.6	12.6	10.2	4.8
Link Distance (m)		1977.6		329.3			252.0	252.0		167.7	167.7
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)		10		0							
Queuing Penalty (veh)		1		0							

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	32.2	66.9	61.8	18.4	23.9	41.4	30.4	38.6	51.6	54.1	36.6	36.5
Average Queue (m)	12.0	39.4	27.5	7.7	9.3	23.3	9.2	16.7	23.2	24.5	17.2	21.7
95th Queue (m)	24.4	60.2	50.8	14.8	19.8	37.5	22.8	29.2	42.3	45.9	31.7	33.6
Link Distance (m)		250.1	250.1				193.4	193.4		131.9		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)	0	9	2		0	3	0	1	1	1		
Queuing Penalty (veh)	0	8	3		0	2	1	1	2	2		

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	32.2	15.4
Average Queue (m)	12.7	3.8
95th Queue (m)	25.2	10.6
Link Distance (m)	406.0	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		35.0
Storage Blk Time (%)	0	
Queuing Penalty (veh)	1	

Queuing and Blocking Report
Background AM Peak Hour

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (m)	17.6	24.9	27.0	41.3	29.8
Average Queue (m)	6.0	8.1	10.8	7.9	7.3
95th Queue (m)	14.6	17.9	21.3	25.4	21.3
Link Distance (m)	293.0		305.3		103.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	50.0		30.0		
Storage Blk Time (%)			0		0
Queuing Penalty (veh)			0		1

Intersection: 11: Block 1 Access B & South Service Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 12: South Service Rd & Road B

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Queuing and Blocking Report
Background AM Peak Hour

Background AM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 181

Timings

1: Waterdown Rd & North Service Rd

Background PM Peak Hour

Mixed Use Development 1200 King Rd

	←	←	←	←	↑	↓	↓
Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↩	↩	↩	↩	↩	↩	↩
Volume (vph)	202	428	230	494	975	107	556
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	30.0	30.0	30.0	19.0	39.0	11.0	31.0
Total Split (%)	37.5%	37.5%	37.5%	23.8%	48.8%	13.8%	38.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	26.0	26.0	26.0	15.0	37.5	33.5	27.0
Actuated g/C Ratio	0.32	0.32	0.32	0.19	0.47	0.42	0.34
v/c Ratio	0.35	0.71	0.34	0.75	0.68	0.42	0.56
Control Delay	18.4	26.6	2.7	42.7	11.0	14.5	22.1
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	18.4	26.6	2.7	42.7	11.0	14.5	22.1
LOS	B	C	A	D	B	B	C
Approach Delay		18.3			20.4		21.1
Approach LOS		B			C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 16 (20%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 20.0
Intersection Capacity Utilization 71.8%
Analysis Period (min) 15
Intersection LOS: C
ICU Level of Service C

Splits and Phases: 1: Waterdown Rd & North Service Rd

← 11 s	↑ 39 s (R)	← 30 s
← 19 s	↓ 31 s (R)	← 30 s

HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Background PM Peak Hour

Mixed Use Development 1200 King Rd

	←	→	↩	↩	←	↩	↩	↑	↩	↩	↓	↩
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↩	↩	↩	↩	↩		↩	↩	
Volume (vph)	0	0	0	202	428	230	494	975	202	107	556	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1583	3539	3630		1770	3609	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.18	1.00	
Satd. Flow (perm)				1770	1863	1583	3539	3630		335	3609	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	202	428	230	494	975	202	107	556	147
RTOR Reduction (vph)	0	0	0	0	0	155	0	23	0	0	32	0
Lane Group Flow (vph)	0	0	0	202	428	75	494	1154	0	107	671	0
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				23.0	23.0	23.0	13.0	34.9		31.1	25.0	
Effective Green, g (s)				26.0	26.0	26.0	15.0	36.9		29.1	27.0	
Actuated g/C Ratio				0.32	0.32	0.32	0.19	0.46		0.36	0.34	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				575	605	514	663	1674		213	1218	
v/s Ratio Prot				0.11	c0.23		c0.14	c0.32		0.03	0.19	
v/s Ratio Perm						0.05				0.15		
v/c Ratio				0.35	0.71	0.15	0.75	0.69		0.50	0.55	
Uniform Delay, d1				20.6	23.7	19.1	30.7	17.0		17.6	21.6	
Progression Factor				0.80	0.83	0.45	1.17	0.54		1.00	1.00	
Incremental Delay, d2				0.3	6.4	0.6	6.2	1.9		1.9	1.8	
Delay (s)				16.7	26.0	9.2	42.1	11.1		19.5	23.4	
Level of Service				B	C	A	D	B		B	C	
Approach Delay (s)		0.0			19.3			20.2			22.8	
Approach LOS		A			B			C			C	

Intersection Summary

HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Mixed Use Development 1200 King Rd

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 78 (98%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 11.6	Intersection LOS: B
Intersection Capacity Utilization 64.3%	ICU Level of Service C
Analysis Period (min) 15	

Speed and Phase: 2: Waterdown Rd & HWY 405 WB On Ramp

Ø2 (R) 48 s

Ø3 16 s

Ø4 16 s

Ø6 (R) 48 s

Ø7 32 s

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Mixed Use Development 1200 King Rd

Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

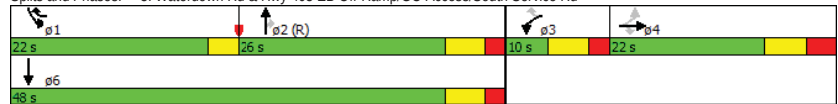
Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	244	142	241	63	384	704	302	305	666
Volume (vph)	244	142	241	63	384	704	302	305	666
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3		2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	22.0	22.0	22.0	10.0	22.0	26.0	26.0	22.0	48.0
Total Split (%)	27.5%	27.5%	27.5%	12.5%	27.5%	32.5%	32.5%	27.5%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	17.2	17.2	17.2	6.0	22.0	25.6	25.6	17.2	46.8
Actuated g/C Ratio	0.22	0.22	0.22	0.08	0.28	0.32	0.32	0.22	0.58
v/c Ratio	0.64	0.35	0.72	0.24	0.88	0.59	0.45	0.41	0.31
Control Delay	36.9	29.2	42.6	37.3	38.8	22.9	5.2	22.2	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	29.2	42.6	37.3	38.8	22.9	5.2	22.2	6.2
LOS	D	C	D	D	D	C	A	C	A
Approach Delay		37.3				17.6			11.2
Approach LOS		D				B			B

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 76 (95%), Referenced to phase 2:NBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 22.7
Intersection LOS: C
Intersection Capacity Utilization 66.8%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Background PM Peak Hour

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	244	142	241	63	0	384	0	704	302	305	666	0
Volume (vph)	244	142	241	63	0	384	0	704	302	305	666	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	*1.00	0.97	*1.00	
Flpb, ped/bikes	1.00	1.00	0.98	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1557	3539		1583		3725	1583	3433	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1557	3539		1583		3725	1583	3433	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	244	142	241	63	0	384	0	704	302	305	666	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	176	0	0	0
Lane Group Flow (vph)	244	142	241	63	0	384	0	704	126	305	666	0
Confl. Peds. (#/hr)			3	3								
Turn Type	Perm	NA	Perm	Prot		pm+ov		NA	Perm	Prot	NA	
Protected Phases		4		3		1		2		1	6	
Permitted Phases	4		4			3			2			
Actuated Green, G (s)	14.2	14.2	14.2	3.2		21.4		22.4	22.4	18.2	43.6	
Effective Green, g (s)	17.2	17.2	17.2	5.2		19.4		24.4	24.4	17.2	45.6	
Actuated g/C Ratio	0.21	0.21	0.21	0.07		0.24		0.30	0.30	0.21	0.57	
Clearance Time (s)	7.0	7.0	7.0	6.0		3.0		6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	380	400	334	230		383		1136	482	738	2123	
v/s Ratio Prot		0.08		0.02		c0.22		c0.19		0.09	0.18	
v/s Ratio Perm	0.14		c0.15			0.03			0.08			
v/c Ratio	0.64	0.35	0.72	0.27		1.00		0.62	0.26	0.41	0.31	
Uniform Delay, d1	28.6	26.7	29.2	35.6		30.3		23.8	21.0	27.1	9.0	
Progression Factor	1.00	1.00	1.00	1.00		0.73		0.86	0.58	0.76	0.64	
Incremental Delay, d2	3.7	0.5	7.5	0.6		46.6		2.3	1.2	0.4	0.4	
Delay (s)	32.3	27.2	36.7	36.3		68.6		22.8	13.4	20.9	6.1	
Level of Service	C	C	D	D		E		C	B	C	A	
Approach Delay (s)		32.8			64.1			20.0			10.7	
Approach LOS		C			E			B			B	

Intersection Summary

HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

5: GO Bus Driveway & South Service Rd

Background PM Peak Hour

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↑↑	↑↑	↑
Volume (vph)	733	434	13
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.21	0.12	0.06
Control Delay	0.7	0.5	28.5
Queue Delay	0.0	0.0	0.0
Total Delay	0.7	0.5	28.5
LOS	A	A	C
Approach Delay	0.7	0.5	28.5
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.21
 Intersection Signal Delay: 1.0 Intersection LOS: A
 Intersection Capacity Utilization 34.1% ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Background PM Peak Hour

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Volume (vph)	733	16	0	434	13	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3714			3725	1753	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3714			3725	1753	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	733	16	0	434	13	2
RTOR Reduction (vph)	1	0	0	0	2	0
Lane Group Flow (vph)	748	0	0	434	13	0
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3129			3138	100	
v/s Ratio Prot	c0.20			0.12	c0.01	
v/s Ratio Perm						
v/c Ratio	0.24			0.14	0.13	
Uniform Delay, d1	1.2			1.1	35.8	
Progression Factor	0.70			0.54	1.00	
Incremental Delay, d2	0.2			0.1	0.6	
Delay (s)	1.0			0.7	36.4	
Level of Service	A			A	D	
Approach Delay (s)	1.0			0.7	36.4	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 1.4 HCM 2000 Level of Service A
 HCM 2000 Volume to Capacity ratio 0.23
 Actuated Cycle Length (s) 80.0 Sum of lost time (s) 8.0
 Intersection Capacity Utilization 34.1% ICU Level of Service A
 Analysis Period (min) 15
 c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Background PM Peak Hour

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔	↔	↔	↔↔	↔	↔
Volume (veh/h)	601	134	0	302	132	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	601	134	0	302	132	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.97		0.97	0.97
vC, conflicting volume			735		819	368
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			673		759	295
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		60	99
cM capacity (veh/h)			889		333	682
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	401	334	101	201	140	
Volume Left	0	0	0	0	132	
Volume Right	0	134	0	0	8	
cSH	1700	1700	889	1700	343	
Volume to Capacity	0.24	0.20	0.00	0.12	0.41	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	15.4	
Control Delay (s)	0.0	0.0	0.0	0.0	22.5	
Lane LOS					C	
Approach Delay (s)	0.0		0.0		22.5	
Approach LOS					C	
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			35.4%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Background PM Peak Hour

Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	520	80	125	115	39
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	59.0	59.0	59.0	59.0	21.0
Total Split (%)	73.8%	73.8%	73.8%	73.8%	26.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	55.6	55.6	55.6	55.6	16.4
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.20
v/c Ratio	0.59	0.07	0.10	0.10	0.59
Control Delay	8.4	2.2	2.0	0.6	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	2.2	2.0	0.6	35.8
LOS	A	A	A	A	D
Approach Delay		7.5	1.3		35.8
Approach LOS		A	A		D
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 48 (60%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 50					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.59					
Intersection Signal Delay: 11.9					Intersection LOS: B
Intersection Capacity Utilization 57.8%					ICU Level of Service B
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South 500th Rd

Background PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	80	9	0	125	115	177	39	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	0.98			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.96				
Satd. Flow (prot)	1770	1830			1863	1583		1789				
Flt Permitted	0.68	1.00			1.00	1.00		0.96				
Satd. Flow (perm)	1261	1830			1863	1583		1789				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	520	80	9	0	125	115	177	39	0	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	35	0	0	0	0	0	0
Lane Group Flow (vph)	520	86	0	0	125	80	0	216	0	0	0	0
Confl. Peds. (#/hr)	2											
Turn Type	Perm	NA		Perm	NA		Perm	Perm	NA			
Protected Phases	2			6		6		8				
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	53.6	53.6		53.6		53.6		13.4				
Effective Green, g (s)	55.6	55.6		55.6		55.6		16.4				
Actuated g/C Ratio	0.70	0.70		0.70		0.70		0.20				
Clearance Time (s)	6.0	6.0		6.0		6.0		7.0				
Vehicle Extension (s)	3.0	3.0		3.0		3.0		5.0				
Lane Grp Cap (vph)	876	1271		1294		1100		366				
v/s Ratio Prot	0.05			0.07								
v/s Ratio Perm	0.41					0.05		0.12				
v/c Ratio	0.59	0.07		0.10		0.07		0.59				
Uniform Delay, d1	6.3	3.9		4.0		3.9		28.8				
Progression Factor	0.78	0.56		0.44		0.43		1.00				
Incremental Delay, d2	2.9	0.1		0.1		0.1		3.8				
Delay (s)	7.9	2.3		1.9		1.8		32.6				
Level of Service	A	A		A		A		C				
Approach Delay (s)	7.1			1.9				32.6		0.0		
Approach LOS	A			A				C		A		
Intersection Summary												
HCM 2000 Control Delay	11.1			HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)					8.0			
Intersection Capacity Utilization	57.8%			ICU Level of Service					B			
Analysis Period (min)	15											
c Critical Lane Group												

Timings

8: King Rd & North Service Rd

Background PM Peak Hour

Mixed Use Development 1200 King Rd

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	8	342	495	651	91	73	91	21	35
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2	1	6			8		4
Permitted Phases			6		6	8		4	
Detector Phase	2	2	1	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0
Total Split (s)	28.0	28.0	27.0	55.0	55.0	25.0	25.0	25.0	25.0
Total Split (%)	35.0%	35.0%	33.8%	68.8%	68.8%	31.3%	31.3%	31.3%	31.3%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	30.6	30.6	54.0	54.0	54.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.38	0.38	0.68	0.68	0.68	0.22	0.22	0.22	0.22
v/c Ratio	0.03	0.59	0.76	0.52	0.08	0.24	0.38	0.11	0.06
Control Delay	9.1	14.3	15.8	8.3	1.3	25.5	7.2	26.5	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	14.3	15.8	8.3	1.3	25.5	7.2	26.5	19.6
LOS	A	B	B	A	A	C	A	C	B
Approach Delay	14.2		10.8		10.4		21.7		
Approach LOS	B		B		B		C		
Intersection Summary									
Cycle Length: 80									
Actuated Cycle Length: 80									
Offset: 3 (4%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green									
Natural Cycle: 70									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.76									
Intersection Signal Delay: 11.7					Intersection LOS: B				
Intersection Capacity Utilization 77.1%					ICU Level of Service D				
Analysis Period (min) 15									

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	8	342	69	495	651	91	73	91	252	21	35	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.89		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1816		1770	1863	1583	1770	3149		1770	3395	
Flt Permitted	0.42	1.00		0.28	1.00	1.00	0.72	1.00		0.46	1.00	
Satd. Flow (perm)	778	1816		522	1863	1583	1349	3149		852	3395	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	342	69	495	651	91	73	91	252	21	35	13
RTOR Reduction (vph)	0	8	0	0	0	30	0	195	0	0	10	0
Lane Group Flow (vph)	8	403	0	495	651	61	73	148	0	21	38	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6		8				4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	28.6	28.6		52.0	52.0	52.0	15.0	15.0		15.0	15.0	
Effective Green, g (s)	30.6	30.6		51.0	54.0	54.0	18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.38	0.38		0.64	0.68	0.68	0.22	0.22		0.22	0.22	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	297	694		635	1257	1068	303	708		191	763	
v/s Ratio Prot		0.22		c0.19	0.35		0.05				0.01	
v/s Ratio Perm	0.01			c0.31		0.04	c0.05			0.02		
v/c Ratio	0.03	0.58		0.78	0.52	0.06	0.24	0.21		0.11	0.05	
Uniform Delay, d1	15.4	19.6		10.0	6.5	4.4	25.4	25.2		24.6	24.3	
Progression Factor	0.47	0.48		1.00	1.00	1.00	0.91	0.77		1.00	1.00	
Incremental Delay, d2	0.2	3.2		6.0	1.5	0.1	0.4	0.1		0.3	0.0	
Delay (s)	7.4	12.7		16.1	8.0	4.5	23.5	19.5		24.9	24.3	
Level of Service	A	B		B	A	A	C	B		C	C	
Approach Delay (s)		12.6			11.0			20.2			24.5	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		13.5							B			
HCM 2000 Volume to Capacity ratio		0.64										
Actuated Cycle Length (s)		80.0						12.0				
Intersection Capacity Utilization		77.1%							D			
Analysis Period (min)		15										
c Critical Lane Group												

Timings 9: King Rd & Plains Rd E

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	102	933	88	100	1277	256	346	144	386	170	82
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	15.0	25.0	15.0	25.0	25.0
Total Split (%)	9.4%	43.5%	43.5%	9.4%	43.5%	43.5%	17.6%	29.4%	17.6%	29.4%	29.4%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	36.3	33.3	33.3	36.3	33.3	33.3	27.3	16.5	11.1	16.8	16.8
Actuated g/C Ratio	0.46	0.42	0.42	0.46	0.42	0.42	0.35	0.21	0.14	0.21	0.21
v/c Ratio	0.54	0.60	0.12	0.43	0.82	0.34	0.78	0.56	0.80	0.43	0.18
Control Delay	23.7	20.7	0.3	17.8	26.9	7.2	32.6	30.6	48.7	31.1	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	20.7	0.3	17.8	26.9	7.2	32.6	30.6	48.7	31.1	0.8
LOS	C	C	A	B	C	A	C	C	D	C	A
Approach Delay		19.4			23.3			31.9		37.8	
Approach LOS		B			C			C		D	
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 79.1											
Natural Cycle: 85											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.82											
Intersection Signal Delay: 25.7								Intersection LOS: C			
Intersection Capacity Utilization 83.2%								ICU Level of Service E			
Analysis Period (min) 15											
Splits and Phases: 9: King Rd & Plains Rd E											
ϕ1	8 s	37 s		ϕ3	15 s		ϕ4	25 s			
ϕ5	8 s	37 s		ϕ7	15 s		ϕ8	25 s			

HCM Signalized Intersection Capacity Analysis 9: King Rd & Plains Rd E

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	102	933	88	100	1277	256	346	144	72	386	170	82
Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	*1.00	1.00	1.00	*1.00	*1.00	1.00	1.00	0.97	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.98	1.00	1.00	0.98	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1769	3725	1539	1769	3725	1531	1766	1737	3433	1863	1556	1556
Flt Permitted	0.13	1.00	1.00	0.19	1.00	1.00	0.53	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	247	3725	1539	355	3725	1531	989	1737	3433	1863	1556	1556
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	102	933	88	100	1277	256	346	144	72	386	170	82
RTOR Reduction (vph)	0	0	51	0	0	105	0	22	0	0	0	65
Lane Group Flow (vph)	102	933	37	100	1277	151	346	194	0	386	170	17
Confl. Peds. (#/hr)	10	6	6	10	4	33	33	4	33	33	4	4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm	Perm
Protected Phases	5	2	1	6	7	4	3	8	8	8	8	8
Permitted Phases	2	2	6	6	4	4	4	4	4	4	4	4
Actuated Green, G (s)	35.1	31.2	31.2	35.1	31.2	31.2	25.3	13.5	8.1	13.8	13.8	13.8
Effective Green, g (s)	33.1	33.2	33.2	33.1	33.2	33.2	23.3	16.5	11.1	16.8	16.8	16.8
Actuated g/C Ratio	0.42	0.42	0.42	0.42	0.42	0.42	0.29	0.21	0.14	0.21	0.21	0.21
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	1551	641	198	1551	637	394	359	478	392	327	327
v/s Ratio Prot	c0.02	0.25	0.02	c0.34	0.12	0.11	0.11	0.09	0.11	0.09	0.01	0.01
v/s Ratio Perm	0.24	0.02	0.19	0.10	c0.14	0.88	0.54	0.81	0.43	0.05	0.05	0.05
v/c Ratio	0.65	0.60	0.06	0.51	0.82	0.24	0.88	0.54	0.81	0.43	0.05	0.05
Uniform Delay, d1	17.8	18.1	13.9	15.6	20.6	15.1	25.5	28.2	33.3	27.3	25.1	25.1
Progression 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
Incremental Delay, d2	8.9	1.7	0.2	2.0	5.1	0.9	19.3	1.6	9.7	0.8	0.1	0.1
Delay (s)	26.7	19.8	14.1	17.6	25.7	15.9	44.8	29.8	42.9	28.1	25.2	25.2
Level of Service	C	B	B	B	C	B	D	C	D	C	C	C
Approach Delay (s)	20.0	23.7	39.0	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7	36.7
Approach LOS	C	C	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C									
HCM 2000 Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	16.0									
Intersection Capacity Utilization	83.2%	ICU Level of Service	E									
Analysis Period (min)	15											
c Critical Lane Group												

Timings 10: King Rd & South Service Rd

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	19	61	184	395	558
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	24.0	24.0	14.0	56.0	42.0
Total Split (%)	30.0%	30.0%	17.5%	70.0%	52.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	8.6	8.6	65.7	66.5	55.3
Actuated g/C Ratio	0.11	0.11	0.82	0.83	0.69
v/c Ratio	0.10	0.27	0.31	0.26	0.48
Control Delay	19.1	9.1	3.4	2.6	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.1	9.1	3.4	2.6	3.6
LOS	B	A	A	A	A
Approach Delay	11.5			2.8	3.6
Approach LOS	B			A	A
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 17 (21%), Referenced to phase 2:NBT and 6:SBT, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.48					
Intersection Signal Delay: 3.8			Intersection LOS: A		
Intersection Capacity Utilization 56.3%			ICU Level of Service B		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (vph)	19	61	184	395	558	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1840	
Flt Permitted	0.95	1.00	0.33	1.00	1.00	
Satd. Flow (perm)	1770	1583	609	1863	1840	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	19	61	184	395	558	56
RTOR Reduction (vph)	0	55	0	0	3	0
Lane Group Flow (vph)	19	6	184	395	611	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	5.5	5.5	62.5	62.5	52.1	
Effective Green, g (s)	7.5	7.5	61.5	64.5	54.1	
Actuated g/C Ratio	0.09	0.09	0.77	0.81	0.68	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	165	148	561	1502	1244	
v/s Ratio Prot			c0.03	0.21	c0.33	
v/s Ratio Perm	c0.01	0.00	0.23			
v/c Ratio	0.12	0.04	0.33	0.26	0.49	
Uniform Delay, d1	33.2	33.0	3.8	1.9	6.3	
Progression Factor	0.57	0.64	1.00	1.00	0.36	
Incremental Delay, d2	0.3	0.1	0.3	0.4	1.1	
Delay (s)	19.3	21.3	4.2	2.3	3.4	
Level of Service	B	C	A	A	A	
Approach Delay (s)	20.8			2.9	3.4	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			4.3		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.45			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			56.3%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (veh/h)	80	0	0	240	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	80	0	0	240	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			80		320	80
vC1, stage 1 conf vol					80	
vC2, stage 2 conf vol					240	
vCu, unblocked vol			80		320	80
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1518		765	980
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	80	240	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1518	1700			
Volume to Capacity	0.05	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			16.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Volume (veh/h)	0	80	240	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	80	240	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	240				320	240
vC1, stage 1 conf vol					240	
vC2, stage 2 conf vol					80	
vCu, unblocked vol	240				320	240
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1327				765	799
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	80	240	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1327	1700	1700			
Volume to Capacity	0.00	0.14	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		22.6%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↗	↖	↗
Volume (veh/h)	80	0	0	240	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	80	0	0	240	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT		TWLT		
Median storage (veh)		2		2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			80		320	80
vC1, stage 1 conf vol					80	
vC2, stage 2 conf vol					240	
vCu, unblocked vol			80		320	80
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1518		765	980
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	80	240	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1518	1700			
Volume to Capacity	0.05	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		22.6%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Background PM Peak Hour

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	T	TR	L	T	TR
Maximum Queue (m)	112.1	160.0	95.4	59.3	65.3	70.1	79.5	48.3	96.8	92.2
Average Queue (m)	36.7	75.7	29.2	37.1	42.4	36.1	44.5	15.6	39.1	57.7
95th Queue (m)	79.7	131.1	64.8	58.1	61.6	59.3	67.1	32.7	73.2	86.1
Link Distance (m)	341.1						135.0	135.0	130.8	
Upstream Blk Time (%)									0	
Queuing Penalty (veh)									0	
Storage Bay Dist (m)	165.0	125.0		60.0	60.0	70.0			70.0	
Storage Blk Time (%)	3		0		1	0	1			4
Queuing Penalty (veh)	15		1		7	1	3			15

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	8.7	33.6	47.3	75.7	39.6	39.4	55.9	69.2
Average Queue (m)	1.4	15.0	22.6	39.8	21.4	21.6	21.1	36.5
95th Queue (m)	6.6	28.6	38.6	64.2	37.7	37.4	46.0	62.3
Link Distance (m)	62.7	438.5			168.5	168.5	135.0	135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Background PM Peak Hour

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB						
Directions Served	L	T	R	L	L	R	T	T	R	L	L	T						
Maximum Queue (m)	66.6	49.3	70.2	15.6	20.3	105.7	70.9	71.2	59.8	40.0	40.0	50.6						
Average Queue (m)	37.4	23.3	38.7	6.3	9.2	48.7	45.1	42.6	24.5	19.7	18.5	17.9						
95th Queue (m)	60.6	41.0	63.0	14.9	17.7	85.1	65.9	64.1	51.4	34.2	34.1	38.6						
Link Distance (m)	326.8							195.9	195.9			115.0	115.0	168.5	168.5			
Upstream Blk Time (%)																		
Queuing Penalty (veh)																		
Storage Bay Dist (m)	125.0		250.0		65.0						30.0		35.0					
Storage Blk Time (%)											20		1		1		0	
Queuing Penalty (veh)											60		4		1		1	

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB
Directions Served	T
Maximum Queue (m)	53.1
Average Queue (m)	17.3
95th Queue (m)	41.2
Link Distance (m)	168.5
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	19.9	42.4	80.7	1.7	47.2	43.7	42.4	47.9	53.5
Average Queue (m)	6.1	16.6	39.4	0.1	20.4	16.8	17.0	16.6	22.7
95th Queue (m)	15.9	35.0	66.1	1.2	38.2	32.9	32.2	34.7	41.8
Link Distance (m)	132.4	154.0		115.7		115.7	209.5		209.5
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	35.0		90.0				90.0		
Storage Blk Time (%)	1		13						
Queuing Penalty (veh)	6		10						

Queuing and Blocking Report
Background PM Peak Hour

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	20.6	12.6	9.8	16.8	15.3
Average Queue (m)	2.6	1.1	0.4	2.1	2.7
95th Queue (m)	11.9	6.3	4.0	9.7	9.8
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	NB
Directions Served	LR
Maximum Queue (m)	33.7
Average Queue (m)	14.8
95th Queue (m)	24.8
Link Distance (m)	52.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	82.7	23.4	25.9	26.2	68.8
Average Queue (m)	42.9	5.8	8.4	9.6	36.4
95th Queue (m)	72.6	17.1	20.3	20.8	61.0
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)					1
Queuing Penalty (veh)					0
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
Background PM Peak Hour

Background PM Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	21.5	97.8	98.7	104.0	46.0	30.4	24.0	53.1	16.2	19.8	11.8
Average Queue (m)	2.2	52.5	48.8	40.6	7.7	12.3	10.0	25.1	5.1	5.1	2.3
95th Queue (m)	13.4	87.3	82.1	75.5	27.4	25.0	20.3	45.6	12.8	14.0	8.1
Link Distance (m)		1977.6		329.3				252.0	252.0	167.7	167.7
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)		16	2	5						0	
Queuing Penalty (veh)		1	13	29						0	

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	60.8	93.2	80.4	18.8	59.9	204.3	202.7	60.0	74.9	132.7	115.0	130.0
Average Queue (m)	21.8	56.2	44.7	6.1	36.0	160.8	154.2	51.5	57.8	64.0	104.8	117.3
95th Queue (m)	50.2	83.7	70.0	14.6	73.2	235.8	236.5	79.4	84.7	131.2	138.1	156.9
Link Distance (m)		250.1	250.1			193.4	193.4			131.9		
Upstream Blk Time (%)						22	24			5		
Queuing Penalty (veh)						0	0			0		
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)	1	23	10		2	54	51	3	39	5	45	69
Queuing Penalty (veh)	4	23	9		14	54	129	19	84	18	114	175

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB	B21
Directions Served	T	R	T
Maximum Queue (m)	429.0	52.9	146.8
Average Queue (m)	243.8	12.4	31.7
95th Queue (m)	492.8	35.0	158.6
Link Distance (m)	406.0		305.3
Upstream Blk Time (%)	18		1
Queuing Penalty (veh)	114		6
Storage Bay Dist (m)		35.0	
Storage Blk Time (%)	6	0	
Queuing Penalty (veh)	29	1	

Intersection: 10: King Rd & South Service Rd						
Movement	EB	EB	NB	NB	SB	B30
Directions Served	L	R	L	T	TR	T
Maximum Queue (m)	21.8	21.1	31.6	33.1	68.6	10.3
Average Queue (m)	4.9	8.4	15.1	7.1	15.2	0.3
95th Queue (m)	14.7	17.3	26.1	23.7	47.7	7.3
Link Distance (m)	293.0		305.3		103.9	252.0
Upstream Blk Time (%)					1	
Queuing Penalty (veh)					4	
Storage Bay Dist (m)	50.0		30.0			
Storage Blk Time (%)			0		0	
Queuing Penalty (veh)			1		0	

Intersection: 11: Block 1 Access B & South Service Rd						
Movement						
Directions Served						
Maximum Queue (m)						
Average Queue (m)						
95th Queue (m)						
Link Distance (m)						
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 12: South Service Rd & Road B						
Movement						
Directions Served						
Maximum Queue (m)						
Average Queue (m)						
95th Queue (m)						
Link Distance (m)						
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 13: Block 1 Access A & South Service Rd						
Movement						
Directions Served						
Maximum Queue (m)						
Average Queue (m)						
95th Queue (m)						
Link Distance (m)						
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Network Summary						
Network wide Queuing Penalty: 967						

Timings

1: Waterdown Rd & North Service Rd

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

							
Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations					 		 
Volume (vph)	39	81	43	94	184	21	107
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	27.0	27.0	27.0	13.0	32.0	11.0	30.0
Total Split (%)	38.6%	38.6%	38.6%	18.6%	45.7%	15.7%	42.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	23.0	23.0	23.0	9.0	37.0	32.0	26.0
Actuated g/C Ratio	0.33	0.33	0.33	0.13	0.53	0.46	0.37
v/c Ratio	0.07	0.13	0.07	0.21	0.11	0.04	0.10
Control Delay	16.6	17.3	0.9	23.6	4.6	7.5	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	17.3	0.9	23.6	4.6	7.5	11.6
LOS	B	B	A	C	A	A	B
Approach Delay		12.8			10.3		11.0
Approach LOS		B			B		B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 16 (23%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.21

Intersection Signal Delay: 11.1

Intersection LOS: B

Intersection Capacity Utilization 29.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd

↰	↱	↰	↱
11 s	32 s	27 s	27 s
↰	↱	↰	↱
13 s	30 s	27 s	27 s

HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

	↰	→	↰	↰	←	↰	↰	↑	↰	↰	↓	↰
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↱	↰	↰	↱		↰	↱	
Volume (vph)	0	0	0	39	81	43	94	184	38	21	107	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1583	3539	3630		1770	3610	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.62	1.00	
Satd. Flow (perm)				1770	1863	1583	3539	3630		1154	3610	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	39	81	43	94	184	38	21	107	28
RTOR Reduction (vph)	0	0	0	0	0	29	0	19	0	0	18	0
Lane Group Flow (vph)	0	0	0	39	81	14	94	203	0	21	117	0
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				20.0	20.0	20.0	7.0	32.6		25.4	24.0	
Effective Green, g (s)				23.0	23.0	23.0	9.0	34.6		23.4	26.0	
Actuated g/C Ratio				0.33	0.33	0.33	0.13	0.49		0.33	0.37	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				581	612	520	455	1794		389	1340	
v/s Ratio Prot				0.02	c0.04		c0.03	c0.06		0.00	0.03	
v/s Ratio Perm						0.01				0.02		
v/c Ratio				0.07	0.13	0.03	0.21	0.11		0.05	0.09	
Uniform Delay, d1				16.1	16.5	15.9	27.3	9.5		15.7	14.3	
Progression Factor				1.00	1.00	1.00	0.82	0.58		1.00	1.00	
Incremental Delay, d2				0.0	0.4	0.1	1.0	0.1		0.1	0.1	
Delay (s)				16.2	16.9	16.0	23.4	5.7		15.8	14.4	
Level of Service				B	B	B	C	A		B	B	
Approach Delay (s)		0.0			16.5			10.9			14.6	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay		13.3								B		
HCM 2000 Volume to Capacity ratio		0.14										
Actuated Cycle Length (s)		70.0						12.0				
Intersection Capacity Utilization		29.2%								A		
Analysis Period (min)		15										
c Critical Lane Group												

Timings

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations	1	0	42	0	251	144
Volume (vph)	1	0	42	0	251	144
Turn Type	Perm	NA	custom	NA	NA	NA
Protected Phases	4	4	3	7	2	6
Permitted Phases	4	4	3	7	2	6
Detector Phase	4	4	3	7	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0
Total Split (s)	14.0	14.0	18.0	32.0	38.0	38.0
Total Split (%)	20.0%	20.0%	25.7%	45.7%	54.3%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effct Green (s)	8.6	9.3	11.9	56.7	56.7	56.7
Actuated g/C Ratio	0.12	0.13	0.17	0.81	0.81	0.81
v/c Ratio	0.00	0.09	0.09	0.08	0.05	0.05
Control Delay	27.0	26.7	0.2	3.0	2.9	2.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	26.7	0.2	3.0	2.9	2.9
LOS	C	C	A	A	A	A
Approach Delay	27.0			10.7	3.0	2.9
Approach LOS	C			B	A	A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 66 (94%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.09

Intersection Signal Delay: 4.6

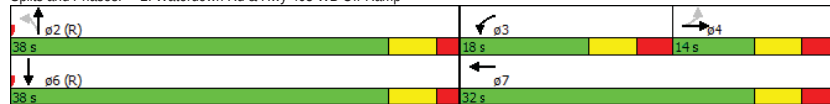
Intersection LOS: A

Intersection Capacity Utilization 17.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	0	0	42	0	64	0	251	0	0	144	2
Volume (vph)	1	0	0	42	0	64	0	251	0	0	144	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770	1770
Flt Permitted	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (perm)	1774	1774	1774	1774	1774	1774	1774	1774	1774	1774	1774	1774
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	0	42	0	64	0	251	0	0	144	2
RTOR Reduction (vph)	0	0	0	0	50	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	1	0	42	14	0	0	251	0	0	145	0
Turn Type	Perm	NA	custom	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	4	4	3	7	2	6	2	6	2	6	2	6
Permitted Phases	4	4	3	7	2	6	2	6	2	6	2	6
Actuated Green, G (s)	1.2	4.1	12.3	44.7	44.7	44.7	44.7	44.7	44.7	44.7	44.7	44.7
Effective Green, g (s)	4.2	7.1	15.3	46.7	46.7	46.7	46.7	46.7	46.7	46.7	46.7	46.7
Actuated g/C Ratio	0.06	0.10	0.22	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	106	358	345	2485	2485	2485	2485	2485	2485	2485	2485	2485
v/s Ratio Prot			c0.01	c0.01			c0.07					0.04
v/s Ratio Perm	0.00											
v/c Ratio	0.01	0.12	0.04	0.10	0.06	0.06	0.10	0.06	0.06	0.06	0.06	0.06
Uniform Delay, d1	30.9	28.6	21.6	4.2	4.0	4.0	4.2	4.0	4.0	4.0	4.0	4.0
Progression Factor	1.00	1.00	1.00	0.82	0.77	0.77	0.82	0.77	0.77	0.77	0.77	0.77
Incremental Delay, d2	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Delay (s)	31.0	28.7	21.6	3.5	3.2	3.2	3.5	3.2	3.2	3.2	3.2	3.2
Level of Service	C	C	C	A	A	A	A	A	A	A	A	A
Approach Delay (s)	31.0		24.4	3.5	3.2	3.2	3.5	3.2	3.2	3.2	3.2	3.2
Approach LOS	C		C	A	A	A	A	A	A	A	A	A

Intersection Summary

HCM 2000 Control Delay 7.9

HCM 2000 Level of Service A

HCM 2000 Volume to Capacity ratio 0.10

Actuated Cycle Length (s) 70.0

Sum of lost time (s) 12.0

Intersection Capacity Utilization 17.6%

ICU Level of Service A

Analysis Period (min) 15

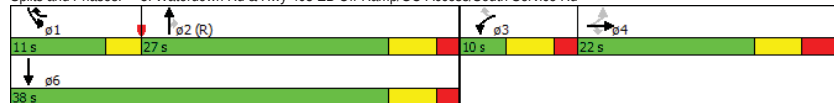
c Critical Lane Group

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Background Arena Peak Hour

Intersection Summary	
Cycle Length: 70	
Actuated Cycle Length: 70	
Offset: 0 (0%), Referenced to phase 2:NBT, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.40	
Intersection Signal Delay: 14.9	Intersection LOS: B
Intersection Capacity Utilization 27.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

Background Arena Peak Hour

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	46	28	45	13	0	73	0	132	56	58	128	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0		
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	*1.00	0.97	*1.00		
Frpb, ped/bikes	1.00	1.00	0.98	1.00		1.00		1.00	1.00	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00		
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00		
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1770	1863	1558	3539		1583		3725	1583	3433	3725		
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1770	1863	1558	3539		1583		3725	1583	3433	3725		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	46	28	45	13	0	73	0	132	56	58	128	0	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	28	0	0	0	
Lane Group Flow (vph)	46	28	45	13	0	73	0	132	28	58	128	0	
Confl. Peds. (#/hr)			3	3									
Turn Type	Perm	NA	Perm	Prot	pm+ov			NA	Perm	Prot	NA		
Protected Phases		4		3	1			2		1	6		
Permitted Phases	4		4		3				2				
Actuated Green, G (s)	6.9	6.9	6.9	0.8	7.6			33.5	33.5	6.8	43.3		
Effective Green, g (s)	9.9	9.9	9.9	2.8	5.8			35.5	35.5	5.8	45.3		
Actuated g/C Ratio	0.14	0.14	0.14	0.04	0.08			0.51	0.51	0.08	0.65		
Clearance Time (s)	7.0	7.0	7.0	6.0	3.0			6.0	6.0	3.0	6.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	250	263	220	141	131			1889	802	284	2410		
v/s Ratio Prot		0.02		c0.00	c0.05			c0.04		0.02	0.03		
v/s Ratio Perm	0.03		c0.03						0.02				
v/c Ratio	0.18	0.11	0.20	0.09	0.56			0.07	0.04	0.20	0.05		
Uniform Delay, d1	26.5	26.2	26.6	32.4	30.9			8.8	8.7	29.9	4.5		
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00	1.00	0.84	0.58		
Incremental Delay, d2	0.4	0.2	0.5	0.3	5.1			0.1	0.1	0.4	0.0		
Delay (s)	26.8	26.4	27.0	32.7	35.9			8.9	8.7	25.4	2.7		
Level of Service	C	C	C	C	D			A	A	C	A		
Approach Delay (s)		26.8			35.4				8.8		9.7		
Approach LOS		C			D				A		A		

Intersection Summary

HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.15		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	27.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Waterdown Rd & Masonry Crt/Railway Rd

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	5	0	16	0	77	40	143
Volume (vph)	5	0	16	0	77	40	143
Turn Type	Perm	NA	Perm	NA	NA	pm+pt	NA
Protected Phases	4	4	8	8	2	1	6
Permitted Phases	4	4	8	8	2	1	6
Detector Phase	4	4	8	8	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	12.0	36.0
Total Split (s)	29.0	29.0	29.0	29.0	37.0	14.0	51.0
Total Split (%)	36.3%	36.3%	36.3%	36.3%	46.3%	17.5%	63.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)	12.9	12.9	12.9	11.7	11.1	13.1	
Actuated g/C Ratio	0.50	0.50	0.50	0.46	0.43	0.51	
v/c Ratio	0.01	0.02	0.08	0.05	0.06	0.08	
Control Delay	0.0	8.7	0.1	8.0	5.6	5.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	0.0	8.7	0.1	8.0	5.6	5.1	
LOS	A	A	A	A	A	A	
Approach Delay	0.0		1.3	8.0		5.2	
Approach LOS	A		A	A		A	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 25.7

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.08

Intersection Signal Delay: 4.6

Intersection LOS: A

Intersection Capacity Utilization 22.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd



HCM Signalized Intersection Capacity Analysis

4: Waterdown Rd & Masonry Crt/Railway Rd

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	0	2	16	0	100	0	77	6	40	143	3
Volume (vph)	5	0	2	16	0	100	0	77	6	40	143	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	0.96	1.00	0.85	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1729	1770	1583	3685	1770	3714	3685	1770	3714	1770	3714	3685
Flt Permitted	0.73	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1299	1403	1583	3685	1080	3714	3685	1080	3714	3685	1080	3714
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	0	2	16	0	100	0	77	6	40	143	3
RTOR Reduction (vph)	0	5	0	0	72	0	0	5	0	0	2	0
Lane Group Flow (vph)	0	2	0	16	28	0	0	78	0	40	144	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA	NA
Protected Phases	4	4	8	8	2	2	2	2	1	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	1	6	6	6
Actuated Green, G (s)	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9	3.9
Effective Green, g (s)	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	361	390	440	876	300	1482	876	300	1482	876	300	1482
v/s Ratio Prot	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
v/s Ratio Perm	0.01	0.04	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
v/c Ratio	0.01	0.04	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Uniform Delay, d1	6.5	6.5	6.6	7.4	6.7	4.7	7.4	6.7	4.7	7.4	6.7	4.7
Progression 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
Incremental Delay, d2	0.0	0.0	0.1	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.2	0.0
Delay (s)	6.5	6.6	6.6	7.4	6.9	4.7	7.4	6.9	4.7	7.4	6.9	4.7
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	6.5	6.6	6.6	7.4	6.9	4.7	7.4	6.9	4.7	7.4	6.9	4.7
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A

Intersection Summary

HCM 2000 Control Delay 6.1

HCM 2000 Level of Service A

HCM 2000 Volume to Capacity ratio 0.11

Actuated Cycle Length (s) 24.8

Sum of lost time (s) 12.0

Intersection Capacity Utilization 22.2%

ICU Level of Service A

Analysis Period (min) 15

c Critical Lane Group

Timings

5: GO Bus Driveway & South Service Rd

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↑↑	↑↑	↔
Volume (vph)	139	83	3
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.04	0.02	0.01
Control Delay	0.8	1.2	30.0
Queue Delay	0.0	0.0	0.0
Total Delay	0.8	1.2	30.0
LOS	A	A	C
Approach Delay	0.8	1.2	30.0
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 45 (56%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.04
Intersection Signal Delay: 1.3
Intersection LOS: A
Intersection Capacity Utilization 20.0%
ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	
Volume (vph)	139	3	0	83	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3714			3725	1770	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3714			3725	1770	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	139	3	0	83	3	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	142	0	0	83	3	0
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3129			3138	101	
v/s Ratio Prot	c0.04			0.02	c0.00	
v/s Ratio Perm						
v/c Ratio	0.05			0.03	0.03	
Uniform Delay, d1	1.0			1.0	35.6	
Progression Factor	1.00			1.28	1.00	
Incremental Delay, d2	0.0			0.0	0.1	
Delay (s)	1.1			1.3	35.7	
Level of Service	A			A	D	
Approach Delay (s)	1.1			1.3	35.7	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay	1.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.04		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	20.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔	↔	↔	↔↔	↔	↔
Volume (veh/h)	113	26	0	58	25	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	113	26	0	58	25	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked						
vC, conflicting volume			139		155	70
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			139		155	70
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	100
cM capacity (veh/h)			1442		821	979
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	75	64	19	39	27	
Volume Left	0	0	0	0	25	
Volume Right	0	26	0	0	2	
cSH	1700	1700	1442	1700	831	
Volume to Capacity	0.04	0.04	0.00	0.02	0.03	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	0.8	
Control Delay (s)	0.0	0.0	0.0	0.0	9.5	
Lane LOS					A	
Approach Delay (s)	0.0		0.0		9.5	
Approach LOS					A	
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			14.0%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

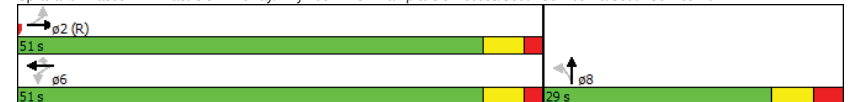
7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Background Arena Peak Hour

Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	97	16	24	22	7
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	51.0	51.0	51.0	51.0	29.0
Total Split (%)	63.8%	63.8%	63.8%	63.8%	36.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	67.2	67.2	67.2	67.2	12.4
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.16
v/c Ratio	0.08	0.01	0.02	0.02	0.15
Control Delay	2.9	2.8	2.9	0.2	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.9	2.8	2.9	0.2	29.9
LOS	A	A	A	A	C
Approach Delay		2.9	1.6		29.9
Approach LOS		A	A		C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 40 (50%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 45					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.15					
Intersection Signal Delay: 8.1					Intersection LOS: A
Intersection Capacity Utilization 32.5%					ICU Level of Service A
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Background Arena Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱		↰	↱			
Volume (vph)	97	16	2	0	24	22	34	7	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	0.98			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.96				
Satd. Flow (prot)	1770	1827			1863	1583		1789				
Flt Permitted	0.74	1.00			1.00	1.00		0.96				
Satd. Flow (perm)	1381	1827			1863	1583		1789				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	97	16	2	0	24	22	34	7	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	5	0	0	0	0	0	0
Lane Group Flow (vph)	97	18	0	0	24	17	0	41	0	0	0	0
Confl. Peds. (#/hr)	2											
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2			6		6		8				
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	60.8	60.8			60.8	60.8		6.2				
Effective Green, g (s)	62.8	62.8			62.8	62.8		9.2				
Actuated g/C Ratio	0.78	0.78			0.78	0.78		0.11				
Clearance Time (s)	6.0	6.0			6.0	6.0		7.0				
Vehicle Extension (s)	3.0	3.0			3.0	3.0		5.0				
Lane Grp Cap (vph)	1084	1434			1462	1242		205				
v/s Ratio Prot	0.01			0.01		0.01		0.02				
v/s Ratio Perm	0.07			0.01		0.01		0.20				
v/c Ratio	0.09	0.01			0.02	0.01		0.20				
Uniform Delay, d1	2.0	1.9			1.9	1.9		32.1				
Progression Factor	1.02	1.01			1.00	1.00		1.00				
Incremental Delay, d2	0.2	0.0			0.0	0.0		1.0				
Delay (s)	2.2	1.9			1.9	1.9		33.1				
Level of Service	A	A			A	A		C				
Approach Delay (s)	2.1			1.9		33.1		0.0				
Approach LOS	A			A		C		A				

Intersection Summary

HCM 2000 Control Delay	8.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.10		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings

8: King Rd & North Service Rd

Background Arena Peak Hour

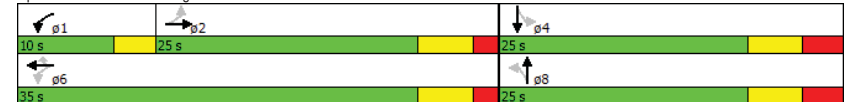
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	2	65	94	124	17	14	17	4	7
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases	2		1	6	8		4		
Permitted Phases	2		6	6	8	8	4	4	
Detector Phase	2	2	1	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0
Total Split (s)	25.0	25.0	10.0	35.0	35.0	25.0	25.0	25.0	25.0
Total Split (%)	41.7%	41.7%	16.7%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	Max	Max	None	Max	Max	None	None	None	None
Act Effct Green (s)	33.7	33.7	37.6	39.4	39.4	14.0	14.0	18.1	18.1
Actuated g/C Ratio	0.62	0.62	0.69	0.73	0.73	0.26	0.26	0.33	0.33
v/c Ratio	0.00	0.07	0.11	0.09	0.01	0.04	0.08	0.01	0.01
Control Delay	11.5	9.9	6.1	5.9	0.0	13.9	6.9	13.5	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	9.9	6.1	5.9	0.0	13.9	6.9	13.5	12.3
LOS	B	A	A	A	A	B	A	B	B
Approach Delay	9.9		5.5		8.1		12.7		
Approach LOS	A		A		A		B		
Intersection Summary									
Cycle Length: 60									
Actuated Cycle Length: 54.2									
Natural Cycle: 60									
Control Type: Semi Act-Uncoordinated									
Maximum v/c Ratio: 0.11									
Intersection Signal Delay: 7.1					Intersection LOS: A				
Intersection Capacity Utilization 31.0%					ICU Level of Service A				
Analysis Period (min) 15									

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 54.2
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.11
Intersection Signal Delay: 7.1
Intersection Capacity Utilization 31.0%
Analysis Period (min) 15

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱		↰	↱	↱
Volume (vph)	2	65	13	94	124	17	14	17	48	4	7	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	0.95	1.00		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.89		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1816		1770	1863	1583	1770	3147		1770	3421	
Flt Permitted	0.68	1.00		0.62	1.00	1.00	0.75	1.00		0.71	1.00	
Satd. Flow (perm)	1262	1816		1156	1863	1583	1400	3147		1327	3421	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	65	13	94	124	17	14	17	48	4	7	2
RTOR Reduction (vph)	0	6	0	0	0	6	0	38	0	0	2	0
Lane Group Flow (vph)	2	72	0	94	124	11	14	27	0	4	7	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	29.9	29.9		36.9	36.9	36.9	8.6	8.6		8.6	8.6	
Effective Green, g (s)	31.9	31.9		35.9	38.9	38.9	11.6	11.6		11.6	11.6	
Actuated g/C Ratio	0.55	0.55		0.61	0.66	0.66	0.20	0.20		0.20	0.20	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	688	990		740	1238	1052	277	624		263	678	
v/s Ratio Prot		0.04		c0.01	0.07			0.01			0.00	
v/s Ratio Perm	0.00			c0.07		0.01	c0.01			0.00		
v/c Ratio	0.00	0.07		0.13	0.10	0.01	0.05	0.04		0.02	0.01	
Uniform Delay, d1	6.1	6.3		4.8	3.5	3.3	19.0	19.0		18.9	18.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.1		0.1	0.2	0.0	0.1	0.0		0.0	0.0	
Delay (s)	6.1	6.4		4.8	3.7	3.3	19.1	19.0		18.9	18.8	
Level of Service	A	A		A	A	A	B	B		B	B	
Approach Delay (s)		6.4			4.1			19.0			18.9	
Approach LOS		A			A			B			B	
Intersection Summary												
HCM 2000 Control Delay		7.9							A			
HCM 2000 Volume to Capacity ratio		0.11										
Actuated Cycle Length (s)		58.5						12.0				
Intersection Capacity Utilization		31.0%							A			
Analysis Period (min)		15										
c Critical Lane Group												

Timings 9: King Rd & Plains Rd E

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱	↰	↱	↱
Volume (vph)	19	177	17	19	243	49	66	27	74	32	16
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	39.0	39.0	8.0	39.0	39.0	10.0	25.0	13.0	28.0	28.0
Total Split (%)	9.4%	45.9%	45.9%	9.4%	45.9%	45.9%	11.8%	29.4%	15.3%	32.9%	32.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	41.5	42.9	42.9	41.5	42.9	42.9	9.7	11.6	11.6	12.6	12.6
Actuated g/C Ratio	0.68	0.71	0.71	0.68	0.71	0.71	0.16	0.19	0.19	0.21	0.21
v/c Ratio	0.02	0.07	0.02	0.02	0.09	0.04	0.23	0.12	0.11	0.08	0.04
Control Delay	7.5	7.8	0.0	7.5	7.6	0.1	21.1	20.4	24.9	23.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.5	7.8	0.0	7.5	7.6	0.1	21.1	20.4	24.9	23.8	0.2
LOS	A	A	A	A	A	A	C	C	C	C	A
Approach Delay		7.1			6.4			20.8		21.3	
Approach LOS		A			A			C		C	
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 60.7											
Natural Cycle: 85											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.23											
Intersection Signal Delay: 11.1											
Intersection Capacity Utilization 50.6%											
Analysis Period (min) 15											
Splits and Phases: 9: King Rd & Plains Rd E											

HCM Signalized Intersection Capacity Analysis 9: King Rd & Plains Rd E

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰	↰↱	↰	↰	↰	↰	↰↱	↰	↰
Volume (vph)	19	177	17	19	243	49	66	27	14	74	32	16
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	*1.00	1.00	1.00	*1.00	*1.00	1.00	1.00		0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1755	3725	1541	1760	3725	1533	1762	1737		3433	1863	1557
Flt Permitted	0.61	1.00	1.00	0.65	1.00	1.00	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1123	3725	1541	1196	3725	1533	1854	1737		3433	1863	1557
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	19	177	17	19	243	49	66	27	14	74	32	16
RTOR Reduction (vph)	0	0	7	0	0	21	0	13	0	0	0	13
Lane Group Flow (vph)	19	177	10	19	243	28	66	28	0	74	32	3
Confl. Peds. (#/hr)	10		6	6		10	4		33	33		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	39.5	38.7	38.7	39.5	38.7	38.7	6.6	2.9		5.5	8.7	8.7
Effective Green, g (s)	37.7	40.7	40.7	37.7	40.7	40.7	4.6	5.9		8.5	11.7	11.7
Actuated g/C Ratio	0.53	0.57	0.57	0.53	0.57	0.57	0.06	0.08		0.12	0.17	0.17
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	597	2138	884	635	2138	880	116	144		411	307	256
v/s Ratio Prot		0.05			c0.07		c0.02	c0.02		c0.02	0.02	
v/s Ratio Perm	0.02		0.01	0.02		0.02	0.02					0.00
v/c Ratio	0.03	0.08	0.01	0.03	0.11	0.03	0.57	0.20		0.18	0.10	0.01
Uniform Delay, d1	7.9	6.8	6.5	7.9	6.9	6.6	32.2	30.3		28.1	25.1	24.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.1	0.0	0.0	0.1	0.1	6.3	0.7		0.2	0.2	0.0
Delay (s)	7.9	6.8	6.5	7.9	7.0	6.6	38.5	31.0		28.3	25.3	24.8
Level of Service	A	A	A	A	A	A	D	C		C	C	C
Approach Delay (s)		6.9			7.0			35.6			27.0	
Approach LOS		A			A			D			C	

Intersection Summary

HCM 2000 Control Delay	14.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.15		
Actuated Cycle Length (s)	70.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Timings 10: King Rd & South Service Rd

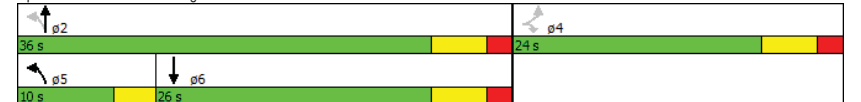
Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↰	↰	↰	↰	↰
Volume (vph)	4	12	35	74	106
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	24.0	24.0	10.0	36.0	26.0
Total Split (%)	40.0%	40.0%	16.7%	60.0%	43.3%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	Max	Max
Act Effct Green (s)	7.8	7.8	43.5	46.7	42.1
Actuated g/C Ratio	0.16	0.16	0.87	0.93	0.84
v/c Ratio	0.01	0.05	0.03	0.04	0.08
Control Delay	17.2	10.6	1.6	1.4	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	10.6	1.6	1.4	3.6
LOS	B	B	A	A	A
Approach Delay	12.3			1.4	3.6
Approach LOS	B			A	A

Intersection Summary

Cycle Length: 60
Actuated Cycle Length: 50.1
Natural Cycle: 60
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.08
Intersection Signal Delay: 3.2
Intersection Capacity Utilization 18.6%
Analysis Period (min) 15

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (vph)	4	12	35	74	106	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1839	
Flt Permitted	0.95	1.00	0.61	1.00	1.00	
Satd. Flow (perm)	1770	1583	1145	1863	1839	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	12	35	74	106	11
RTOR Reduction (vph)	0	11	0	0	3	0
Lane Group Flow (vph)	4	1	35	74	114	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	1.3	1.3	43.2	43.2	37.7	
Effective Green, g (s)	3.3	3.3	42.2	45.2	39.7	
Actuated g/C Ratio	0.06	0.06	0.75	0.80	0.70	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	103	92	871	1490	1292	
v/s Ratio Prot			0.00	c0.04	c0.06	
v/s Ratio Perm	c0.00	0.00	0.03			
v/c Ratio	0.04	0.01	0.04	0.05	0.09	
Uniform Delay, d1	25.1	25.1	2.0	1.2	2.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.0	0.0	0.1	0.1	
Delay (s)	25.3	25.1	2.0	1.2	2.8	
Level of Service	C	C	A	A	A	
Approach Delay (s)	25.1			1.5	2.8	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			3.7	HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio			0.09			
Actuated Cycle Length (s)			56.5	Sum of lost time (s)		14.0
Intersection Capacity Utilization			18.6%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (veh/h)	16	0	0	46	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	16	0	0	46	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			16		62	16
vC1, stage 1 conf vol					16	
vC2, stage 2 conf vol					46	
vCu, unblocked vol			16		62	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1602		949	1063
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	16	46	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1602	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			6.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↙	↘
Volume (veh/h)	0	16	46	0	0	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	16	46	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	46				62	46
vC1, stage 1 conf vol					46	
vC2, stage 2 conf vol					16	
vCu, unblocked vol	46				62	46
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	100
cM capacity (veh/h)	1562				949	1023
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	16	46	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1562	1700	1700			
Volume to Capacity	0.00	0.03	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			13.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↘	↙	↘
Volume (veh/h)	16	0	0	46	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	16	0	0	46	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage (veh)	2			2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			16		62	16
vC1, stage 1 conf vol					16	
vC2, stage 2 conf vol					46	
vCu, unblocked vol			16		62	16
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1602		949	1063
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	16	46	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1602	1700			
Volume to Capacity	0.01	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			13.3%		ICU Level of Service	A
Analysis Period (min)			15			

Queuing and Blocking Report
Background Arena Peak Hour

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	T	TR	L	T	TR
Maximum Queue (m)	19.4	31.2	19.6	12.3	21.2	16.6	24.4	15.1	19.9	29.4
Average Queue (m)	6.9	11.7	6.0	2.3	11.8	6.1	10.8	3.9	4.9	11.0
95th Queue (m)	16.4	24.6	15.0	8.0	20.0	13.8	21.1	11.9	13.9	22.3
Link Distance (m)	341.1			135.0				130.8		
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	165.0		125.0		60.0		60.0		70.0	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	8.6	12.3	16.6	17.3	8.0	1.4	14.2	21.5
Average Queue (m)	0.4	3.5	6.5	8.4	1.0	0.1	1.3	4.0
95th Queue (m)	3.4	10.9	15.4	15.4	5.1	0.7	6.7	13.5
Link Distance (m)	62.7	438.5		168.5		168.5	135.0	135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Background Arena Peak Hour

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	T	R	L	L	T
Maximum Queue (m)	23.0	23.8	23.6	7.3	10.4	33.4	18.6	16.4	15.4	15.4	12.7	8.2
Average Queue (m)	10.2	5.9	9.5	0.9	2.6	12.9	6.3	4.7	4.0	4.5	3.1	1.0
95th Queue (m)	21.8	16.3	20.1	5.2	9.3	27.2	15.3	12.3	10.9	11.8	9.4	4.4
Link Distance (m)	326.8				195.9	195.9	115.0	115.0			168.5	168.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	125.0		250.0		65.0				30.0	35.0		
Storage Blk Time (%)	0											
Queuing Penalty (veh)	0											

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB
Directions Served	T
Maximum Queue (m)	3.8
Average Queue (m)	0.1
95th Queue (m)	2.0
Link Distance (m)	168.5
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	T	TR	L	T	TR
Maximum Queue (m)	9.7	11.5	18.7	16.4	13.6	11.6	14.4	13.6
Average Queue (m)	1.3	3.7	9.3	4.7	2.8	4.5	4.0	4.5
95th Queue (m)	6.4	11.1	16.8	13.1	9.9	11.2	10.9	11.3
Link Distance (m)	132.4	154.0		115.7	115.7	209.5		209.5
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	35.0				90.0			
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Background Arena Peak Hour

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	NB
Directions Served	TR	LR
Maximum Queue (m)	1.8	7.6
Average Queue (m)	0.1	0.5
95th Queue (m)	1.3	3.6
Link Distance (m)	195.9	45.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	NB
Directions Served	LR
Maximum Queue (m)	14.7
Average Queue (m)	5.8
95th Queue (m)	14.0
Link Distance (m)	52.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	25.3	11.4	8.5	11.6	18.8
Average Queue (m)	5.5	1.0	0.8	1.0	8.0
95th Queue (m)	17.0	6.0	4.7	5.8	16.9
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
Background Arena Peak Hour

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	2.9	20.4	20.8	20.9	8.8	11.6	9.8	21.2	7.8	8.5	5.0
Average Queue (m)	0.2	5.9	6.6	6.8	1.1	2.8	2.6	5.9	0.8	0.9	0.5
95th Queue (m)	1.9	15.8	16.3	18.3	5.6	9.2	8.3	14.0	4.4	4.9	3.2
Link Distance (m)		1977.6		329.3			252.0	252.0		167.7	167.7
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	11.4	26.0	12.2	5.0	10.2	34.2	17.1	14.5	22.0	21.0	12.3	20.4
Average Queue (m)	2.9	10.0	1.8	0.9	2.9	15.3	3.5	5.1	9.5	5.6	3.1	10.3
95th Queue (m)	9.1	21.1	7.3	3.9	9.7	28.2	11.6	12.6	20.3	15.3	10.4	18.5
Link Distance (m)		250.1	250.1			193.4	193.4			131.9		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)		0				1						
Queuing Penalty (veh)		0				0						

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	17.1	7.3
Average Queue (m)	4.6	2.2
95th Queue (m)	12.7	6.7
Link Distance (m)	406.0	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		35.0
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
Background Arena Peak Hour

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (m)	8.2	11.9	14.4	13.9	12.8
Average Queue (m)	0.9	2.7	1.8	1.2	2.0
95th Queue (m)	4.9	8.8	8.7	7.7	8.5
Link Distance (m)	293.0		305.3		103.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	50.0		30.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 11: Block 1 Access B & South Service Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 12: South Service Rd & Road B

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Queuing and Blocking Report
Background Arena Peak Hour

Background Arena Peak Hour
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

Appendix G

Total Traffic Operations - Phase 1

Timings

1: Waterdown Rd & North Service Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

							
Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	63	114	68	185	427	280	966
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	27.0	27.0	27.0	13.0	34.0	19.0	40.0
Total Split (%)	33.8%	33.8%	33.8%	16.3%	42.5%	23.8%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	23.0	23.0	23.0	9.0	34.2	46.4	36.0
Actuated g/C Ratio	0.29	0.29	0.29	0.11	0.43	0.58	0.45
v/c Ratio	0.12	0.21	0.12	0.46	0.50	0.66	0.69
Control Delay	22.0	23.0	0.4	46.9	5.4	15.3	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	23.0	0.4	46.9	5.4	15.3	19.6
LOS	C	C	A	D	A	B	B
Approach Delay		16.5			12.9		18.8
Approach LOS		B			B		B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 33 (41%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 16.3

Intersection LOS: B

Intersection Capacity Utilization 65.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

	↰	→	↰	↰	←	↰	↰	↑	↰	↰	↓	↰
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↱	↰	↰	↱		↰	↱	
Volume (vph)	0	0	0	63	114	68	185	427	413	280	966	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Flpb, ped/bikes				1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.98	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1562	3539	3451		1770	3632	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.23	1.00	
Satd. Flow (perm)				1770	1863	1562	3539	3451		420	3632	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	63	114	68	185	427	413	280	966	177
RTOR Reduction (vph)	0	0	0	0	0	48	0	200	0	0	20	0
Lane Group Flow (vph)	0	0	0	63	114	20	185	640	0	280	1123	0
Confl. Peds. (#/hr)	1						1	1				1
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				20.0	20.0	20.0	7.0	32.2		45.8	34.0	
Effective Green, g (s)				23.0	23.0	23.0	9.0	34.2		43.8	36.0	
Actuated g/C Ratio				0.29	0.29	0.29	0.11	0.43		0.55	0.45	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				508	535	449	398	1475		412	1634	
v/s Ratio Prot				0.04	c0.06		0.05	0.19		c0.09	c0.31	
v/s Ratio Perm						0.01				0.28		
v/c Ratio				0.12	0.21	0.04	0.46	0.43		0.68	0.69	
Uniform Delay, d1				21.1	21.6	20.6	33.2	16.1		11.2	17.5	
Progression Factor				1.00	1.00	1.00	1.28	0.45		1.00	1.00	
Incremental Delay, d2				0.1	0.9	0.2	3.7	0.9		4.4	2.4	
Delay (s)				21.2	22.5	20.7	46.4	8.1		15.7	19.9	
Level of Service				C	C	C	D	A		B	B	
Approach Delay (s)		0.0			21.7			15.0			19.1	
Approach LOS		A			C			B			B	

Intersection Summary

HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	1	0	355	0	3	778	1022
Volume (vph)	1	0	355	0	3	778	1022
Turn Type	Perm	NA	custom	NA	Perm	NA	NA
Protected Phases	4	4	3	7	2	2	6
Permitted Phases	4	4	3	7	2	2	6
Detector Phase	4	4	3	7	2	2	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0	31.0
Total Split (s)	11.0	11.0	21.0	32.0	48.0	48.0	48.0
Total Split (%)	13.8%	13.8%	26.3%	40.0%	60.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	7.8	15.5	17.7		54.3	54.3	
Actuated g/C Ratio	0.10	0.19	0.22		0.68	0.68	
v/c Ratio	0.02	0.52	0.51		0.32	0.41	
Control Delay	0.0	31.5	12.4		6.8	2.2	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	0.0	31.5	12.4		6.8	2.2	
LOS	A	C	B		A	A	
Approach Delay	0.0		23.7		6.8	2.2	
Approach LOS	A		C		A	A	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 28 (35%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.52

Intersection Signal Delay: 9.0

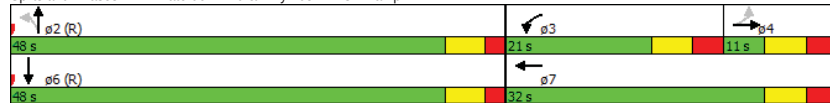
Intersection LOS: A

Intersection Capacity Utilization 51.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	0	3	355	0	246	3	778	0	0	1022	7
Volume (vph)	1	0	3	355	0	246	3	778	0	0	1022	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00			*1.00	1.00			*1.00			*1.00	
Frpb, ped/bikes	1.00			1.00	0.99			1.00			1.00	
Flpb, ped/bikes	1.00			1.00	1.00			1.00			1.00	
Frt	0.90			1.00	0.85			1.00			1.00	
Flt Protected	0.99			0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1652			3539	1563			3725			3721	
Flt Permitted	0.84			0.95	1.00			0.95			1.00	
Satd. Flow (perm)	1399			3539	1563			3548			3721	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	3	355	0	246	3	778	0	0	1022	7
RTOR Reduction (vph)	0	4	0	0	120	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	355	126	0	0	781	0	0	1029	0
Confl. Peds. (#/hr)	1					1	3					3
Turn Type	Perm	NA		custom	NA		Perm	NA			NA	
Protected Phases		4		3	7			2			6	
Permitted Phases	4			3			2					
Actuated Green, G (s)		0.8		12.5	20.3			46.7			46.7	
Effective Green, g (s)		3.8		15.5	23.3			48.7			48.7	
Actuated g/C Ratio		0.05		0.19	0.29			0.61			0.61	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		66		685	455			2159			2265	
v/s Ratio Prot				c0.10	c0.08						c0.28	
v/s Ratio Perm		0.00						0.22				
v/c Ratio		0.00		0.52	0.28			0.36			0.45	
Uniform Delay, d1		36.3		28.9	21.8			7.9			8.5	
Progression Factor		1.00		1.00	1.00			1.03			0.27	
Incremental Delay, d2		0.0		0.7	0.3			0.4			0.5	
Delay (s)		36.3		29.6	22.2			8.5			2.8	
Level of Service		D		C	C			A			A	
Approach Delay (s)		36.3			26.5			8.5			2.8	
Approach LOS		D			C			A			A	

Intersection Summary

HCM 2000 Control Delay 10.6

HCM 2000 Level of Service B

HCM 2000 Volume to Capacity ratio 0.47

Actuated Cycle Length (s) 80.0

Sum of lost time (s) 12.0

Intersection Capacity Utilization 51.9%

ICU Level of Service A

Analysis Period (min) 15

c Critical Lane Group

Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 1 AM

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↩	↑	↗	↖	↗	↑	↗	↖	↑
Volume (vph)	237	451	299	45	124	420	513	630	750
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3		2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	25.0	25.0	25.0	10.0	20.0	25.0	25.0	20.0	45.0
Total Split (%)	31.3%	31.3%	31.3%	12.5%	25.0%	31.3%	31.3%	25.0%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	22.6	22.6	22.6	6.0	19.9	23.1	23.1	16.3	43.4
Actuated g/C Ratio	0.28	0.28	0.28	0.08	0.25	0.29	0.29	0.20	0.54
v/c Ratio	0.47	0.86	0.67	0.17	0.31	0.39	0.88	0.90	0.37
Control Delay	28.1	46.1	34.9	34.0	15.2	11.7	29.3	44.2	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.1	46.1	34.9	34.0	15.2	11.7	29.3	44.2	4.9
LOS	C	D	C	C	B	B	C	D	A
Approach Delay	38.4			21.4			22.8		
Approach LOS	D			C			C		

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 76 (95%), Referenced to phase 2:NBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 26.7
Intersection LOS: C
Intersection Capacity Utilization 83.5%
ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 1 AM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↑	↗	↖		↗		↑	↗	↖	↑	
Volume (vph)	237	451	299	45	0	124	0	420	513	630	750	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	*1.00	0.97	*1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3539		1583		3725	1583	3433	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3539		1583		3725	1583	3433	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	237	451	299	45	0	124	0	420	513	630	750	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	131	0	0	0
Lane Group Flow (vph)	237	451	299	45	0	124	0	420	382	630	750	0
Confl. Peds. (#/hr)	2											2
Turn Type	Perm	NA	Perm	Prot	pm+ov			NA	Perm	Prot	NA	
Protected Phases		4		3		1		2		1	6	
Permitted Phases	4		4			3			2			
Actuated Green, G (s)	19.6	19.6	19.6	2.4		19.7		18.7	18.7	17.3	39.0	
Effective Green, g (s)	22.6	22.6	22.6	4.4		17.7		20.7	20.7	16.3	41.0	
Actuated g/C Ratio	0.28	0.28	0.28	0.06		0.22		0.26	0.26	0.20	0.51	
Clearance Time (s)	7.0	7.0	7.0	6.0		3.0		6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	500	526	447	194		350		963	409	699	1909	
v/s Ratio Prot		c0.24		c0.01		0.07		0.11		c0.18	0.20	
v/s Ratio Perm	0.13		0.19			0.01			c0.24			
v/c Ratio	0.47	0.86	0.67	0.23		0.35		0.44	0.93	0.90	0.39	
Uniform Delay, d1	23.8	27.2	25.4	36.2		26.3		24.8	29.0	31.1	11.9	
Progression Factor	1.00	1.00	1.00	0.93		0.92		0.45	0.53	0.85	0.40	
Incremental Delay, d2	0.7	13.0	3.8	0.6		0.6		1.3	28.7	13.9	0.6	
Delay (s)	24.5	40.2	29.2	34.3		24.7		12.5	44.1	40.4	5.3	
Level of Service	C	D	C	C		C		B	D	D	A	
Approach Delay (s)	33.1			27.3			29.8			21.3		
Approach LOS	C			C			C			C		

Intersection Summary

HCM 2000 Control Delay	27.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	27	0	26	0	8	779	456	617
Volume (vph)	27	0	26	0	8	779	456	617
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	4	4	8	8	2	2	1	6
Permitted Phases	4	4	8	8	2	2	1	6
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	12.0	36.0
Total Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	18.0	54.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	45.0%	45.0%	22.5%	67.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	11.3	11.3	11.3	11.3	39.0	39.0	63.7	64.5
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.49	0.49	0.80	0.81
v/c Ratio	0.17	0.14	0.22	0.02	0.51	0.69	0.21	0.21
Control Delay	2.6	31.8	0.9	14.1	16.3	13.5	3.4	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.6	31.8	0.9	14.1	16.3	13.5	3.4	3.4
LOS	A	C	A	B	B	B	A	A
Approach Delay	2.6		6.1		16.3		7.6	
Approach LOS	A		A		B		A	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 40 (50%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 11.0
Intersection Capacity Utilization 78.7%
Analysis Period (min) 15

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd

18 s	36 s	26 s
54 s	26 s	

HCM Signalized Intersection Capacity Analysis

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	27	0	10	26	0	127	8	779	128	456	617	21
Volume (vph)	27	0	10	26	0	127	8	779	128	456	617	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	0.96	1.00	0.85	1.00	0.85	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.96	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1732	1770	1583	1770	1583	1770	1583	1770	1583	1770	1583	1770
Flt Permitted	0.61	0.73	1.00	0.42	1.00	0.42	1.00	0.21	1.00	0.21	1.00	1.00
Satd. Flow (perm)	1091	1365	1583	787	1365	787	1365	386	1365	386	1365	1365
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	0	10	26	0	127	8	779	128	456	617	21
RTOR Reduction (vph)	0	33	0	0	112	0	0	15	0	0	2	0
Lane Group Flow (vph)	0	4	0	26	15	0	8	892	0	456	636	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA	NA
Protected Phases	4	4	8	8	2	2	1	6	1	6	1	6
Permitted Phases	4	4	8	8	2	2	1	6	1	6	1	6
Actuated Green, G (s)	6.7	6.7	6.7	35.6	35.6	60.3	60.3	60.3	60.3	60.3	60.3	60.3
Effective Green, g (s)	9.7	9.7	9.7	37.6	37.6	59.3	59.3	59.3	59.3	59.3	59.3	59.3
Actuated g/C Ratio	0.12	0.12	0.12	0.47	0.47	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Clearance Time (s)	7.0	7.0	7.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	132	165	191	369	1714	644	2886	0.17	0.17	0.17	0.17	0.17
v/s Ratio Prot	0.00	0.02	0.01	0.01	0.01	0.24	0.34	0.34	0.34	0.34	0.34	0.34
v/s Ratio Perm	0.03	0.16	0.08	0.02	0.52	0.71	0.22	0.22	0.22	0.22	0.22	0.22
Uniform Delay, d1	31.0	31.5	31.2	11.4	14.9	10.1	2.4	2.4	2.4	2.4	2.4	2.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.05	1.32	1.32	1.32	1.32	1.32	1.32
Incremental Delay, d2	0.1	0.4	0.2	0.1	1.1	3.3	0.2	0.2	0.2	0.2	0.2	0.2
Delay (s)	31.1	31.9	31.4	11.5	16.0	13.9	3.3	3.3	3.3	3.3	3.3	3.3
Level of Service	C	C	C	B	B	B	A	A	A	A	A	A
Approach Delay (s)	31.1	31.5	31.5	16.0	16.0	7.7	7.7	7.7	7.7	7.7	7.7	7.7
Approach LOS	C	C	C	B	B	A	A	A	A	A	A	A

Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↑↑	↑↑	↑
Volume (vph)	1575	155	14
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.45	0.04	0.07
Control Delay	0.5	0.8	28.4
Queue Delay	0.0	0.0	0.0
Total Delay	0.5	0.8	28.4
LOS	A	A	C
Approach Delay	0.5	0.8	28.4
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 64 (80%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.45
 Intersection Signal Delay: 0.8
 Intersection LOS: A
 Intersection Capacity Utilization 57.5%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Volume (vph)	1575	19	0	155	14	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3718			3725	1755	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3718			3725	1755	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1575	19	0	155	14	2
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	1594	0	0	155	14	0
Confl. Peds. (#/hr)		2	2			
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3132			3138	100	
v/s Ratio Prot	c0.43			0.04	c0.01	
v/s Ratio Perm						
v/c Ratio	0.51			0.05	0.14	
Uniform Delay, d1	1.7			1.0	35.8	
Progression Factor	0.27			0.92	1.00	
Incremental Delay, d2	0.3			0.0	0.6	
Delay (s)	0.7			1.0	36.5	
Level of Service	A			A	D	
Approach Delay (s)	0.7			1.0	36.5	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 1.1 HCM 2000 Level of Service A
 HCM 2000 Volume to Capacity ratio 0.49
 Actuated Cycle Length (s) 80.0 Sum of lost time (s) 8.0
 Intersection Capacity Utilization 57.5% ICU Level of Service B
 Analysis Period (min) 15
 Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (veh/h)	1436	141	0	107	48	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1436	141	0	107	48	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.86		0.86	0.86
vC, conflicting volume			1577		1560	788
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1340		1320	421
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		62	99
cM capacity (veh/h)			437		127	499
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	957	620	36	71	55	
Volume Left	0	0	0	0	48	
Volume Right	0	141	0	0	7	
cSH	1700	1700	437	1700	140	
Volume to Capacity	0.56	0.36	0.00	0.04	0.39	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	13.4	
Control Delay (s)	0.0	0.0	0.0	0.0	46.3	
Lane LOS					E	
Approach Delay (s)	0.0		0.0		46.3	
Approach LOS					E	
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			54.2%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

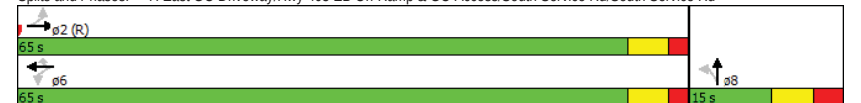
7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	657	513	94	137	22
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	65.0	65.0	65.0	65.0	15.0
Total Split (%)	81.3%	81.3%	81.3%	81.3%	18.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	68.6	68.6	68.6	68.6	11.0
Actuated g/C Ratio	0.86	0.86	0.86	0.86	0.14
v/c Ratio	0.59	0.52	0.06	0.10	0.14
Control Delay	3.3	1.5	2.1	0.6	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	1.5	2.1	0.6	32.0
LOS	A	A	A	A	C
Approach Delay		2.3	1.3		32.0
Approach LOS		A	A		C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 68 (85%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.59					
Intersection Signal Delay: 2.8					Intersection LOS: A
Intersection Capacity Utilization 61.5%					ICU Level of Service B
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	657	513	273	0	94	137	13	22	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Frpb, ped/bikes	1.00	0.99			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	0.95			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.98				
Satd. Flow (prot)	1770	1751			1863	1583		1829				
Flt Permitted	0.70	1.00			1.00	1.00		0.98				
Satd. Flow (perm)	1297	1751			1863	1583		1829				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	657	513	273	0	94	137	13	22	0	0	0	0
RTOR Reduction (vph)	0	20	0	0	0	27	0	0	0	0	0	0
Lane Group Flow (vph)	657	766	0	0	94	110	0	35	0	0	0	0
Confl. Peds. (#/hr)	2											
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2			6		6		8				
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	62.2	62.2			62.2	62.2		4.8				
Effective Green, g (s)	64.2	64.2			64.2	64.2		7.8				
Actuated g/C Ratio	0.80	0.80			0.80	0.80		0.10				
Clearance Time (s)	6.0	6.0			6.0	6.0		7.0				
Vehicle Extension (s)	3.0	3.0			3.0	3.0		5.0				
Lane Grp Cap (vph)	1040	1405			1495	1270		178				
v/s Ratio Prot	0.44				0.05			0.02				
v/s Ratio Perm	0.51				0.07			0.20				
v/c Ratio	0.63	0.55			0.06	0.09		0.20				
Uniform Delay, d1	3.2	2.8			1.6	1.7		33.2				
Progression Factor	0.29	0.13			1.00	1.00		1.00				
Incremental Delay, d2	2.7	1.4			0.1	0.1		1.1				
Delay (s)	3.6	1.8			1.7	1.8		34.4				
Level of Service	A	A			A	A		C				
Approach Delay (s)	2.6				1.8			34.4		0.0		
Approach LOS	A				A			C		A		
Intersection Summary												
HCM 2000 Control Delay	3.1			HCM 2000 Level of Service					A			
HCM 2000 Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)					8.0			
Intersection Capacity Utilization	61.5%			ICU Level of Service					B			
Analysis Period (min)	15											
c Critical Lane Group												

Timings

8: King Rd & North Service Rd

Total Traffic Phase 1 AM

Mixed Use Development 1200 King Rd

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations										
Volume (vph)	6	465	253	249	23	47	25	21	32	
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA	
Protected Phases		2	1	6			8		4	
Permitted Phases	2		6		6	8		4		
Detector Phase	2	2	1	6	6	8	8	4	4	
Switch Phase										
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0	
Total Split (s)	70.0	70.0	23.0	93.0	93.0	27.0	27.0	27.0	27.0	
Total Split (%)	58.3%	58.3%	19.2%	77.5%	77.5%	22.5%	22.5%	22.5%	22.5%	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	
Act Effct Green (s)	81.0	81.0	93.9	93.9	93.9	18.1	18.1	18.1	18.1	
Actuated g/C Ratio	0.68	0.68	0.78	0.78	0.78	0.15	0.15	0.15	0.15	
v/c Ratio	0.01	0.48	0.44	0.17	0.02	0.23	0.50	0.28	0.08	
Control Delay	7.0	10.9	5.8	3.6	0.5	40.7	4.9	56.1	37.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.0	10.9	5.8	3.6	0.5	40.7	4.9	56.1	37.3	
LOS	A	B	A	A	A	D	A	E	D	
Approach Delay	10.9		4.5		8.8		43.8			
Approach LOS	B		A		A		D			
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 22 (18%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green										
Natural Cycle: 60										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.50										
Intersection Signal Delay: 9.5					Intersection LOS: A					
Intersection Capacity Utilization 73.5%					ICU Level of Service D					
Analysis Period (min) 15										

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	6	465	124	253	249	23	47	25	359	21	32	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.86		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1799		1770	1863	1583	1770	3043		1770	3433	
Flt Permitted	0.60	1.00		0.34	1.00	1.00	0.73	1.00		0.27	1.00	
Satd. Flow (perm)	1126	1799		633	1863	1583	1359	3043		497	3433	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	6	465	124	253	249	23	47	25	359	21	32	8
RTOR Reduction (vph)	0	6	0	0	0	5	0	305	0	0	7	0
Lane Group Flow (vph)	6	583	0	253	249	18	47	79	0	21	33	0
Confl. Peds. (#/hr)			1	1								
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	79.0	79.0		91.9	91.9	91.9	15.1	15.1		15.1	15.1	
Effective Green, g (s)	81.0	81.0		90.9	93.9	93.9	18.1	18.1		18.1	18.1	
Actuated g/C Ratio	0.68	0.68		0.76	0.78	0.78	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	760	1214		563	1457	1238	204	458		74	517	
v/s Ratio Prot		c0.32		c0.03	0.13			0.03			0.01	
v/s Ratio Perm	0.01			0.31		0.01	0.03			c0.04		
v/c Ratio	0.01	0.48		0.45	0.17	0.01	0.23	0.17		0.28	0.06	
Uniform Delay, d1	6.4	9.4		6.3	3.3	2.9	44.8	44.4		45.2	43.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.84	0.41		1.00	1.00	
Incremental Delay, d2	0.0	1.4		0.6	0.3	0.0	0.6	0.2		2.1	0.1	
Delay (s)	6.4	10.7		6.9	3.5	2.9	38.1	18.4		47.3	43.7	
Level of Service	A	B		A	A	A	D	B		D	D	
Approach Delay (s)		10.7			5.1			20.6			45.0	
Approach LOS		B			A			C			D	

Intersection Summary

HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings 9: King Rd & Plains Rd E

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	93	801	147	54	345	507	184	118	260	76	30
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	38.0	38.0	8.0	38.0	38.0	11.0	25.0	14.0	28.0	28.0
Total Split (%)	9.4%	44.7%	44.7%	9.4%	44.7%	44.7%	12.9%	29.4%	16.5%	32.9%	32.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	38.1	35.8	35.8	37.3	34.2	34.2	24.3	15.6	10.1	18.0	18.0
Actuated g/C Ratio	0.49	0.46	0.46	0.48	0.44	0.44	0.31	0.20	0.13	0.23	0.23
v/c Ratio	0.18	0.47	0.19	0.18	0.21	0.53	0.41	0.52	0.59	0.18	0.07
Control Delay	11.6	17.0	4.2	11.8	15.2	4.0	21.1	28.0	39.5	25.0	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.6	17.0	4.2	11.8	15.2	4.0	21.1	28.0	39.5	25.0	0.3
LOS	B	B	A	B	B	A	C	C	D	C	A
Approach Delay		14.7			8.7			24.6		33.3	
Approach LOS		B			A			C		C	

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 78.2

Natural Cycle: 85

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.59

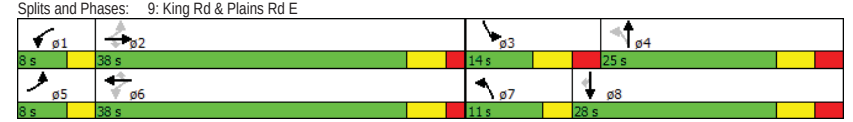
Intersection Signal Delay: 16.6

Intersection Capacity Utilization 63.8%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service B



HCM Signalized Intersection Capacity Analysis
9: King Rd & Plains Rd E

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

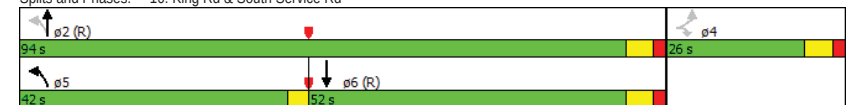
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰	↰↱	↰	↰	↰	↰	↰↱	↰	↰
Volume (vph)	93	801	147	54	345	507	184	118	76	260	76	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	*1.00	1.00	1.00	*1.00	*1.00	1.00	1.00		0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1765	3725	1533	1768	3725	1537	1764	1730		3433	1863	1556
Flt Permitted	0.52	1.00	1.00	0.27	1.00	1.00	0.64	1.00		0.95	1.00	1.00
Satd. Flow (perm)	969	3725	1533	507	3725	1537	1187	1730		3433	1863	1556
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	93	801	147	54	345	507	184	118	76	260	76	30
RTOR Reduction (vph)	0	0	78	0	0	289	0	28	0	0	0	24
Lane Group Flow (vph)	93	801	69	54	345	218	184	166	0	260	76	6
Confl. Peds. (#/hr)	7		9	9		7	4		16	16		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	37.7	33.8	33.8	35.7	32.8	32.8	26.7	14.4		7.0	13.1	13.1
Effective Green, g (s)	35.7	35.8	35.8	33.7	34.8	34.8	24.7	17.4		10.0	16.1	16.1
Actuated g/C Ratio	0.44	0.44	0.44	0.42	0.43	0.43	0.30	0.21		0.12	0.20	0.20
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	455	1644	676	240	1598	659	441	371		423	369	308
v/s Ratio Prot	c0.01	c0.22		0.01	0.09		0.06	c0.10		c0.08	0.04	
v/s Ratio Perm	0.08		0.05	0.09		0.14	0.07					0.00
v/c Ratio	0.20	0.49	0.10	0.23	0.22	0.33	0.42	0.45		0.61	0.21	0.02
Uniform Delay, d1	13.4	16.1	13.3	14.7	14.6	15.4	21.9	27.7		33.7	27.2	26.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.2	1.0	0.3	0.5	0.3	1.3	0.6	0.9		2.6	0.3	0.0
Delay (s)	13.7	17.2	13.6	15.2	14.9	16.7	22.5	28.5		36.4	27.4	26.2
Level of Service	B	B	B	B	B	B	C	C		D	C	C
Approach Delay (s)		16.3			15.9			25.6			33.7	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		19.9			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.49										
Actuated Cycle Length (s)		81.1			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		63.8%			ICU Level of Service			B				
Analysis Period (min)		15										
c Critical Lane Group												

Timings
10: King Rd & South Service Rd

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	78	100	440	348	256
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	26.0	26.0	42.0	94.0	52.0
Total Split (%)	21.7%	21.7%	35.0%	78.3%	43.3%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	12.6	12.6	99.4	99.4	83.4
Actuated g/C Ratio	0.10	0.10	0.83	0.83	0.70
v/c Ratio	0.42	0.39	0.55	0.23	0.32
Control Delay	56.3	13.8	5.3	2.8	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	56.3	13.8	5.3	2.8	9.6
LOS	E	B	A	A	A
Approach Delay	32.4			4.2	9.6
Approach LOS	C			A	A
Intersection Summary					
Cycle Length: 120					
Actuated Cycle Length: 120					
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green					
Natural Cycle: 65					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.55					
Intersection Signal Delay: 9.5			Intersection LOS: A		
Intersection Capacity Utilization 61.0%			ICU Level of Service B		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	78	100	440	348	256	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1772	
Flt Permitted	0.95	1.00	0.46	1.00	1.00	
Satd. Flow (perm)	1770	1583	858	1863	1772	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	78	100	440	348	256	145
RTOR Reduction (vph)	0	90	0	0	9	0
Lane Group Flow (vph)	78	11	440	348	392	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	10.6	10.6	97.4	97.4	81.4	
Effective Green, g (s)	12.6	12.6	96.4	99.4	83.4	
Actuated g/C Ratio	0.10	0.10	0.80	0.83	0.70	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	185	166	780	1543	1231	
v/s Ratio Prot			c0.06	0.19	0.22	
v/s Ratio Perm	c0.04	0.01	c0.40			
v/c Ratio	0.42	0.06	0.56	0.23	0.32	
Uniform Delay, d1	50.3	48.4	3.9	2.2	7.2	
Progression Factor	1.00	1.00	1.00	1.00	1.16	
Incremental Delay, d2	1.6	0.2	0.9	0.3	0.6	
Delay (s)	51.8	48.5	4.9	2.5	8.9	
Level of Service	D	D	A	A	A	
Approach Delay (s)	50.0			3.8	8.9	
Approach LOS	D			A	A	
Intersection Summary						
HCM 2000 Control Delay			11.3	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.56			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		14.0
Intersection Capacity Utilization			61.0%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	480	0	0	274	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	480	0	0	274	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			480		754	480
vC1, stage 1 conf vol					480	
vC2, stage 2 conf vol					274	
vCu, unblocked vol			480		754	480
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1082		562	586
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	480	274	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1082	1700			
Volume to Capacity	0.28	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization		28.6%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↙	↘
Volume (veh/h)	153	327	254	144	32	20
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	153	327	254	144	32	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	398				959	326
vC1, stage 1 conf vol					326	
vC2, stage 2 conf vol					633	
vCu, unblocked vol	398				959	326
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	87				92	97
cM capacity (veh/h)	1161				424	715
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	480	398	52			
Volume Left	153	0	32			
Volume Right	0	144	20			
cSH	1161	1700	503			
Volume to Capacity	0.13	0.23	0.10			
Queue Length 95th (m)	3.6	0.0	2.8			
Control Delay (s)	3.7	0.0	13.0			
Lane LOS	A		B			
Approach Delay (s)	3.7	0.0	13.0			
Approach LOS			B			
Intersection Summary						
Average Delay		2.6				
Intersection Capacity Utilization		61.2%		ICU Level of Service	B	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↘	↙	↘
Volume (veh/h)	260	0	0	500	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	260	0	0	500	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT		TWLT		
Median storage (veh)		2		2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			260		760	260
vC1, stage 1 conf vol					260	
vC2, stage 2 conf vol					500	
vCu, unblocked vol			260		760	260
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1304		555	779
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	260	500	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1304	1700			
Volume to Capacity	0.15	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		29.6%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Total Traffic Phase 1 AM

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	T	TR	L	T	TR
Maximum Queue (m)	29.9	42.7	20.9	28.0	37.2	46.5	83.4	58.9	111.0	96.1
Average Queue (m)	11.6	19.1	9.1	12.3	20.1	20.9	39.1	32.6	59.2	69.1
95th Queue (m)	24.2	36.0	18.1	24.2	31.6	38.9	66.6	52.5	98.6	98.7
Link Distance (m)	341.1			135.0				135.0		
Upstream Blk Time (%)	0									
Queuing Penalty (veh)	0									
Storage Bay Dist (m)	165.0		125.0		60.0		60.0		70.0	
Storage Blk Time (%)	0									
Queuing Penalty (veh)	1									
							2		7	
							1		23	
									56	

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	6.7	56.5	62.0	46.8	43.1	44.5	30.8	40.3
Average Queue (m)	0.8	29.3	31.7	21.5	10.0	12.5	9.8	13.8
95th Queue (m)	4.9	49.2	54.3	37.0	31.2	33.9	23.3	30.5
Link Distance (m)	60.7	437.7		168.8		168.8		135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Total Traffic Phase 1 AM

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	T	R	L	L	T
Maximum Queue (m)	138.0	203.6	81.8	14.8	19.3	37.2	62.7	103.2	60.0	64.9	119.9	66.3
Average Queue (m)	46.9	97.4	45.0	6.0	6.1	17.1	24.2	35.1	41.2	43.1	48.9	25.0
95th Queue (m)	110.8	177.1	73.7	14.4	15.5	32.9	46.1	74.1	65.6	65.0	85.3	49.0
Link Distance (m)	326.8				195.9	195.9	115.0	115.0			168.8	168.8
Upstream Blk Time (%)									0	0		
Queuing Penalty (veh)									0	0		
Storage Bay Dist (m)	125.0	250.0		65.0					30.0	35.0		
Storage Blk Time (%)	0	11							3	19	22	28
Queuing Penalty (veh)	0	56							17	40	70	88

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB
Directions Served	T
Maximum Queue (m)	41.0
Average Queue (m)	16.9
95th Queue (m)	35.3
Link Distance (m)	168.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	18.3	22.5	29.3	8.6	95.0	113.8	87.5	50.0	36.4
Average Queue (m)	6.8	6.8	14.6	1.5	42.2	66.9	42.6	8.3	13.8
95th Queue (m)	15.8	18.1	24.1	6.7	82.6	107.5	74.0	35.2	28.2
Link Distance (m)	132.4		154.0		115.7	115.7		209.5	209.5
Upstream Blk Time (%)					0	0			
Queuing Penalty (veh)					0	0			
Storage Bay Dist (m)		35.0		90.0			90.0		
Storage Blk Time (%)			0		0		1		
Queuing Penalty (veh)			0		0		3		

Queuing and Blocking Report
Total Traffic Phase 1 AM

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	40.5	42.5	12.0	17.9	15.4
Average Queue (m)	7.2	8.1	1.0	2.1	4.1
95th Queue (m)	26.8	27.8	6.0	9.5	12.4
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	EB	EB	NB
Directions Served	T	TR	LR
Maximum Queue (m)	10.6	12.2	28.0
Average Queue (m)	0.5	0.6	12.6
95th Queue (m)	5.2	6.2	24.6
Link Distance (m)	94.7	94.7	52.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	87.2	79.4	20.5	24.3	16.9
Average Queue (m)	41.4	27.8	3.4	6.0	7.9
95th Queue (m)	76.7	64.9	12.7	16.8	16.5
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	1	0			
Storage Bay Dist (m)			50.0		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
Total Traffic Phase 1 AM

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	19.9	105.7	47.2	33.1	9.9	24.0	19.8	71.0	17.2	18.7	8.9
Average Queue (m)	1.1	52.9	25.4	15.0	1.1	8.6	4.2	30.5	5.3	5.5	1.3
95th Queue (m)	11.6	88.7	43.1	28.4	5.9	19.0	13.1	57.2	14.3	14.8	5.8
Link Distance (m)		1977.6		329.3			252.0	252.0		167.7	167.7
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)		10		0							
Queuing Penalty (veh)		1		0							

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	35.4	71.6	62.3	17.5	23.4	51.9	71.7	59.5	57.7	58.1	43.9	45.7
Average Queue (m)	13.8	44.0	32.2	7.3	9.0	25.3	13.9	34.1	23.5	27.0	22.3	27.3
95th Queue (m)	28.4	65.3	56.1	14.2	18.8	42.8	43.2	56.6	43.8	49.1	38.5	42.5
Link Distance (m)		250.1	250.1				193.4	193.4			131.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)	0	13	3		0	5	0	11	2	2		
Queuing Penalty (veh)	1	12	4		0	3	0	19	4	3		

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	31.9	14.6
Average Queue (m)	12.4	4.3
95th Queue (m)	25.7	11.2
Link Distance (m)	406.0	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		35.0
Storage Blk Time (%)	0	
Queuing Penalty (veh)	1	

Queuing and Blocking Report
Total Traffic Phase 1 AM

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (m)	43.3	38.1	56.8	62.3	72.2
Average Queue (m)	19.8	12.0	31.6	15.0	28.4
95th Queue (m)	36.6	24.1	52.2	40.7	60.8
Link Distance (m)	293.0		305.2		103.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	50.0	30.0			
Storage Blk Time (%)	0	0	9	1	
Queuing Penalty (veh)	0	0	31	2	

Intersection: 11: Block 1 Access B & South Service Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 12: South Service Rd & Road B

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	57.6	8.1	18.0
Average Queue (m)	17.7	0.6	8.8
95th Queue (m)	40.1	3.9	16.8
Link Distance (m)	173.6	281.0	68.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
Total Traffic Phase 1 AM

Total Traffic Phase 1 AM
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 436

Timings

1: Waterdown Rd & North Service Rd

Total Traffic Phase 1 PM

Mixed Use Development 1200 King Rd

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↰	↱	↰	↱
Volume (vph)	200	545	285	488	967	123	552
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	32.0	32.0	32.0	18.0	37.0	11.0	30.0
Total Split (%)	40.0%	40.0%	40.0%	22.5%	46.3%	13.8%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	28.0	28.0	28.0	14.0	35.4	32.6	26.0
Actuated g/C Ratio	0.35	0.35	0.35	0.18	0.44	0.41	0.32
v/c Ratio	0.32	0.84	0.39	0.79	0.72	0.49	0.58
Control Delay	17.1	33.0	2.8	48.0	11.9	17.2	23.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	33.0	2.8	48.0	11.9	17.2	23.1
LOS	B	C	A	D	B	B	C
Approach Delay		21.6			22.6		22.2
Approach LOS		C			C		C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 12 (15%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.84

Intersection Signal Delay: 22.2

Intersection LOS: C

Intersection Capacity Utilization 78.6%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd

↰ ø1	↱ ø2 (R)	↰ ø4
11 s	37 s	32 s
↰ ø5	↱ ø6 (R)	↰ ø8
18 s	30 s	32 s

HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Total Traffic Phase 1 PM

Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↱	↰	↰	↱		↰	↱	
Volume (vph)	0	0	0	200	545	285	488	967	199	123	552	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1583	3539	3630		1770	3608	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.17	1.00	
Satd. Flow (perm)				1770	1863	1583	3539	3630		324	3608	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	200	545	285	488	967	199	123	552	147
RTOR Reduction (vph)	0	0	0	0	0	185	0	23	0	0	32	0
Lane Group Flow (vph)	0	0	0	200	545	100	488	1143	0	123	667	0
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				25.0	25.0	25.0	12.0	32.8		30.2	24.0	
Effective Green, g (s)				28.0	28.0	28.0	14.0	34.8		28.2	26.0	
Actuated g/C Ratio				0.35	0.35	0.35	0.18	0.43		0.35	0.32	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				619	652	554	619	1579		208	1172	
v/s Ratio Prot				0.11	c0.29		c0.14	c0.31		0.04	0.18	
v/s Ratio Perm						0.06				0.17		
v/c Ratio				0.32	0.84	0.18	0.79	0.72		0.59	0.57	
Uniform Delay, d1				19.1	23.9	18.0	31.6	18.6		18.7	22.4	
Progression Factor				0.81	0.87	0.54	1.24	0.51		1.00	1.00	
Incremental Delay, d2				0.3	10.8	0.6	8.2	2.4		4.5	2.0	
Delay (s)				15.7	31.5	10.3	47.3	12.0		23.1	24.4	
Level of Service				B	C	B	D	B		C	C	
Approach Delay (s)		0.0			22.6			22.4			24.2	
Approach LOS		A			C			C			C	

Intersection Summary

HCM 2000 Control Delay 22.9

HCM 2000 Level of Service

C

HCM 2000 Volume to Capacity ratio 0.81

Actuated Cycle Length (s) 80.0

Sum of lost time (s)

12.0

Intersection Capacity Utilization 78.6%

ICU Level of Service

D

Analysis Period (min) 15

c Critical Lane Group

Timings

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 1 PM

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations		↔	↔	↔	↔	↔
Volume (vph)	3	0	246	0	1315	745
Turn Type	Perm	NA	custom	NA	NA	NA
Protected Phases		4	3	7	2	6
Permitted Phases	4		3			
Detector Phase	4	4	3	7	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0
Total Split (s)	17.0	17.0	16.0	33.0	47.0	47.0
Total Split (%)	21.3%	21.3%	20.0%	41.3%	58.8%	58.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0
Lost Time Adjust (s)		-3.0	-3.0	-3.0	-2.0	-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effct Green (s)		9.4	19.6	23.0	49.0	49.0
Actuated g/C Ratio		0.12	0.24	0.29	0.61	0.61
v/c Ratio		0.02	0.28	0.70	0.58	0.33
Control Delay		0.2	26.0	29.5	7.7	7.7
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2	26.0	29.5	7.7	7.7
LOS		A	C	C	A	A
Approach Delay		0.2		28.0	7.7	7.7
Approach LOS		A		C	A	A

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 76 (95%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.70

Intersection Signal Delay: 12.1

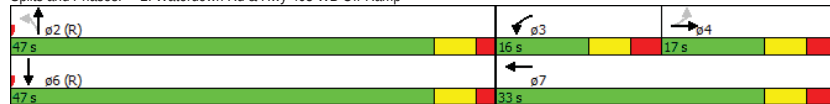
Intersection LOS: B

Intersection Capacity Utilization 63.8%

ICU Level of Service B

Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 1 PM

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (vph)	3	0	2	246	0	336	0	1315	0	0	745	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		*1.00	1.00			*1.00			*1.00	
Frt		0.95		1.00	0.85			1.00			1.00	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1711		3539	1583			3725			3720	
Flt Permitted		0.64		0.95	1.00			1.00			1.00	
Satd. Flow (perm)		1128		3539	1583			3725			3720	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	3	0	2	246	0	336	0	1315	0	0	745	7
RTOR Reduction (vph)	0	5	0	0	26	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	246	310	0	0	1315	0	0	751	0
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4		3	7			2			6	
Permitted Phases	4			3			2					
Actuated Green, G (s)		2.0		16.6	25.6			41.4			41.4	
Effective Green, g (s)		5.0		19.6	28.6			43.4			43.4	
Actuated g/C Ratio		0.06		0.25	0.36			0.54			0.54	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		70		867	565			2020			2018	
v/s Ratio Prot				0.07	c0.20			c0.35			0.20	
v/s Ratio Perm		0.00										
v/c Ratio		0.00		0.28	0.55			0.65			0.37	
Uniform Delay, d1		35.2		24.5	20.5			12.9			10.5	
Progression Factor		1.00		1.00	1.00			0.66			0.88	
Incremental Delay, d2		0.0		0.2	1.1			1.2			0.5	
Delay (s)		35.2		24.7	21.6			9.8			9.7	
Level of Service		D		C	C			A			A	
Approach Delay (s)		35.2			22.9			9.8			9.7	
Approach LOS		D			C			A			A	

Intersection Summary

HCM 2000 Control Delay 12.7

HCM 2000 Level of Service

B

HCM 2000 Volume to Capacity ratio 0.65

Actuated Cycle Length (s) 80.0

Sum of lost time (s)

12.0

Intersection Capacity Utilization 63.8%

ICU Level of Service

B

Analysis Period (min) 15

c Critical Lane Group

Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

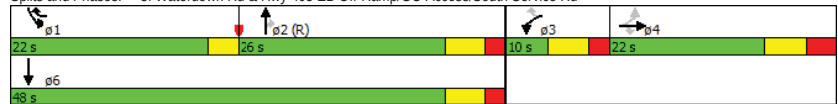
Total Traffic Phase 1 PM

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↩	↑	↗	↖	↗	↑↑	↗	↖	↑↑
Volume (vph)	244	182	238	165	384	687	343	335	658
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3		2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	22.0	22.0	22.0	10.0	22.0	26.0	26.0	22.0	48.0
Total Split (%)	27.5%	27.5%	27.5%	12.5%	27.5%	32.5%	32.5%	27.5%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	17.1	17.1	17.1	6.0	21.8	25.0	25.0	15.8	44.9
Actuated g/C Ratio	0.21	0.21	0.21	0.08	0.27	0.31	0.31	0.20	0.56
v/c Ratio	0.64	0.46	0.71	0.62	0.89	0.59	0.49	0.49	0.32
Control Delay	37.1	31.2	42.2	45.7	41.4	22.5	5.0	23.6	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	31.2	42.2	45.7	41.4	22.5	5.0	23.6	7.2
LOS	D	C	D	D	D	C	A	C	A
Approach Delay	37.3			16.7			12.7		
Approach LOS	D			B			B		

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 75 (94%), Referenced to phase 2:NBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 24.1
Intersection LOS: C
Intersection Capacity Utilization 66.3%
ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 1 PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↑	↗	↖		↗		↑↑	↗	↖	↑↑	
Volume (vph)	244	182	238	165	0	384	0	687	343	335	658	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	*1.00	0.97	*1.00	
Flpb, ped/bikes	1.00	1.00	0.98	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1557	3539		1583		3725	1583	3433	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1557	3539		1583		3725	1583	3433	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	244	182	238	165	0	384	0	687	343	335	658	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	202	0	0	0
Lane Group Flow (vph)	244	182	238	165	0	384	0	687	141	335	658	0
Confl. Peds. (#/hr)	3			3			NA			Perm	Prot	NA
Turn Type	Perm	NA	Perm	Prot	pm+ov			NA	Perm	Prot	NA	
Protected Phases	4			3			1			2	1	6
Permitted Phases	4			4			3			2		
Actuated Green, G (s)	14.1	14.1	14.1	4.0	20.8			23.1	23.1	16.8	42.9	
Effective Green, g (s)	17.1	17.1	17.1	6.0	18.8			25.1	25.1	15.8	44.9	
Actuated g/C Ratio	0.21	0.21	0.21	0.08	0.24			0.31	0.31	0.20	0.56	
Clearance Time (s)	7.0	7.0	7.0	6.0	3.0			6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	378	398	332	265	372			1168	496	678	2090	
v/s Ratio Prot	0.10			c0.05			c0.20			c0.18		
v/s Ratio Perm	0.14			c0.15			0.04			0.09		
v/c Ratio	0.65	0.46	0.72	0.62	1.03			0.59	0.28	0.49	0.31	
Uniform Delay, d1	28.7	27.4	29.2	35.9	30.6			23.1	20.7	28.5	9.4	
Progression Factor	1.00	1.00	1.00	0.97	0.86			0.84	0.54	0.75	0.70	
Incremental Delay, d2	3.8	0.8	7.2	4.5	55.1			2.0	1.3	0.5	0.4	
Delay (s)	32.4	28.2	36.4	39.1	81.3			21.4	12.4	22.1	6.9	
Level of Service	C	C	D	D	F			C	B	C	A	
Approach Delay (s)	32.7			68.6			18.4			12.0		
Approach LOS	C			E			B			B		

Intersection Summary

HCM 2000 Control Delay	27.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 1 PM

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	26	0	76	0	1	453	192	855
Volume (vph)	26	0	76	0	1	453	192	855
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	4	4	8	8	2	2	1	6
Permitted Phases	4	4	8	8	2	2	1	6
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	12.0	36.0
Total Split (s)	32.0	32.0	32.0	32.0	36.0	36.0	12.0	48.0
Total Split (%)	40.0%	40.0%	40.0%	40.0%	45.0%	45.0%	15.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	17.7	17.7	17.7	17.7	42.6	42.6	54.3	54.3
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.53	0.53	0.68	0.68
v/c Ratio	0.22	0.25	0.79	0.00	0.25	0.31	0.34	0.34
Control Delay	3.5	25.0	14.8	13.0	11.7	3.6	2.5	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.5	25.0	14.8	13.0	11.7	3.6	2.5	2.5
LOS	A	C	B	B	B	A	A	A
Approach Delay	3.5		16.0		11.7		2.7	
Approach LOS	A		B		B		A	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 60 (75%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.79

Intersection Signal Delay: 8.5

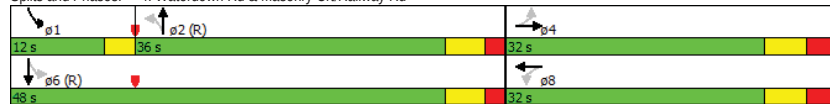
Intersection LOS: A

Intersection Capacity Utilization 74.9%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd



HCM Signalized Intersection Capacity Analysis

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 1 PM

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	26	0	8	76	0	551	1	453	42	192	855	14
Volume (vph)	26	0	8	76	0	551	1	453	42	192	855	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	0.97	1.00	0.85	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Flt Protected	0.96	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1737	1770	1583	1770	1583	1770	1583	1770	1583	1770	1583	1770
Flt Permitted	0.23	0.73	1.00	0.34	1.00	0.34	1.00	0.34	1.00	0.42	1.00	1.00
Satd. Flow (perm)	407	1369	1583	635	3678	635	3678	635	3678	776	3716	3716
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	0	8	76	0	551	1	453	42	192	855	14
RTOR Reduction (vph)	0	26	0	0	345	0	0	7	0	0	1	0
Lane Group Flow (vph)	0	8	0	76	206	0	1	488	0	192	868	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA	NA
Protected Phases	4	4	8	8	2	2	1	6	1	6	6	6
Permitted Phases	4	4	8	8	2	2	1	6	1	6	6	6
Actuated Green, G (s)	14.7	14.7	14.7	14.7	40.6	40.6	52.3	52.3	52.3	52.3	52.3	52.3
Effective Green, g (s)	17.7	17.7	17.7	17.7	42.6	42.6	51.3	51.3	51.3	51.3	51.3	51.3
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.53	0.53	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	90	302	350	338	1958	593	2522	593	2522	593	2522	593
v/s Ratio Prot	0.02	0.06	0.13	0.13	0.13	0.13	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.08	0.25	0.59	0.59	0.00	0.25	0.32	0.32	0.32	0.32	0.32	0.32
Uniform Delay, d1	24.7	25.7	27.9	8.8	10.1	6.1	5.4	5.4	5.4	5.4	5.4	5.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.39	0.39	0.39	0.39	0.39	0.39
Incremental Delay, d2	0.4	0.4	2.5	0.0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Delay (s)	25.1	26.1	30.4	8.8	10.4	2.7	2.1	2.1	2.1	2.1	2.1	2.1
Level of Service	C	C	C	A	B	A	A	A	A	A	A	A
Approach Delay (s)	25.1		29.9		10.4		2.2	2.2	2.2	2.2	2.2	2.2
Approach LOS	C		C		B		A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	12.2											
HCM 2000 Volume to Capacity ratio	0.43											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	74.9%											
Analysis Period (min)	15											
c Critical Lane Group												

Timings

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 1 PM

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↔↔	↔↔	↔
Volume (vph)	844	536	13
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.24	0.15	0.06
Control Delay	0.7	0.6	28.5
Queue Delay	0.0	0.0	0.0
Total Delay	0.7	0.6	28.5
LOS	A	A	C
Approach Delay	0.7	0.6	28.5
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 52 (65%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.24
 Intersection Signal Delay: 1.0
 Intersection LOS: A
 Intersection Capacity Utilization 37.2%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 1 PM

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (vph)	844	16	0	536	13	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3715			3725	1753	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3715			3725	1753	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	844	16	0	536	13	2
RTOR Reduction (vph)	1	0	0	0	2	0
Lane Group Flow (vph)	859	0	0	536	13	0
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3129			3138	100	
v/s Ratio Prot	c0.23			0.14	c0.01	
v/s Ratio Perm						
v/c Ratio	0.27			0.17	0.13	
Uniform Delay, d1	1.3			1.2	35.8	
Progression Factor	0.71			0.71	1.00	
Incremental Delay, d2	0.2			0.1	0.6	
Delay (s)	1.1			0.9	36.4	
Level of Service	A			A	D	
Approach Delay (s)	1.1			0.9	36.4	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 1.4
 HCM 2000 Volume to Capacity ratio 0.27
 Actuated Cycle Length (s) 80.0
 Intersection Capacity Utilization 37.2%
 Analysis Period (min) 15
 HCM 2000 Level of Service A
 Sum of lost time (s) 8.0
 ICU Level of Service A
 Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Total Traffic Phase 1 PM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	712	134	0	405	131	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	712	134	0	405	131	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.96		0.96	0.96
vC, conflicting volume			846		982	423
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			758		899	318
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		51	99
cM capacity (veh/h)			816		268	652
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	475	371	135	270	139	
Volume Left	0	0	0	0	131	
Volume Right	0	134	0	0	8	
cSH	1700	1700	816	1700	277	
Volume to Capacity	0.28	0.22	0.00	0.16	0.50	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	21.0	
Control Delay (s)	0.0	0.0	0.0	0.0	30.4	
Lane LOS					D	
Approach Delay (s)	0.0		0.0		30.4	
Approach LOS					D	
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			38.4%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 1 PM

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	511	200	228	226	39
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	59.0	59.0	59.0	59.0	21.0
Total Split (%)	73.8%	73.8%	73.8%	73.8%	26.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	55.6	55.6	55.6	55.6	16.4
Actuated g/C Ratio	0.70	0.70	0.70	0.70	0.20
v/c Ratio	0.64	0.16	0.18	0.19	0.59
Control Delay	8.9	2.6	1.7	0.4	35.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	2.6	1.7	0.4	35.8
LOS	A	A	A	A	D
Approach Delay		7.1	1.0		35.8
Approach LOS		A	A		D
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 50 (63%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 55					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.64					
Intersection Signal Delay: 9.6					Intersection LOS: A
Intersection Capacity Utilization 64.2%					ICU Level of Service C
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	511	200	9	0	228	226	177	39	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flt	1.00	0.99			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.96				
Satd. Flow (prot)	1770	1849			1863	1583		1789				
Flt Permitted	0.62	1.00			1.00	1.00		0.96				
Satd. Flow (perm)	1148	1849			1863	1583		1789				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	511	200	9	0	228	226	177	39	0	0	0	0
RTOR Reduction (vph)	0	2	0	0	0	69	0	0	0	0	0	0
Lane Group Flow (vph)	511	207	0	0	228	157	0	216	0	0	0	0
Confl. Peds. (#/hr)	2											
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2											
Permitted Phases	2											
Actuated Green, G (s)	53.6	53.6			53.6	53.6		13.4				
Effective Green, g (s)	55.6	55.6			55.6	55.6		16.4				
Actuated g/C Ratio	0.70	0.70			0.70	0.70		0.20				
Clearance Time (s)	6.0	6.0			6.0	6.0		7.0				
Vehicle Extension (s)	3.0	3.0			3.0	3.0		5.0				
Lane Grp Cap (vph)	797	1285			1294	1100		366				
v/s Ratio Prot		0.11			0.12							
v/s Ratio Perm	c0.45					0.10		0.12				
v/c Ratio	0.64	0.16			0.18	0.14		0.59				
Uniform Delay, d1	6.7	4.2			4.2	4.1		28.8				
Progression Factor	0.66	0.54			0.31	0.03		1.00				
Incremental Delay, d2	3.9	0.3			0.3	0.3		3.8				
Delay (s)	8.3	2.5			1.6	0.4		32.6				
Level of Service	A	A			A	A		C				
Approach Delay (s)	6.6				1.0		32.6		0.0			
Approach LOS	A				A		C		A			
Intersection Summary												
HCM 2000 Control Delay	8.8				HCM 2000 Level of Service				A			
HCM 2000 Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	80.0				Sum of lost time (s)				8.0			
Intersection Capacity Utilization	64.2%				ICU Level of Service				C			
Analysis Period (min)	15											
c Critical Lane Group												

Timings

8: King Rd & North Service Rd

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations										
Volume (vph)	8	339	515	649	91	245	94	21	35	
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA	
Protected Phases		2	1	6			8		4	
Permitted Phases			6		6	8		4		
Detector Phase	2	2	1	6	6	8	8	4	4	
Switch Phase										
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0	
Total Split (s)	29.0	29.0	26.0	55.0	55.0	25.0	25.0	25.0	25.0	
Total Split (%)	36.3%	36.3%	32.5%	68.8%	68.8%	31.3%	31.3%	31.3%	31.3%	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	
Act Effct Green (s)	28.7	28.7	51.9	51.9	51.9	20.1	20.1	20.1	20.1	
Actuated g/C Ratio	0.36	0.36	0.65	0.65	0.65	0.25	0.25	0.25	0.25	
v/c Ratio	0.03	0.65	0.85	0.54	0.09	0.72	0.40	0.11	0.06	
Control Delay	8.8	15.6	25.8	9.8	1.6	35.6	5.8	24.3	17.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	8.8	15.6	25.8	9.8	1.6	35.6	5.8	24.3	17.8	
LOS	A	B	C	A	A	D	A	C	B	
Approach Delay		15.5		15.8			17.0		19.8	
Approach LOS		B		B			B		B	
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 80										
Offset: 79 (99%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green										
Natural Cycle: 70										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.85										
Intersection Signal Delay: 16.2										
Intersection LOS: B										
Intersection Capacity Utilization 81.8%										
ICU Level of Service D										
Analysis Period (min) 15										

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	8	339	85	515	649	91	245	94	313	21	35	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.88		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1807		1770	1863	1583	1770	3131		1770	3395	
Flt Permitted	0.42	1.00		0.24	1.00	1.00	0.72	1.00		0.41	1.00	
Satd. Flow (perm)	779	1807		449	1863	1583	1349	3131		761	3395	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	339	85	515	649	91	245	94	313	21	35	13
RTOR Reduction (vph)	0	10	0	0	0	32	0	234	0	0	10	0
Lane Group Flow (vph)	8	414	0	515	649	59	245	173	0	21	38	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	2			1	6		8			4		
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	26.7	26.7		49.9	49.9	49.9	17.1	17.1		17.1	17.1	
Effective Green, g (s)	28.7	28.7		48.9	51.9	51.9	20.1	20.1		20.1	20.1	
Actuated g/C Ratio	0.36	0.36		0.61	0.65	0.65	0.25	0.25		0.25	0.25	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	279	648		591	1208	1026	338	786		191	852	
v/s Ratio Prot		0.23		0.21	0.35		0.06			0.01		
v/s Ratio Perm	0.01			0.32		0.04	0.18			0.03		
v/c Ratio	0.03	0.64		0.87	0.54	0.06	0.72	0.22		0.11	0.04	
Uniform Delay, d1	16.6	21.3		13.9	7.6	5.1	27.4	23.7		23.1	22.7	
Progression Factor	0.44	0.47		1.00	1.00	1.00	0.84	0.74		1.00	1.00	
Incremental Delay, d2	0.2	4.3		13.3	1.7	0.1	7.0	0.1		0.3	0.0	
Delay (s)	7.4	14.4		27.2	9.3	5.2	29.9	17.8		23.3	22.7	
Level of Service	A	B		C	A	A	C	B		C	C	
Approach Delay (s)		14.3			16.4		22.3			22.9		
Approach LOS		B			B		C			C		
Intersection Summary												
HCM 2000 Control Delay		17.8							B			
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		80.0						12.0				
Intersection Capacity Utilization		81.8%							D			
Analysis Period (min)		15										
c Critical Lane Group												

Timings 9: King Rd & Plains Rd E

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	102	933	88	100	1277	327	346	150	555	182	82
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	15.0	25.0	15.0	25.0	25.0
Total Split (%)	9.4%	43.5%	43.5%	9.4%	43.5%	43.5%	17.6%	29.4%	17.6%	29.4%	29.4%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	36.3	33.3	33.3	36.3	33.3	33.3	27.5	16.7	11.1	17.0	17.0
Actuated g/C Ratio	0.46	0.42	0.42	0.46	0.42	0.42	0.35	0.21	0.14	0.21	0.21
v/c Ratio	0.54	0.60	0.12	0.43	0.82	0.44	0.79	0.57	1.16	0.46	0.18
Control Delay	24.0	20.9	0.3	17.9	27.1	10.2	34.1	31.1	126.4	31.6	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	20.9	0.3	17.9	27.1	10.2	34.1	31.1	126.4	31.6	0.8
LOS	C	C	A	B	C	B	C	C	F	C	A
Approach Delay		19.5			23.3			32.9		92.8	
Approach LOS		B			C			C		F	
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 79.3											
Natural Cycle: 85											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 1.16											
Intersection Signal Delay: 37.1											
Intersection Capacity Utilization 84.5%											
Analysis Period (min) 15											
Splits and Phases: 9: King Rd & Plains Rd E											

HCM Signalized Intersection Capacity Analysis
9: King Rd & Plains Rd E

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰	↰↱	↰	↰	↰	↰	↰↱	↰	↰
Volume (vph)	102	933	88	100	1277	327	346	150	72	555	182	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	*1.00	1.00	1.00	*1.00	*1.00	1.00	1.00		0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1769	3725	1539	1769	3725	1531	1766	1740		3433	1863	1556
Flt Permitted	0.13	1.00	1.00	0.19	1.00	1.00	0.50	1.00		0.95	1.00	1.00
Satd. Flow (perm)	247	3725	1539	353	3725	1531	934	1740		3433	1863	1556
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	102	933	88	100	1277	327	346	150	72	555	182	82
RTOR Reduction (vph)	0	0	51	0	0	105	0	21	0	0	0	65
Lane Group Flow (vph)	102	933	37	100	1277	222	346	201	0	555	182	17
Confl. Peds. (#/hr)	10		6	6		10	4		33	33		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	35.1	31.2	31.2	35.1	31.2	31.2	25.5	13.7		8.1	14.0	14.0
Effective Green, g (s)	33.1	33.2	33.2	33.1	33.2	33.2	23.5	16.7		11.1	17.0	17.0
Actuated g/C Ratio	0.41	0.42	0.42	0.41	0.42	0.42	0.29	0.21		0.14	0.21	0.21
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	157	1547	639	197	1547	636	387	363		476	396	331
v/s Ratio Prot	c0.02	0.25		0.02	c0.34		0.12	0.12		c0.16	0.10	
v/s Ratio Perm	0.24		0.02	0.19		0.14	c0.14					0.01
v/c Ratio	0.65	0.60	0.06	0.51	0.83	0.35	0.89	0.55		1.17	0.46	0.05
Uniform Delay, d1	17.9	18.2	14.0	15.7	20.8	16.0	25.6	28.3		34.4	27.4	25.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	8.9	1.8	0.2	2.1	5.2	1.5	22.1	1.8		95.5	0.8	0.1
Delay (s)	26.8	20.0	14.2	17.7	25.9	17.5	47.7	30.1		129.9	28.3	25.1
Level of Service	C	B	B	B	C	B	D	C		F	C	C
Approach Delay (s)		20.1			23.8			40.8			96.8	
Approach LOS		C			C			D			F	
Intersection Summary												
HCM 2000 Control Delay		39.3			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		79.9			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		84.5%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

Timings
10: King Rd & South Service Rd

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	255	242	261	393	543
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	24.0	24.0	16.0	56.0	40.0
Total Split (%)	30.0%	30.0%	20.0%	70.0%	50.0%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	17.5	17.5	54.5	54.5	41.2
Actuated g/C Ratio	0.22	0.22	0.68	0.68	0.52
v/c Ratio	0.66	0.45	0.61	0.31	0.67
Control Delay	33.1	5.4	11.9	6.4	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	33.1	5.4	11.9	6.4	12.1
LOS	C	A	B	A	B
Approach Delay	19.6			8.6	12.1
Approach LOS	B			A	B
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 16 (20%), Referenced to phase 2:NBT and 6:SBT, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.67					
Intersection Signal Delay: 12.9			Intersection LOS: B		
Intersection Capacity Utilization 72.8%			ICU Level of Service C		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	255	242	261	393	543	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1826	
Flt Permitted	0.95	1.00	0.21	1.00	1.00	
Satd. Flow (perm)	1770	1583	394	1863	1826	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	255	242	261	393	543	92
RTOR Reduction (vph)	0	189	0	0	7	0
Lane Group Flow (vph)	255	53	261	393	628	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	15.5	15.5	52.5	52.5	39.2	
Effective Green, g (s)	17.5	17.5	51.5	54.5	41.2	
Actuated g/C Ratio	0.22	0.22	0.64	0.68	0.52	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	387	346	413	1269	940	
v/s Ratio Prot			c0.07	0.21	c0.34	
v/s Ratio Perm	c0.14	0.03	0.33			
v/c Ratio	0.66	0.15	0.63	0.31	0.67	
Uniform Delay, d1	28.5	25.3	10.1	5.2	14.3	
Progression Factor	0.87	0.68	1.00	1.00	0.58	
Incremental Delay, d2	4.0	0.2	3.1	0.6	2.5	
Delay (s)	28.7	17.4	13.3	5.8	10.8	
Level of Service	C	B	B	A	B	
Approach Delay (s)	23.2			8.8	10.8	
Approach LOS	C			A	B	
Intersection Summary						
HCM 2000 Control Delay			13.5		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			72.8%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	230	0	0	474	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	230	0	0	474	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			230		704	230
vC1, stage 1 conf vol					230	
vC2, stage 2 conf vol					474	
vCu, unblocked vol			230		704	230
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1338		576	809
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	230	474	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1338	1700			
Volume to Capacity	0.14	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			28.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↙	↘
Volume (veh/h)	43	187	385	40	149	89
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	43	187	385	40	149	89
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	425				678	405
vC1, stage 1 conf vol					405	
vC2, stage 2 conf vol					273	
vCu, unblocked vol	425				678	405
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				75	86
cM capacity (veh/h)	1134				588	646
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	230	425	238			
Volume Left	43	0	149			
Volume Right	0	40	89			
cSH	1134	1700	609			
Volume to Capacity	0.04	0.25	0.39			
Queue Length 95th (m)	0.9	0.0	14.8			
Control Delay (s)	1.8	0.0	14.7			
Lane LOS	A		B			
Approach Delay (s)	1.8	0.0	14.7			
Approach LOS			B			
Intersection Summary						
Average Delay		4.4				
Intersection Capacity Utilization		58.6%		ICU Level of Service	B	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↘	↙	
Volume (veh/h)	423	0	0	385	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	423	0	0	385	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLT			TWLT		
Median storage (veh)	2			2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			423		808	423
vC1, stage 1 conf vol					423	
vC2, stage 2 conf vol					385	
vCu, unblocked vol			423		808	423
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1136		552	631
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	423	385	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1700	1136	1700			
Volume to Capacity	0.25	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS			A			
Intersection Summary						
Average Delay		0.0				
Intersection Capacity Utilization		25.6%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Total Traffic Phase 1 PM

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	B19	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	T	L	L	T	TR	L	T	TR
Maximum Queue (m)	135.3	260.1	134.7	23.7	71.5	78.1	83.4	96.3	41.2	95.3	97.2
Average Queue (m)	49.8	121.0	58.7	3.0	39.4	45.2	45.6	54.6	18.0	36.7	52.4
95th Queue (m)	155.7	284.0	160.7	30.6	63.2	67.2	70.6	80.4	31.7	70.2	82.5
Link Distance (m)	341.1		1977.6				135.0		130.8		
Upstream Blk Time (%)	2								0		
Queuing Penalty (veh)	16								0		
Storage Bay Dist (m)	165.0		125.0		60.0		60.0		70.0		70.0
Storage Blk Time (%)	22				1		3		1		0
Queuing Penalty (veh)	106				3		16		7		2

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	9.7	37.3	49.0	80.3	41.3	43.3	44.9	55.5
Average Queue (m)	1.7	17.8	25.7	42.7	24.3	25.0	16.8	29.0
95th Queue (m)	7.2	32.0	41.3	71.2	40.0	40.7	37.9	51.1
Link Distance (m)	60.7	437.7		168.8		168.8		135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)	0							
Queuing Penalty (veh)	0							

Queuing and Blocking Report
Total Traffic Phase 1 PM

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	T	R	L	L	T
Maximum Queue (m)	81.4	58.9	96.8	36.4	37.2	72.0	73.1	68.4	59.7	39.8	41.2	38.1
Average Queue (m)	44.6	29.9	44.3	16.0	18.7	42.2	42.9	40.2	25.7	20.2	18.8	16.1
95th Queue (m)	72.0	52.6	84.3	29.8	31.9	67.2	63.2	61.3	51.7	35.1	33.7	31.6
Link Distance (m)	326.8				195.9		195.9		115.0		115.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	125.0		250.0		65.0				30.0		35.0	
Storage Blk Time (%)									18		2	
Queuing Penalty (veh)									63		8	
											1	

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB
Directions Served	T
Maximum Queue (m)	41.4
Average Queue (m)	15.2
95th Queue (m)	33.9
Link Distance (m)	168.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	20.0	64.7	110.9	3.4	49.4	50.6	36.7	43.6	47.3
Average Queue (m)	5.2	17.4	48.4	0.2	23.9	22.5	17.7	19.5	25.0
95th Queue (m)	15.1	42.0	88.5	2.1	42.6	42.4	32.0	36.1	42.5
Link Distance (m)	132.4		154.0		115.7	115.7		209.5	209.5
Upstream Blk Time (%)			0						
Queuing Penalty (veh)			0						
Storage Bay Dist (m)		35.0		90.0			90.0		
Storage Blk Time (%)		0	19						
Queuing Penalty (veh)		1	15						

Queuing and Blocking Report
Total Traffic Phase 1 PM

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	17.4	15.7	11.4	19.1	11.6
Average Queue (m)	3.4	2.1	1.5	3.1	3.1
95th Queue (m)	13.0	9.8	7.3	13.6	10.0
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	EB	NB
Directions Served	T	LR
Maximum Queue (m)	22.5	32.6
Average Queue (m)	0.9	16.1
95th Queue (m)	9.9	27.4
Link Distance (m)	94.7	52.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	93.4	36.1	38.7	27.8	65.3
Average Queue (m)	47.6	11.3	12.7	11.8	36.6
95th Queue (m)	80.2	26.2	27.7	23.6	60.6
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)	0				1
Queuing Penalty (veh)	1				0
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queuing and Blocking Report
Total Traffic Phase 1 PM

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	61.4	162.6	110.0	342.8	37.4	122.2	94.4	69.2	17.9	36.3	25.6
Average Queue (m)	5.1	78.1	87.6	220.9	5.6	57.1	20.3	28.2	5.5	12.0	4.8
95th Queue (m)	31.0	156.6	141.0	449.7	21.4	113.4	87.9	53.2	13.9	31.6	20.2
Link Distance (m)		1977.6		329.3			252.0	252.0		167.7	167.7
Upstream Blk Time (%)				52							
Queuing Penalty (veh)				0							
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)		34	62	4		11				10	
Queuing Penalty (veh)		3	455	22		5				2	

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	64.8	90.7	81.3	63.9	59.9	203.5	205.8	60.0	74.8	111.4	115.0	130.0
Average Queue (m)	20.2	57.8	46.5	7.6	36.8	153.6	146.8	53.9	50.0	44.5	114.5	129.8
95th Queue (m)	47.9	83.2	73.3	26.4	72.9	227.6	229.3	77.0	78.2	90.4	117.1	130.0
Link Distance (m)		250.1	250.1				193.4	193.4		131.9		
Upstream Blk Time (%)							14	18			0	
Queuing Penalty (veh)							0	0			0	
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)	0	25	10		3	54	50	5	21	5	69	95
Queuing Penalty (veh)	1	25	9		21	54	164	33	47	17	183	251

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB	B21
Directions Served	T	R	T
Maximum Queue (m)	440.1	32.8	309.8
Average Queue (m)	423.5	9.1	260.7
95th Queue (m)	470.7	23.3	427.7
Link Distance (m)	406.0		305.2
Upstream Blk Time (%)	85		26
Queuing Penalty (veh)	664		202
Storage Bay Dist (m)		35.0	
Storage Blk Time (%)	3	0	
Queuing Penalty (veh)	20	1	

Queuing and Blocking Report
Total Traffic Phase 1 PM

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB	B30	B30
Directions Served	L	R	L	T	TR	T	
Maximum Queue (m)	79.7	161.1	51.2	60.3	135.8	259.4	257.2
Average Queue (m)	50.8	68.5	24.7	28.1	109.9	177.1	96.8
95th Queue (m)	86.3	167.5	43.2	52.1	164.3	361.9	288.5
Link Distance (m)		293.0		305.2	103.9	252.0	252.0
Upstream Blk Time (%)		0			72	37	6
Queuing Penalty (veh)		2			455	118	18
Storage Bay Dist (m)	50.0		30.0				
Storage Blk Time (%)	9	29	5	4			
Queuing Penalty (veh)	21	74	21	11			

Intersection: 11: Block 1 Access B & South Service Rd

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 12: South Service Rd & Road B

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	25.6	1.4	37.6
Average Queue (m)	4.0	0.0	20.2
95th Queue (m)	15.3	1.0	33.1
Link Distance (m)	173.6	281.0	68.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
Total Traffic Phase 1 PM

Total Traffic Phase 1 PM
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement	EB
Directions Served	TR
Maximum Queue (m)	18.7
Average Queue (m)	1.2
95th Queue (m)	18.0
Link Distance (m)	281.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 3149

Appendix H

Total Traffic Operations - Phase 4

Timings

1: Waterdown Rd & North Service Rd

Total Traffic Phase 4 AM

Mixed Use Development 1200 King Rd

							
Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	64	133	77	198	431	281	971
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	27.0	27.0	27.0	13.0	33.0	20.0	40.0
Total Split (%)	33.8%	33.8%	33.8%	16.3%	41.3%	25.0%	50.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	23.0	23.0	23.0	9.0	33.9	46.5	36.0
Actuated g/C Ratio	0.29	0.29	0.29	0.11	0.42	0.58	0.45
v/c Ratio	0.13	0.25	0.14	0.50	0.51	0.66	0.69
Control Delay	22.0	23.4	0.5	43.8	7.5	15.7	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.0	23.4	0.5	43.8	7.5	15.7	19.7
LOS	C	C	A	D	A	B	B
Approach Delay		16.6			14.3		18.9
Approach LOS		B			B		B

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 21 (26%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 17.0

Intersection LOS: B

Intersection Capacity Utilization 65.9%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Total Traffic Phase 4 AM

Mixed Use Development 1200 King Rd

	↰	→	↱	↰	←	↰	↰	↑	↰	↰	↓	↰
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↱	↱	↱	↱		↰	↱	
Volume (vph)	0	0	0	64	133	77	198	431	418	281	971	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Flpb, ped/bikes				1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.98	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1562	3539	3450		1770	3632	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.22	1.00	
Satd. Flow (perm)				1770	1863	1562	3539	3450		405	3632	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	64	133	77	198	431	418	281	971	177
RTOR Reduction (vph)	0	0	0	0	0	55	0	198	0	0	20	0
Lane Group Flow (vph)	0	0	0	64	133	22	198	651	0	281	1128	0
Confl. Peds. (#/hr)	1						1	1				1
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				20.0	20.0	20.0	7.0	31.9		46.1	34.0	
Effective Green, g (s)				23.0	23.0	23.0	9.0	33.9		44.1	36.0	
Actuated g/C Ratio				0.29	0.29	0.29	0.11	0.42		0.55	0.45	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				508	535	449	398	1461		412	1634	
v/s Ratio Prot				0.04	c0.07		0.06	0.19		c0.09	c0.31	
v/s Ratio Perm						0.01						
v/c Ratio				0.13	0.25	0.05	0.50	0.45		0.68	0.69	
Uniform Delay, d1				21.1	21.9	20.6	33.4	16.4		11.3	17.6	
Progression Factor				1.00	1.00	1.00	1.17	0.62		1.00	1.00	
Incremental Delay, d2				0.1	1.1	0.2	4.2	0.9		4.6	2.4	
Delay (s)				21.2	23.0	20.8	43.4	11.1		15.9	20.0	
Level of Service				C	C	C	D	B		B	B	
Approach Delay (s)		0.0			21.9			17.2			19.2	
Approach LOS		A			C			B			B	

Intersection Summary

HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	1	0	372	0	3	800	1028
Volume (vph)	1	0	372	0	3	800	1028
Turn Type	Perm	NA	custom	NA	Perm	NA	NA
Protected Phases	4	4	3	7	2	2	6
Permitted Phases	4	4	3	7	2	2	6
Detector Phase	4	4	3	7	2	2	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0	31.0
Total Split (s)	11.0	11.0	21.0	32.0	48.0	48.0	48.0
Total Split (%)	13.8%	13.8%	26.3%	40.0%	60.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	7.7	15.7	17.9		54.1	54.1	
Actuated g/C Ratio	0.10	0.20	0.22		0.68	0.68	
v/c Ratio	0.02	0.54	0.52		0.34	0.41	
Control Delay	0.0	31.7	13.2		4.0	1.6	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	0.0	31.7	13.2		4.0	1.6	
LOS	A	C	B		A	A	
Approach Delay	0.0		24.4		4.0	1.6	
Approach LOS	A		C		A	A	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 18 (23%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.54

Intersection Signal Delay: 8.1

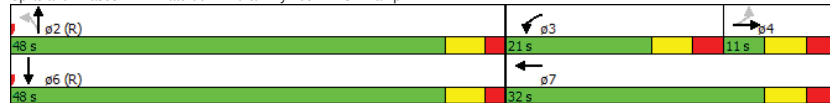
Intersection LOS: A

Intersection Capacity Utilization 52.6%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	0	3	372	0	246	3	800	0	0	1028	7
Volume (vph)	1	0	3	372	0	246	3	800	0	0	1028	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00			*1.00	1.00			*1.00			*1.00	
Flpb, ped/bikes	1.00			1.00	0.99			1.00			1.00	
Flpb, ped/bikes	1.00			1.00	1.00			1.00			1.00	
Frt	0.90			1.00	0.85			1.00			1.00	
Flt Protected	0.99			0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1652			3539	1563			3725			3721	
Flt Permitted	0.84			0.95	1.00			0.95			1.00	
Satd. Flow (perm)	1399			3539	1563			3548			3721	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	3	372	0	246	3	800	0	0	1028	7
RTOR Reduction (vph)	0	4	0	0	114	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	372	132	0	0	803	0	0	1035	0
Confl. Peds. (#/hr)	1					1	3					3
Turn Type	Perm	NA		custom	NA		Perm	NA			NA	
Protected Phases		4		3	7			2			6	
Permitted Phases	4			3			2					
Actuated Green, G (s)		0.8		12.7	20.5			46.5			46.5	
Effective Green, g (s)		3.8		15.7	23.5			48.5			48.5	
Actuated g/C Ratio		0.05		0.20	0.29			0.61			0.61	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		66		694	459			2150			2255	
v/s Ratio Prot				c0.11	c0.08						c0.28	
v/s Ratio Perm		0.00						0.23				
v/c Ratio		0.00		0.54	0.29			0.37			0.46	
Uniform Delay, d1		36.3		28.9	21.8			8.0			8.6	
Progression Factor		1.00		1.00	1.00			0.57			0.19	
Incremental Delay, d2		0.0		0.8	0.3			0.5			0.5	
Delay (s)		36.3		29.7	22.1			5.1			2.1	
Level of Service		D		C	C			A			A	
Approach Delay (s)		36.3			26.7			5.1			2.1	
Approach LOS		D			C			A			A	

Intersection Summary

HCM 2000 Control Delay 9.3

HCM 2000 Level of Service

A

HCM 2000 Volume to Capacity ratio 0.48

Actuated Cycle Length (s) 80.0

Sum of lost time (s)

12.0

Intersection Capacity Utilization 52.6%

ICU Level of Service

A

Analysis Period (min) 15

c Critical Lane Group

Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 4 AM

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	237	467	302	62	136	430	527	647	756
Volume (vph)	237	467	302	62	136	430	527	647	756
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3		2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	25.0	25.0	25.0	10.0	19.0	26.0	26.0	19.0	45.0
Total Split (%)	31.3%	31.3%	31.3%	12.5%	23.8%	32.5%	32.5%	23.8%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	21.6	21.6	21.6	6.0	20.2	22.9	22.9	15.4	42.4
Actuated g/C Ratio	0.27	0.27	0.27	0.08	0.25	0.29	0.29	0.19	0.53
v/c Ratio	0.50	0.93	0.71	0.23	0.34	0.40	0.91	0.95	0.38
Control Delay	29.2	56.6	37.4	34.7	13.7	11.3	31.6	51.9	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.2	56.6	37.4	34.7	13.7	11.3	31.6	51.9	8.1
LOS	C	E	D	C	B	B	C	D	A
Approach Delay		44.4				22.5			28.3
Approach LOS		D				C			C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 75 (94%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

Intersection Signal Delay: 30.8

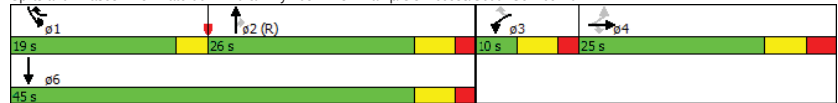
Intersection LOS: C

Intersection Capacity Utilization 85.7%

ICU Level of Service E

Analysis Period (min) 15

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 4 AM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	237	467	302	62	0	136	0	430	527	647	756	0
Volume (vph)	237	467	302	62	0	136	0	430	527	647	756	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	1.00	*1.00	*1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3539		1583		3725	1583	3539	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3539		1583		3725	1583	3539	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	237	467	302	62	0	136	0	430	527	647	756	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	129	0	0	0
Lane Group Flow (vph)	237	467	302	62	0	136	0	430	398	647	756	0
Confl. Peds. (#/hr)							2					2
Turn Type	Perm	NA	Perm	Prot		pm+ov		NA	Perm	Prot	NA	
Protected Phases		4		3		1		2		1	6	
Permitted Phases	4		4			3			2			
Actuated Green, G (s)	18.6	18.6	18.6	3.2		19.6		19.8	19.8	16.4	39.2	
Effective Green, g (s)	21.6	21.6	21.6	5.2		17.6		21.8	21.8	15.4	41.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.07		0.22		0.27	0.27	0.19	0.52	
Clearance Time (s)	7.0	7.0	7.0	6.0		3.0		6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	477	503	427	230		348		1015	431	681	1918	
v/s Ratio Prot		c0.25		c0.02		0.08		0.12		c0.18	0.20	
v/s Ratio Perm	0.13		0.19			0.01			c0.25			
v/c Ratio	0.50	0.93	0.71	0.27		0.39		0.42	0.92	0.95	0.39	
Uniform Delay, d1	24.6	28.4	26.3	35.6		26.6		23.9	28.3	31.9	11.8	
Progression Factor	1.00	1.00	1.00	0.93		0.88		0.43	0.47	0.84	0.65	
Incremental Delay, d2	0.8	23.4	5.3	0.6		0.7		1.2	26.1	21.6	0.6	
Delay (s)	25.4	51.9	31.6	33.7		24.1		11.6	39.6	48.4	8.3	
Level of Service	C	D	C	C		C		B	D	D	A	
Approach Delay (s)		39.6			27.1			27.0			26.8	
Approach LOS		D			C			C			C	

Intersection Summary

HCM 2000 Control Delay	30.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Timings
4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	27	0	29	0	8	784	465	634
Volume (vph)	27	0	29	0	8	784	465	634
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	4	4	8	8	2	2	1	6
Permitted Phases	4	4	8	8	2	2	1	6
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	12.0	36.0
Total Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	18.0	54.0
Total Split (%)	32.5%	32.5%	32.5%	32.5%	45.0%	45.0%	22.5%	67.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	11.4	11.4	11.4	11.4	37.8	37.8	63.6	64.4
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.47	0.47	0.80	0.80
v/c Ratio	0.16	0.15	0.20	0.02	0.52	0.69	0.22	0.22
Control Delay	2.4	31.9	0.8	14.4	17.1	13.7	3.8	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.4	31.9	0.8	14.4	17.1	13.7	3.8	3.8
LOS	A	C	A	B	B	B	A	A
Approach Delay	2.4		7.1		17.0		7.9	
Approach LOS	A		A		B		A	

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 40 (50%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 80	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 11.6	Intersection LOS: B
Intersection Capacity Utilization 70.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd

18 s	36 s	26 s
5 s	26 s	

HCM Signalized Intersection Capacity Analysis
4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	27	0	10	29	0	114	8	784	128	465	634	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00			1.00	1.00		1.00	*1.00		1.00	*1.00	
Frt	0.96			1.00	0.85		1.00	0.98		1.00	1.00	
Flt Protected	0.96			0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1732			1770	1583		1770	3647		1770	3708	
Flt Permitted	0.66			0.73	1.00		0.42	1.00		0.20	1.00	
Satd. Flow (perm)	1182			1365	1583		775	3647		368	3708	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	0	10	29	0	114	8	784	128	465	634	21
RTOR Reduction (vph)	0	32	0	0	100	0	0	16	0	0	2	0
Lane Group Flow (vph)	0	5	0	29	14	0	8	896	0	465	653	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		6.8		6.8	6.8		34.4	34.4		60.2	60.2	
Effective Green, g (s)		9.8		9.8	9.8		36.4	36.4		59.2	62.2	
Actuated g/C Ratio		0.12		0.12	0.12		0.45	0.45		0.74	0.78	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		144		167	193		352	1659		654	2882	
v/s Ratio Prot					0.01			0.25		c0.19	0.18	
v/s Ratio Perm		0.00		c0.02			0.01			c0.33		
v/c Ratio		0.03		0.17	0.07		0.02	0.54		0.71	0.23	
Uniform Delay, d1		30.9		31.5	31.1		12.0	15.8		11.1	2.4	
Progression Factor		1.00		1.00	1.00		1.00	1.00		0.96	1.43	
Incremental Delay, d2		0.1		0.5	0.2		0.1	1.3		3.3	0.2	
Delay (s)		31.0		32.0	31.2		12.1	17.0		13.9	3.6	
Level of Service		C		C	C		B	B		B	A	
Approach Delay (s)		31.0			31.4			17.0			7.9	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			13.6		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			80.0		Sum of lost time (s)					12.0		
Intersection Capacity Utilization			70.3%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

Timings

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 4 AM

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↕↕	↕↕	↕
Volume (vph)	1622	184	14
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.46	0.05	0.07
Control Delay	0.6	0.8	28.4
Queue Delay	0.0	0.0	0.0
Total Delay	0.6	0.8	28.4
LOS	A	A	C
Approach Delay	0.6	0.8	28.4
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 64 (80%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.46
 Intersection Signal Delay: 0.9
 Intersection LOS: A
 Intersection Capacity Utilization 58.8%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 4 AM

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↕↕			↕↕	↕	
Volume (vph)	1622	19	0	184	14	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3718			3725	1755	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3718			3725	1755	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1622	19	0	184	14	2
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	1641	0	0	184	14	0
Confl. Peds. (#/hr)		2	2			
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3132			3138	100	
v/s Ratio Prot	c0.44			0.05	c0.01	
v/s Ratio Perm						
v/c Ratio	0.52			0.06	0.14	
Uniform Delay, d1	1.8			1.0	35.8	
Progression Factor	0.40			0.93	1.00	
Incremental Delay, d2	0.2			0.0	0.6	
Delay (s)	0.9			1.0	36.5	
Level of Service	A			A	D	
Approach Delay (s)	0.9			1.0	36.5	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 1.3 HCM 2000 Level of Service A
 HCM 2000 Volume to Capacity ratio 0.50
 Actuated Cycle Length (s) 80.0 Sum of lost time (s) 8.0
 Intersection Capacity Utilization 58.8% ICU Level of Service B
 Analysis Period (min) 15
 Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Total Traffic Phase 4 AM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (veh/h)	1483	141	0	136	48	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1483	141	0	136	48	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.85		0.85	0.85
vC, conflicting volume			1624		1622	812
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1377		1374	419
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		59	99
cM capacity (veh/h)			419		116	494
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	989	635	45	91	55	
Volume Left	0	0	0	0	48	
Volume Right	0	141	0	0	7	
cSH	1700	1700	419	1700	128	
Volume to Capacity	0.58	0.37	0.00	0.05	0.43	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	15.0	
Control Delay (s)	0.0	0.0	0.0	0.0	52.6	
Lane LOS					F	
Approach Delay (s)	0.0		0.0		52.6	
Approach LOS					F	
Intersection Summary						
Average Delay			1.6			
Intersection Capacity Utilization			55.5%		ICU Level of Service	B
Analysis Period (min)			15			

Timings 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 4 AM

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	668	549	123	170	22
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	65.0	65.0	65.0	65.0	15.0
Total Split (%)	81.3%	81.3%	81.3%	81.3%	18.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	68.6	68.6	68.6	68.6	11.0
Actuated g/C Ratio	0.86	0.86	0.86	0.86	0.14
v/c Ratio	0.62	0.54	0.08	0.12	0.14
Control Delay	3.8	1.7	2.1	0.6	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	3.8	1.7	2.1	0.6	32.0
LOS	A	A	A	A	C
Approach Delay		2.6	1.3		32.0
Approach LOS		A	A		C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 68 (85%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.62					
Intersection Signal Delay: 3.0					Intersection LOS: A
Intersection Capacity Utilization 65.6%					ICU Level of Service C
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 4 AM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	668	549	273	0	123	170	13	22	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	0.99			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	0.95			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.98				
Satd. Flow (prot)	1770	1756			1863	1583		1829				
Flt Permitted	0.68	1.00			1.00	1.00		0.98				
Satd. Flow (perm)	1263	1756			1863	1583		1829				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	668	549	273	0	123	170	13	22	0	0	0	0
RTOR Reduction (vph)	0	19	0	0	0	34	0	0	0	0	0	0
Lane Group Flow (vph)	668	803	0	0	123	136	0	35	0	0	0	0
Confl. Peds. (#/hr)			2									
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2				6		6		8			
Permitted Phases	2		6		6		8					
Actuated Green, G (s)	62.2	62.2			62.2	62.2	4.8					
Effective Green, g (s)	64.2	64.2			64.2	64.2	7.8					
Actuated g/C Ratio	0.80	0.80			0.80	0.80	0.10					
Clearance Time (s)	6.0	6.0			6.0	6.0	7.0					
Vehicle Extension (s)	3.0	3.0			3.0	3.0	5.0					
Lane Grp Cap (vph)	1013	1409			1495	1270	178					
v/s Ratio Prot		0.46			0.07							
v/s Ratio Perm	c0.53					0.09	0.02					
v/c Ratio	0.66	0.57			0.08	0.11	0.20					
Uniform Delay, d1	3.3	2.9			1.7	1.7	33.2					
Progression Factor	0.32	0.16			1.00	1.00	1.00					
Incremental Delay, d2	3.0	1.5			0.1	0.2	1.1					
Delay (s)	4.1	2.0			1.8	1.9	34.4					
Level of Service	A	A			A	A	C					
Approach Delay (s)	2.9				1.8		34.4				0.0	
Approach LOS	A				A		C				A	
Intersection Summary												
HCM 2000 Control Delay	3.4		HCM 2000 Level of Service		A							
HCM 2000 Volume to Capacity ratio	0.61											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	65.6%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

Timings

8: King Rd & North Service Rd

Total Traffic Phase 4 AM

Mixed Use Development 1200 King Rd

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	6	470	257	250	23	75	25	21	32
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2	1	6		8		4	
Permitted Phases			6		6		8		4
Detector Phase	2	2	1	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0
Total Split (s)	68.0	68.0	25.0	93.0	93.0	27.0	27.0	27.0	27.0
Total Split (%)	56.7%	56.7%	20.8%	77.5%	77.5%	22.5%	22.5%	22.5%	22.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	80.3	80.3	93.4	93.4	93.4	18.6	18.6	18.6	18.6
Actuated g/C Ratio	0.67	0.67	0.78	0.78	0.78	0.16	0.16	0.16	0.16
v/c Ratio	0.01	0.49	0.45	0.17	0.02	0.36	0.49	0.26	0.07
Control Delay	7.8	11.6	6.2	3.8	0.7	40.8	4.3	52.9	36.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	11.6	6.2	3.8	0.7	40.8	4.3	52.9	36.4
LOS	A	B	A	A	A	D	A	D	D
Approach Delay		11.6		4.8			10.1		42.0
Approach LOS		B		A			B		D
Intersection Summary									
Cycle Length: 120									
Actuated Cycle Length: 120									
Offset: 23 (19%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green									
Natural Cycle: 60									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.49									
Intersection Signal Delay: 10.1					Intersection LOS: B				
Intersection Capacity Utilization 74.0%					ICU Level of Service D				
Analysis Period (min) 15									

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	6	470	125	257	250	23	75	25	371	21	32	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*1.00		1.00	*1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.86		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1799		1770	1863	1583	1770	3202		1770	3614	
Flt Permitted	0.60	1.00		0.33	1.00	1.00	0.73	1.00		0.29	1.00	
Satd. Flow (perm)	1125	1799		622	1863	1583	1362	3202		533	3614	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	6	470	125	257	250	23	75	25	371	21	32	8
RTOR Reduction (vph)	0	6	0	0	0	5	0	313	0	0	7	0
Lane Group Flow (vph)	6	589	0	257	250	18	75	83	0	21	33	0
Confl. Peds. (#/hr)			1	1								
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	78.3	78.3		91.4	91.4	91.4	15.6	15.6		15.6	15.6	
Effective Green, g (s)	80.3	80.3		90.4	93.4	93.4	18.6	18.6		18.6	18.6	
Actuated g/C Ratio	0.67	0.67		0.75	0.78	0.78	0.16	0.16		0.16	0.16	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	752	1203		555	1450	1232	211	496		82	560	
v/s Ratio Prot		c0.33		c0.04	0.13			0.03			0.01	
v/s Ratio Perm	0.01			0.31		0.01	c0.06			0.04		
v/c Ratio	0.01	0.49		0.46	0.17	0.01	0.36	0.17		0.26	0.06	
Uniform Delay, d1	6.6	9.8		6.6	3.4	3.0	45.3	44.0		44.6	43.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.79	0.37		1.00	1.00	
Incremental Delay, d2	0.0	1.4		0.6	0.3	0.0	1.0	0.2		1.7	0.0	
Delay (s)	6.6	11.2		7.2	3.7	3.0	37.0	16.5		46.3	43.3	
Level of Service	A	B		A	A	A	D	B		D	D	
Approach Delay (s)		11.2			5.4			19.8			44.3	
Approach LOS		B			A			B			D	

Intersection Summary

HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings 9: King Rd & Plains Rd E

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	96	801	147	54	345	515	184	122	286	81	34
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	11.0	25.0	15.0	29.0	29.0
Total Split (%)	9.4%	43.5%	43.5%	9.4%	43.5%	43.5%	12.9%	29.4%	17.6%	34.1%	34.1%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	37.1	34.8	34.8	36.3	33.2	33.2	24.7	15.8	11.1	18.8	18.8
Actuated g/C Ratio	0.47	0.44	0.44	0.46	0.42	0.42	0.32	0.20	0.14	0.24	0.24
v/c Ratio	0.19	0.48	0.19	0.18	0.22	0.54	0.39	0.53	0.57	0.18	0.07
Control Delay	12.3	17.9	4.6	12.4	15.9	4.2	20.1	28.5	37.7	24.2	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.3	17.9	4.6	12.4	15.9	4.2	20.1	28.5	37.7	24.2	0.3
LOS	B	B	A	B	B	A	C	C	D	C	A
Approach Delay		15.5			9.1			24.5		31.8	
Approach LOS		B			A			C		C	

Intersection Summary

Cycle Length: 85

Actuated Cycle Length: 78.3

Natural Cycle: 85

Control Type: Semi Act-Uncoord

Maximum v/c Ratio: 0.57

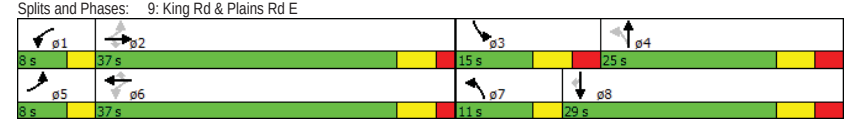
Intersection Signal Delay: 17.0

Intersection Capacity Utilization 64.9%

Analysis Period (min) 15

Intersection LOS: B

ICU Level of Service C



HCM Signalized Intersection Capacity Analysis 9: King Rd & Plains Rd E

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

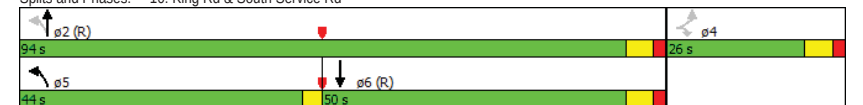
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	96	801	147	54	345	515	184	122	76	286	81	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
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
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1765	3725	1533	1768	3725	1537	1764	1733		3539	1863	1556
Flt Permitted	0.52	1.00	1.00	0.27	1.00	1.00	0.68	1.00		0.95	1.00	1.00
Satd. Flow (perm)	963	3725	1533	494	3725	1537	1269	1733		3539	1863	1556
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	96	801	147	54	345	515	184	122	76	286	81	34
RTOR Reduction (vph)	0	0	78	0	0	301	0	28	0	0	0	27
Lane Group Flow (vph)	96	801	69	54	345	214	184	171	0	286	81	7
Confl. Peds. (#/hr)	7		9	9		7	4		16	16		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	36.7	32.8	32.8	34.7	31.8	31.8	26.9	14.4		8.1	14.0	14.0
Effective Green, g (s)	34.7	34.8	34.8	32.7	33.8	33.8	24.9	17.4		11.1	17.0	17.0
Actuated g/C Ratio	0.43	0.43	0.43	0.40	0.42	0.42	0.31	0.21		0.14	0.21	0.21
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	440	1596	657	228	1550	639	459	371		483	390	325
v/s Ratio Prot	c0.01	c0.22		0.01	0.09		0.06	c0.10		c0.08	0.04	
v/s Ratio Perm	0.09		0.05	0.09		0.14	0.07					0.00
v/c Ratio	0.22	0.50	0.11	0.24	0.22	0.34	0.40	0.46		0.59	0.21	0.02
Uniform Delay, d1	14.1	16.9	13.9	15.4	15.2	16.1	21.8	27.8		32.9	26.5	25.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1	0.3	0.5	0.3	1.4	0.6	0.9		1.9	0.3	0.0
Delay (s)	14.4	18.0	14.2	15.9	15.6	17.5	22.4	28.7		34.9	26.8	25.5
Level of Service	B	B	B	B	B	B	C	C		C	C	C
Approach Delay (s)		17.1			16.7			25.7			32.4	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay		20.4			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.50										
Actuated Cycle Length (s)		81.2			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		64.9%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

Timings 10: King Rd & South Service Rd

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↰	↰	↰	↰	↰
Volume (vph)	110	128	451	356	258
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	26.0	26.0	44.0	94.0	50.0
Total Split (%)	21.7%	21.7%	36.7%	78.3%	41.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	14.8	14.8	97.2	97.2	79.6
Actuated g/C Ratio	0.12	0.12	0.81	0.81	0.66
v/c Ratio	0.51	0.42	0.58	0.24	0.34
Control Delay	56.6	12.0	6.4	3.4	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	56.6	12.0	6.4	3.4	12.3
LOS	E	B	A	A	B
Approach Delay	32.6			5.1	12.3
Approach LOS	C			A	B
Intersection Summary					
Cycle Length: 120					
Actuated Cycle Length: 120					
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green					
Natural Cycle: 65					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.58					
Intersection Signal Delay: 11.6			Intersection LOS: B		
Intersection Capacity Utilization 63.7%			ICU Level of Service B		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	110	128	451	356	258	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1771	
Flt Permitted	0.95	1.00	0.45	1.00	1.00	
Satd. Flow (perm)	1770	1583	833	1863	1771	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	128	451	356	258	148
RTOR Reduction (vph)	0	112	0	0	9	0
Lane Group Flow (vph)	110	16	451	356	397	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	12.8	12.8	95.2	95.2	77.6	
Effective Green, g (s)	14.8	14.8	94.2	97.2	79.6	
Actuated g/C Ratio	0.12	0.12	0.79	0.81	0.66	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	218	195	760	1509	1174	
v/s Ratio Prot			c0.07	0.19	0.22	
v/s Ratio Perm	c0.06	0.01	c0.40			
v/c Ratio	0.50	0.08	0.59	0.24	0.34	
Uniform Delay, d1	49.2	46.6	4.8	2.7	8.8	
Progression Factor	1.00	1.00	1.00	1.00	1.19	
Incremental Delay, d2	1.8	0.2	1.2	0.4	0.7	
Delay (s)	51.0	46.8	6.0	3.0	11.1	
Level of Service	D	D	A	A	B	
Approach Delay (s)	48.7			4.7	11.1	
Approach LOS	D			A	B	
Intersection Summary						
HCM 2000 Control Delay			13.7	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.59			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		14.0
Intersection Capacity Utilization			63.7%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	496	24	1	307	26	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	496	24	1	307	26	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			520		817	508
vC1, stage 1 conf vol					508	
vC2, stage 2 conf vol					309	
vCu, unblocked vol			520		817	508
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			1046		538	565
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	520	308	27			
Volume Left	0	1	26			
Volume Right	24	0	1			
cSH	1700	1046	539			
Volume to Capacity	0.31	0.00	0.05			
Queue Length 95th (m)	0.0	0.0	1.3			
Control Delay (s)	0.0	0.0	12.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.0	12.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			37.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Volume (veh/h)	146	343	280	136	32	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	146	343	280	136	32	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	416				983	348
vC1, stage 1 conf vol					348	
vC2, stage 2 conf vol					635	
vCu, unblocked vol	416				983	348
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	87				92	97
cM capacity (veh/h)	1143				422	695
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	489	416	50			
Volume Left	146	0	32			
Volume Right	0	136	18			
cSH	1143	1700	492			
Volume to Capacity	0.13	0.24	0.10			
Queue Length 95th (m)	3.5	0.0	2.7			
Control Delay (s)	3.5	0.0	13.2			
Lane LOS	A		B			
Approach Delay (s)	3.5	0.0	13.2			
Approach LOS			B			
Intersection Summary						
Average Delay		2.5				
Intersection Capacity Utilization		62.5%		ICU Level of Service	B	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↗	↖	
Volume (veh/h)	301	4	3	517	5	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	301	4	3	517	5	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT		TWLT		
Median storage (veh)		2		2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			305		826	303
vC1, stage 1 conf vol					303	
vC2, stage 2 conf vol					523	
vCu, unblocked vol			305		826	303
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1256		532	737
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	305	520	8			
Volume Left	0	3	5			
Volume Right	4	0	3			
cSH	1700	1256	594			
Volume to Capacity	0.18	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.3			
Control Delay (s)	0.0	0.1	11.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	11.1			
Approach LOS			B			
Intersection Summary						
Average Delay		0.2				
Intersection Capacity Utilization		39.6%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Total Traffic Phase 4 AM

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	T	R	L	L	T	TR	L	T	TR	
Maximum Queue (m)	29.6	41.2	21.0	26.7	31.4	55.7	79.2	58.8	118.2	98.6	
Average Queue (m)	11.7	20.7	9.5	13.3	19.4	22.4	42.1	32.3	57.0	67.7	
95th Queue (m)	24.2	36.4	19.0	24.0	29.7	40.4	66.5	51.4	91.6	94.6	
Link Distance (m)	341.1				135.0		135.0	130.8			
Upstream Blk Time (%)									0		
Queuing Penalty (veh)									0		
Storage Bay Dist (m)	165.0		125.0		60.0	60.0			70.0	70.0	
Storage Blk Time (%)							0	0	2	6	
Queuing Penalty (veh)							0	0	17	49	

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	8.8	50.7	56.0	42.5	17.0	21.7	21.0	26.8
Average Queue (m)	0.6	26.4	30.9	22.2	4.7	7.7	6.3	9.2
95th Queue (m)	4.4	44.3	49.8	37.8	12.3	18.3	16.3	21.3
Link Distance (m)	62.7	438.5			168.5	168.5	135.0	135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Total Traffic Phase 4 AM

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	T	R	L	L	T
Maximum Queue (m)	155.0	333.2	280.0	21.6	18.4	43.8	58.9	92.6	60.0	64.9	123.6	49.8
Average Queue (m)	123.9	235.9	138.7	8.2	7.4	18.3	25.7	33.9	42.0	48.3	57.0	23.7
95th Queue (m)	210.6	388.7	329.7	18.2	16.5	34.1	47.3	72.8	65.7	72.2	98.2	41.5
Link Distance (m)	326.8				195.9	195.9	115.0	115.0			168.5	168.5
Upstream Blk Time (%)	18											
Queuing Penalty (veh)	0											
Storage Bay Dist (m)	125.0	250.0		65.0					30.0	35.0		
Storage Blk Time (%)	63						3	17	22		30	
Queuing Penalty (veh)	338						16	37	72		96	

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB
Directions Served	T
Maximum Queue (m)	40.2
Average Queue (m)	17.2
95th Queue (m)	33.7
Link Distance (m)	168.5
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	24.2	23.9	33.3	8.6	95.6	122.6	107.4	69.7	34.1
Average Queue (m)	8.6	6.7	13.8	1.2	46.8	68.7	48.9	10.5	13.7
95th Queue (m)	19.6	17.7	25.1	6.0	86.3	110.9	92.7	37.9	27.6
Link Distance (m)	132.4	154.0		115.7		115.7		209.5	209.5
Upstream Blk Time (%)						1			
Queuing Penalty (veh)						0			
Storage Bay Dist (m)	35.0		90.0				90.0		
Storage Blk Time (%)	0		0		0		2		
Queuing Penalty (veh)	0		0		0		6		

Queuing and Blocking Report
Total Traffic Phase 4 AM

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	36.7	42.8	10.1	15.7	17.9
Average Queue (m)	6.1	7.4	0.6	1.7	4.0
95th Queue (m)	22.8	27.5	5.1	8.8	12.6
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	EB	EB	NB
Directions Served	T	TR	LR
Maximum Queue (m)	22.6	15.1	35.0
Average Queue (m)	1.5	1.3	13.2
95th Queue (m)	10.6	8.5	28.2
Link Distance (m)	94.7	94.7	52.2
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	94.4	75.0	21.0	26.4	23.1
Average Queue (m)	45.9	26.7	3.6	7.2	8.3
95th Queue (m)	83.1	63.7	13.5	19.2	17.0
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)	0	0			
Queuing Penalty (veh)	1	0			
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
Total Traffic Phase 4 AM

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	8.2	101.6	47.5	37.6	10.2	34.2	17.7	89.9	19.4	23.3	12.0
Average Queue (m)	1.0	58.4	26.6	16.7	2.3	14.9	3.9	34.1	5.8	5.9	1.8
95th Queue (m)	5.1	91.0	46.1	32.8	8.5	29.9	12.6	68.8	16.2	16.6	7.9
Link Distance (m)		1977.6		329.3			252.0	252.0		167.7	167.7
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)		12		0						0	
Queuing Penalty (veh)		1		0						0	

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	50.5	71.2	64.0	32.6	22.3	52.3	76.1	60.0	57.4	59.8	48.4	54.4
Average Queue (m)	15.3	43.9	32.1	8.2	9.7	26.0	14.1	35.3	22.9	26.4	23.8	29.5
95th Queue (m)	34.9	65.3	55.0	20.0	19.5	44.2	42.9	58.4	43.2	50.8	42.2	46.8
Link Distance (m)		250.1	250.1				193.4	193.4			131.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)	0	12	3	0	0	5	0	11	1	2		
Queuing Penalty (veh)	2	12	4	0	0	3	0	20	2	4		

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	31.0	16.4
Average Queue (m)	13.4	4.2
95th Queue (m)	25.7	11.3
Link Distance (m)	406.0	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		35.0
Storage Blk Time (%)	0	
Queuing Penalty (veh)	1	

Queuing and Blocking Report
Total Traffic Phase 4 AM

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (m)	51.5	33.2	58.1	69.5	73.2
Average Queue (m)	23.7	14.5	32.4	18.9	29.9
95th Queue (m)	41.5	26.3	52.8	44.4	58.4
Link Distance (m)	293.0		305.2		103.9
Upstream Blk Time (%)					0
Queuing Penalty (veh)					0
Storage Bay Dist (m)	50.0	30.0			
Storage Blk Time (%)	0	0	8	1	
Queuing Penalty (veh)	1	0	28	5	

Intersection: 11: Block 1 Access B & South Service Rd

Movement	NB
Directions Served	LR
Maximum Queue (m)	14.1
Average Queue (m)	5.7
95th Queue (m)	13.5
Link Distance (m)	70.3
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: South Service Rd & Road B

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	53.8	5.3	19.5
Average Queue (m)	16.8	0.4	8.6
95th Queue (m)	39.7	3.2	17.0
Link Distance (m)	173.6	281.0	68.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
Total Traffic Phase 4 AM

Total Traffic Phase 4 AM
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	3.0	8.6
Average Queue (m)	0.1	2.0
95th Queue (m)	2.1	7.8
Link Distance (m)	293.0	70.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 715

Timings

1: Waterdown Rd & North Service Rd

Total Traffic Phase 4 PM

Mixed Use Development 1200 King Rd

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↩	↩	↩	↩	↩	↩	↩
Volume (vph)	202	581	302	514	978	136	564
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	33.0	33.0	33.0	17.0	36.0	11.0	30.0
Total Split (%)	41.3%	41.3%	41.3%	21.3%	45.0%	13.8%	37.5%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	29.0	29.0	29.0	13.0	32.3	32.7	26.0
Actuated g/C Ratio	0.36	0.36	0.36	0.16	0.40	0.41	0.32
v/c Ratio	0.32	0.86	0.39	0.89	0.79	0.54	0.59
Control Delay	16.1	33.6	2.8	57.6	15.1	19.0	23.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	33.6	2.8	57.6	15.1	19.0	23.4
LOS	B	C	A	E	B	B	C
Approach Delay		21.8			28.0		22.7
Approach LOS		C			C		C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 13 (16%), Referenced to phase 2:NBT and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 24.9
Intersection LOS: C
Intersection Capacity Utilization 81.6%
ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd

11 s	36 s	33 s
17 s	30 s	33 s

HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Total Traffic Phase 4 PM

Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↩	↩	↩	↩	↩		↩	↩	
Volume (vph)	0	0	0	202	581	302	514	978	202	136	564	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1583	3539	3630		1770	3610	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.17	1.00	
Satd. Flow (perm)				1770	1863	1583	3539	3630		324	3610	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	202	581	302	514	978	202	136	564	147
RTOR Reduction (vph)	0	0	0	0	0	193	0	23	0	0	32	0
Lane Group Flow (vph)	0	0	0	202	581	109	514	1157	0	136	679	0
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				26.0	26.0	26.0	11.0	30.3		31.7	24.0	
Effective Green, g (s)				29.0	29.0	29.0	13.0	32.3		29.7	26.0	
Actuated g/C Ratio				0.36	0.36	0.36	0.16	0.40		0.37	0.32	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				641	675	573	575	1465		241	1173	
v/s Ratio Prot				0.11	c0.31		c0.15	c0.32		0.05	0.19	
v/s Ratio Perm						0.07				0.16		
v/c Ratio				0.32	0.86	0.19	0.89	0.79		0.56	0.58	
Uniform Delay, d1				18.4	23.6	17.5	32.8	20.9		18.4	22.5	
Progression Factor				0.80	0.86	0.59	1.24	0.55		1.00	1.00	
Incremental Delay, d2				0.2	11.7	0.6	16.1	3.6		3.0	2.1	
Delay (s)				14.9	32.0	11.0	56.6	15.2		21.4	24.5	
Level of Service				B	C	B	E	B		C	C	
Approach Delay (s)		0.0			23.0			27.8			24.0	
Approach LOS		A			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2: Waterdown Rd & Hwy 403 WB Off-Ramp

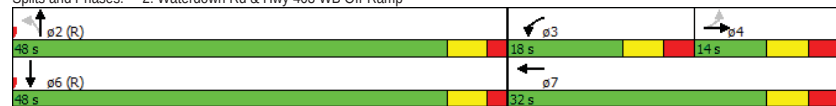
Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Volume (vph)	3	0	372	0	1355	759
Turn Type	Perm	NA	custom	NA	NA	NA
Protected Phases		4	3	7	2	6
Permitted Phases	4		3			
Detector Phase	4	4	3	7	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0
Total Split (s)	14.0	14.0	18.0	32.0	48.0	48.0
Total Split (%)	17.5%	17.5%	22.5%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0
Lost Time Adjust (s)		-3.0	-3.0	-3.0	-2.0	-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effct Green (s)		8.8	19.9	22.7	49.3	49.3
Actuated g/C Ratio		0.11	0.25	0.28	0.62	0.62
v/c Ratio		0.02	0.42	0.70	0.59	0.33
Control Delay		0.2	27.1	30.1	7.4	7.3
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2	27.1	30.1	7.4	7.3
LOS		A	C	C	A	A
Approach Delay		0.2		28.5	7.4	7.3
Approach LOS		A		C	A	A

Intersection Summary

Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 77 (96%), Referenced to phase 2:NBTL and 6:SBT, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 12.6	Intersection
Intersection Capacity Utilization 64.9%	ICU Level
Analysis Period (min) 15	

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	3	0	2	372	0	336	0	1355	0	0	759	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		*1.00	1.00			*1.00			*1.00	
Frt		0.95		1.00	0.85			1.00			1.00	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1711		3539	1583			3725			3720	
Flt Permitted		0.73		0.95	1.00			1.00			1.00	
Satd. Flow (perm)		1282		3539	1583			3725			3720	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	3	0	2	372	0	336	0	1355	0	0	759	7
RTOR Reduction (vph)	0	5	0	0	26	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	372	310	0	0	1355	0	0	765	0
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4		3	7			2			6	
Permitted Phases	4			3			2					
Actuated Green, G (s)		1.4		16.9	25.3			41.7			41.7	
Effective Green, g (s)		4.4		19.9	28.3			43.7			43.7	
Actuated g/C Ratio		0.06		0.25	0.35			0.55			0.55	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		70		880	559			2034			2032	
v/s Ratio Prot				0.11	0.20			0.36			0.21	
v/s Ratio Perm		0.00										
v/c Ratio		0.00		0.42	0.55			0.67			0.38	
Uniform Delay, d1		35.7		25.2	20.8			12.9			10.4	
Progression Factor		1.00		1.00	1.00			0.64			0.84	
Incremental Delay, d2		0.0		0.3	1.2			1.2			0.5	
Delay (s)		35.8		25.6	22.0			9.5			9.2	
Level of Service		D		C	C			A			A	
Approach Delay (s)		35.8			23.9			9.5			9.2	
Approach LOS		D			C			A			A	

Intersection Summary

HCM 2000 Control Delay	13.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 4 PM

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↩	↑	↩	↩	↩	↑	↑	↩	↩
Volume (vph)	244	277	241	204	407	704	395	467	666
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3	1	2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	22.0	22.0	22.0	11.0	21.0	26.0	26.0	21.0	47.0
Total Split (%)	27.5%	27.5%	27.5%	13.8%	26.3%	32.5%	32.5%	26.3%	58.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	17.2	17.2	17.2	7.0	22.5	24.3	24.3	15.5	43.8
Actuated g/C Ratio	0.22	0.22	0.22	0.09	0.28	0.30	0.30	0.19	0.55
v/c Ratio	0.64	0.69	0.72	0.66	0.91	0.62	0.60	0.68	0.33
Control Delay	36.9	38.7	42.6	44.1	45.3	23.0	9.4	26.4	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.9	38.7	42.6	44.1	45.3	23.0	9.4	26.4	6.5
LOS	D	D	D	D	D	C	A	C	A
Approach Delay	39.4			18.1			14.7		
Approach LOS	D			B			B		

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 76 (95%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 75

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.91

Intersection Signal Delay: 26.1

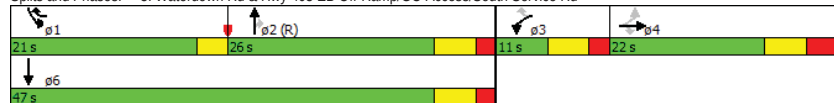
Intersection LOS: C

Intersection Capacity Utilization 68.2%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 4 PM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↑	↩	↩		↑		↑	↑	↩	↩	↩
Volume (vph)	244	277	241	204	0	407	0	704	395	467	666	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	1.00	*1.00	*1.00	
Flpb, ped/bikes	1.00	1.00	0.98	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1557	3539		1583		3725	1583	3539	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1557	3539		1583		3725	1583	3539	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	244	277	241	204	0	407	0	704	395	467	666	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	176	0	0	0
Lane Group Flow (vph)	244	277	241	204	0	407	0	704	219	467	666	0
Confl. Peds. (#/hr)	3			3								
Turn Type	Perm	NA	Perm	Prot	pm+ov			NA	Perm	Prot	NA	
Protected Phases		4		3	1			2		1	6	
Permitted Phases	4		4		3				2			
Actuated Green, G (s)	14.2	14.2	14.2	5.0	21.5			22.3	22.3	16.5	41.8	
Effective Green, g (s)	17.2	17.2	17.2	7.0	19.5			24.3	24.3	15.5	43.8	
Actuated g/C Ratio	0.21	0.21	0.21	0.09	0.24			0.30	0.30	0.19	0.55	
Clearance Time (s)	7.0	7.0	7.0	6.0	3.0			6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	380	400	334	309	385			1131	480	685	2039	
v/s Ratio Prot		0.15		c0.06	c0.20			c0.19		0.13	0.18	
v/s Ratio Perm	0.14		c0.15		0.05				0.14			
v/c Ratio	0.64	0.69	0.72	0.66	1.06			0.62	0.46	0.68	0.33	
Uniform Delay, d1	28.6	29.0	29.2	35.3	30.2			23.9	22.5	30.0	10.0	
Progression Factor	1.00	1.00	1.00	0.93	0.93			0.83	0.60	0.71	0.60	
Incremental Delay, d2	3.7	5.1	7.5	5.2	61.6			2.3	2.8	2.7	0.4	
Delay (s)	32.3	34.1	36.7	38.0	89.8			22.1	16.4	24.0	6.3	
Level of Service	C	C	D	D	F			C	B	C	A	
Approach Delay (s)	34.3			72.5			20.1			13.6		
Approach LOS	C			E			C			B		

Intersection Summary

HCM 2000 Control Delay	29.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

4: Waterdown Rd & Masonry Crt/Railway Rd

Mixed Use Development 1200 King Rd

Intersection Summary	
Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 60 (75%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 9.2	Intersection LOS: A
Intersection Capacity Utilization 75.5%	ICU Level of Service D
Analysis Period (min) 15	

4: Waterdown Rd & Masonry Crt/Railway Rd

Mixed Use Development 1200 King Rd

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Timings

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 4 PM

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↑↑	↑↑	↑
Volume (vph)	1123	598	13
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.32	0.17	0.06
Control Delay	0.8	0.6	28.5
Queue Delay	0.0	0.0	0.0
Total Delay	0.8	0.6	28.5
LOS	A	A	C
Approach Delay	0.8	0.6	28.5
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 54 (68%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.32
 Intersection Signal Delay: 1.0
 Intersection LOS: A
 Intersection Capacity Utilization 44.9%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 4 PM

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Volume (vph)	1123	16	0	598	13	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3718			3725	1753	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3718			3725	1753	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1123	16	0	598	13	2
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	1139	0	0	598	13	0
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3132			3138	100	
v/s Ratio Prot	c0.31			0.16	c0.01	
v/s Ratio Perm						
v/c Ratio	0.36			0.19	0.13	
Uniform Delay, d1	1.4			1.2	35.8	
Progression Factor	0.64			0.65	1.00	
Incremental Delay, d2	0.3			0.1	0.6	
Delay (s)	1.2			0.9	36.4	
Level of Service	A			A	D	
Approach Delay (s)	1.2			0.9	36.4	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 1.4
 HCM 2000 Volume to Capacity ratio 0.35
 Actuated Cycle Length (s) 80.0
 Intersection Capacity Utilization 44.9%
 Analysis Period (min) 15
 HCM 2000 Level of Service A
 Sum of lost time (s) 8.0
 ICU Level of Service A
 Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Total Traffic Phase 4 PM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	991	134	0	466	132	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	991	134	0	466	132	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.93		0.93	0.93
vC, conflicting volume			1125		1291	562
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			978		1157	371
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		25	99
cM capacity (veh/h)			650		176	580
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	661	464	155	311	140	
Volume Left	0	0	0	0	132	
Volume Right	0	134	0	0	8	
cSH	1700	1700	650	1700	183	
Volume to Capacity	0.39	0.27	0.00	0.18	0.76	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	40.3	
Control Delay (s)	0.0	0.0	0.0	0.0	69.5	
Lane LOS					F	
Approach Delay (s)	0.0		0.0		69.5	
Approach LOS					F	
Intersection Summary						
Average Delay			5.6			
Intersection Capacity Utilization			46.1%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 4 PM

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	520	470	289	293	39
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	61.0	61.0	61.0	61.0	19.0
Total Split (%)	76.3%	76.3%	76.3%	76.3%	23.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	57.1	57.1	57.1	57.1	14.9
Actuated g/C Ratio	0.71	0.71	0.71	0.71	0.19
v/c Ratio	0.68	0.36	0.22	0.24	0.65
Control Delay	9.7	3.3	1.4	0.4	40.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	9.7	3.3	1.4	0.4	40.5
LOS	A	A	A	A	D
Approach Delay		6.6	0.9		40.5
Approach LOS		A	A		D
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 50 (63%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.68					
Intersection Signal Delay: 8.8					Intersection LOS: A
Intersection Capacity Utilization 68.8%					ICU Level of Service C
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 4 PM

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	470	9	0	289	293	177	39	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.96				
Satd. Flow (prot)	1770	1857			1863	1583		1789				
Flt Permitted	0.58	1.00			1.00	1.00		0.96				
Satd. Flow (perm)	1079	1857			1863	1583		1789				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	520	470	9	0	289	293	177	39	0	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	84	0	0	0	0	0	0
Lane Group Flow (vph)	520	478	0	0	289	209	0	216	0	0	0	0
Confl. Peds. (#/hr)	2											
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2											
Permitted Phases	2		6		6		8					
Actuated Green, G (s)	55.1	55.1			55.1	55.1	11.9					
Effective Green, g (s)	57.1	57.1			57.1	57.1	14.9					
Actuated g/C Ratio	0.71	0.71			0.71	0.71	0.19					
Clearance Time (s)	6.0	6.0			6.0	6.0	7.0					
Vehicle Extension (s)	3.0	3.0			3.0	3.0	5.0					
Lane Grp Cap (vph)	770	1325			1329	1129	333					
v/s Ratio Prot	0.26				0.16							
v/s Ratio Perm	c0.48				0.13		0.12					
v/c Ratio	0.68	0.36			0.22	0.19	0.65					
Uniform Delay, d1	6.3	4.4			3.9	3.8	30.1					
Progression Factor	0.71	0.56			0.28	0.00	1.00					
Incremental Delay, d2	4.5	0.7			0.3	0.3	5.9					
Delay (s)	9.1	3.2			1.4	0.3	36.0					
Level of Service	A	A			A	A	D					
Approach Delay (s)	6.2				0.9	36.0				0.0		
Approach LOS	A				A	D				A		
Intersection Summary												
HCM 2000 Control Delay	8.1		HCM 2000 Level of Service		A							
HCM 2000 Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	68.8%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

Timings

8: King Rd & North Service Rd

Total Traffic Phase 4 PM

Mixed Use Development 1200 King Rd

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	8	342	539	651	91	298	93	21	36
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2	1	6			8		4
Permitted Phases			6		6	8		4	
Detector Phase	2	2	1	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0
Total Split (s)	26.0	26.0	28.0	54.0	54.0	26.0	26.0	26.0	26.0
Total Split (%)	32.5%	32.5%	35.0%	67.5%	67.5%	32.5%	32.5%	32.5%	32.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	25.8	25.8	50.7	50.7	50.7	21.3	21.3	21.3	21.3
Actuated g/C Ratio	0.32	0.32	0.63	0.63	0.63	0.27	0.27	0.27	0.27
v/c Ratio	0.03	0.74	0.92	0.55	0.09	0.83	0.38	0.10	0.05
Control Delay	10.2	22.2	39.7	10.7	1.7	42.6	5.6	23.3	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.2	22.2	39.7	10.7	1.7	42.6	5.6	23.3	17.2
LOS	B	C	D	B	A	D	A	C	B
Approach Delay	22.0		22.2		20.8		19.0		
Approach LOS	C		C		C		B		
Intersection Summary									
Cycle Length: 80									
Actuated Cycle Length: 80									
Offset: 4 (5%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green									
Natural Cycle: 75									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.92									
Intersection Signal Delay: 21.7					Intersection LOS: C				
Intersection Capacity Utilization 87.0%					ICU Level of Service E				
Analysis Period (min) 15									

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	8	342	98	539	651	91	298	93	335	21	36	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*1.00		1.00	*1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.88		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1801		1770	1863	1583	1770	3288		1770	3577	
Flt Permitted	0.42	1.00		0.18	1.00	1.00	0.73	1.00		0.42	1.00	
Satd. Flow (perm)	778	1801		327	1863	1583	1351	3288		780	3577	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	342	98	539	651	91	298	93	335	21	36	13
RTOR Reduction (vph)	0	12	0	0	0	33	0	246	0	0	10	0
Lane Group Flow (vph)	8	428	0	539	651	58	298	182	0	21	39	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	2			1	6		8			4		
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	23.8	23.8		48.7	48.7	48.7	18.3	18.3		18.3	18.3	
Effective Green, g (s)	25.8	25.8		47.7	50.7	50.7	21.3	21.3		21.3	21.3	
Actuated g/C Ratio	0.32	0.32		0.60	0.63	0.63	0.27	0.27		0.27	0.27	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	580		571	1180	1003	359	875		207	952	
v/s Ratio Prot		0.24		c0.25	0.35		0.06			0.01		
v/s Ratio Perm	0.01			c0.32		0.04	c0.22			0.03		
v/c Ratio	0.03	0.74		0.94	0.55	0.06	0.83	0.21		0.10	0.04	
Uniform Delay, d1	18.6	24.1		19.4	8.3	5.6	27.6	22.8		22.1	21.8	
Progression Factor	0.46	0.51		1.00	1.00	1.00	0.83	0.81		1.00	1.00	
Incremental Delay, d2	0.2	7.1		24.4	1.9	0.1	13.4	0.1		0.2	0.0	
Delay (s)	8.8	19.4		43.8	10.1	5.7	36.4	18.6		22.3	21.8	
Level of Service	A	B		D	B	A	D	B		C	C	
Approach Delay (s)		19.2			24.0		25.9			22.0		
Approach LOS		B			C		C			C		
Intersection Summary												
HCM 2000 Control Delay		23.6					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.90										
Actuated Cycle Length (s)		80.0					Sum of lost time (s)	12.0				
Intersection Capacity Utilization		87.0%					ICU Level of Service	E				
Analysis Period (min)		15										
c Critical Lane Group												

Timings 9: King Rd & Plains Rd E

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	110	933	88	100	1277	396	346	165	608	193	91
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	15.0	25.0	15.0	25.0	25.0
Total Split (%)	9.4%	43.5%	43.5%	9.4%	43.5%	43.5%	17.6%	29.4%	17.6%	29.4%	29.4%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	36.3	33.3	33.3	36.3	33.3	33.3	28.2	17.3	11.1	17.5	17.5
Actuated g/C Ratio	0.45	0.42	0.42	0.45	0.42	0.42	0.35	0.22	0.14	0.22	0.22
v/c Ratio	0.59	0.60	0.12	0.43	0.82	0.52	0.80	0.60	1.24	0.47	0.19
Control Delay	27.1	21.2	0.3	18.3	27.7	11.8	35.2	32.1	157.5	31.7	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	21.2	0.3	18.3	27.7	11.8	35.2	32.1	157.5	31.7	1.1
LOS	C	C	A	B	C	B	D	C	F	C	A
Approach Delay		20.2			23.6			33.9		114.3	
Approach LOS		C			C			C		F	
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 79.9											
Natural Cycle: 85											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 1.24											
Intersection Signal Delay: 42.6								Intersection LOS: D			
Intersection Capacity Utilization 86.7%								ICU Level of Service E			
Analysis Period (min) 15											
Splits and Phases: 9: King Rd & Plains Rd E											
↰ ϕ1	↰ ϕ2	↰ ϕ3	↰ ϕ4								
8 s	37 s	15 s	25 s								
↰ ϕ5	↰ ϕ6	↰ ϕ7	↰ ϕ8								
8 s	37 s	15 s	25 s								

HCM Signalized Intersection Capacity Analysis
9: King Rd & Plains Rd E

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↱	↰	↰↱	↱	↰	↰	↰	↰↱	↱	↱
Volume (vph)	110	933	88	100	1277	396	346	165	72	608	193	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
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
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1769	3725	1539	1769	3725	1531	1767	1748		3539	1863	1556
Flt Permitted	0.13	1.00	1.00	0.19	1.00	1.00	0.48	1.00		0.95	1.00	1.00
Satd. Flow (perm)	247	3725	1539	349	3725	1531	884	1748		3539	1863	1556
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	933	88	100	1277	396	346	165	72	608	193	91
RTOR Reduction (vph)	0	0	52	0	0	120	0	20	0	0	0	71
Lane Group Flow (vph)	110	933	36	100	1277	276	346	217	0	608	193	20
Confl. Peds. (#/hr)	10		6	6		10	4		33	33		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	35.1	31.2	31.2	35.1	31.2	31.2	26.2	14.3		8.1	14.5	14.5
Effective Green, g (s)	33.1	33.2	33.2	33.1	33.2	33.2	24.2	17.3		11.1	17.5	17.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41	0.30	0.21		0.14	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	156	1536	634	194	1536	631	385	375		487	405	338
v/s Ratio Prot	c0.03	0.25		0.02	c0.34		0.12	0.12		c0.17	0.10	
v/s Ratio Perm	0.26		0.02	0.19		0.18	c0.15					0.01
v/c Ratio	0.71	0.61	0.06	0.52	0.83	0.44	0.90	0.58		1.25	0.48	0.06
Uniform Delay, d1	19.4	18.5	14.2	16.0	21.1	17.0	25.4	28.3		34.7	27.5	25.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.5	1.8	0.2	2.3	5.4	2.2	22.8	2.2		128.0	0.9	0.1
Delay (s)	33.0	20.3	14.4	18.3	26.5	19.2	48.2	30.5		162.7	28.4	25.0
Level of Service	C	C	B	B	C	B	D	C		F	C	C
Approach Delay (s)		21.1			24.4			41.0			119.6	
Approach LOS		C			C			D			F	
Intersection Summary												
HCM 2000 Control Delay		45.2			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.86										
Actuated Cycle Length (s)		80.5			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		86.7%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

Timings
10: King Rd & South Service Rd

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	315	305	339	409	564
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	24.0	24.0	18.0	56.0	38.0
Total Split (%)	30.0%	30.0%	22.5%	70.0%	47.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	18.7	18.7	53.3	53.3	36.7
Actuated g/C Ratio	0.23	0.23	0.67	0.67	0.46
v/c Ratio	0.76	0.51	0.87	0.33	0.82
Control Delay	36.6	5.4	40.1	6.9	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	5.4	40.1	6.9	19.6
LOS	D	A	D	A	B
Approach Delay	21.3			21.9	19.6
Approach LOS	C			C	B
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 20 (25%), Referenced to phase 2:NBTL and 6:SBT, Start of Green					
Natural Cycle: 75					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.87					
Intersection Signal Delay: 21.0			Intersection LOS: C		
Intersection Capacity Utilization 83.4%			ICU Level of Service E		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	315	305	339	409	564	124
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1817	
Flt Permitted	0.95	1.00	0.12	1.00	1.00	
Satd. Flow (perm)	1770	1583	217	1863	1817	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	315	305	339	409	564	124
RTOR Reduction (vph)	0	234	0	0	9	0
Lane Group Flow (vph)	315	71	339	409	679	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	16.7	16.7	51.3	51.3	34.7	
Effective Green, g (s)	18.7	18.7	50.3	53.3	36.7	
Actuated g/C Ratio	0.23	0.23	0.63	0.67	0.46	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	413	370	381	1241	833	
v/s Ratio Prot			c0.14	0.22	0.37	
v/s Ratio Perm	c0.18	0.05	c0.42			
v/c Ratio	0.76	0.19	0.89	0.33	0.81	
Uniform Delay, d1	28.6	24.6	20.5	5.7	18.7	
Progression Factor	0.82	0.70	1.00	1.00	0.64	
Incremental Delay, d2	8.1	0.3	21.5	0.7	5.5	
Delay (s)	31.7	17.5	42.0	6.4	17.5	
Level of Service	C	B	D	A	B	
Approach Delay (s)	24.7			22.6	17.5	
Approach LOS	C			C	B	
Intersection Summary						
HCM 2000 Control Delay			21.5	HCM 2000 Level of Service		C
HCM 2000 Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			80.0	Sum of lost time (s)		14.0
Intersection Capacity Utilization			83.4%	ICU Level of Service		E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	355	150	4	549	51	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	355	150	4	549	51	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			505		987	430
vC1, stage 1 conf vol					430	
vC2, stage 2 conf vol					557	
vCu, unblocked vol			505		987	430
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		89	100
cM capacity (veh/h)			1060		484	625
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	505	553	52			
Volume Left	0	4	51			
Volume Right	150	0	1			
cSH	1700	1060	486			
Volume to Capacity	0.30	0.00	0.11			
Queue Length 95th (m)	0.0	0.1	2.9			
Control Delay (s)	0.0	0.1	13.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	13.3			
Approach LOS		B				
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			42.1%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Volume (veh/h)	41	290	452	38	142	85
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	41	290	452	38	142	85
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	490				843	471
vC1, stage 1 conf vol					471	
vC2, stage 2 conf vol					372	
vCu, unblocked vol	490				843	471
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				73	86
cM capacity (veh/h)	1073				526	593
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	331	490	227			
Volume Left	41	0	142			
Volume Right	0	38	85			
cSH	1073	1700	549			
Volume to Capacity	0.04	0.29	0.41			
Queue Length 95th (m)	1.0	0.0	16.1			
Control Delay (s)	1.4	0.0	16.1			
Lane LOS	A		C			
Approach Delay (s)	1.4	0.0	16.1			
Approach LOS			C			
Intersection Summary						
Average Delay		3.9				
Intersection Capacity Utilization		66.7%		ICU Level of Service	C	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↗	↖	↗
Volume (veh/h)	533	26	20	468	9	6
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	533	26	20	468	9	6
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT		TWLT		
Median storage (veh)		2		2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			559		1054	546
vC1, stage 1 conf vol					546	
vC2, stage 2 conf vol					508	
vCu, unblocked vol			559		1054	546
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	99
cM capacity (veh/h)			1012		461	538
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	559	488	15			
Volume Left	0	20	9			
Volume Right	26	0	6			
cSH	1700	1012	489			
Volume to Capacity	0.33	0.02	0.03			
Queue Length 95th (m)	0.0	0.5	0.8			
Control Delay (s)	0.0	0.6	12.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	12.6			
Approach LOS			B			
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		50.9%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Total Traffic Phase 4 PM

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	B19	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	T	L	L	T	TR	L	T	TR
Maximum Queue (m)	107.0	243.9	134.9	41.9	74.9	89.9	132.9	134.2	42.0	83.1	85.0
Average Queue (m)	38.5	91.5	39.4	6.6	56.4	67.6	77.7	81.1	20.7	40.6	54.3
95th Queue (m)	134.2	258.8	126.2	54.6	84.7	100.2	142.5	141.9	36.8	66.9	79.4
Link Distance (m)	341.1			1977.6			135.0		135.0		130.8
Upstream Blk Time (%)	5						3		4		0
Queuing Penalty (veh)	45						27		30		0
Storage Bay Dist (m)	165.0		125.0		60.0		60.0		70.0		70.0
Storage Blk Time (%)	0		13		15		29		8		0
Queuing Penalty (veh)	0		64		72		143		43		1
											7

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	8.4	49.6	55.6	86.1	69.4	71.0	39.9	47.6
Average Queue (m)	1.5	27.1	33.0	46.6	45.7	45.8	17.5	24.7
95th Queue (m)	6.7	43.8	52.1	75.9	121.5	120.8	35.4	44.5
Link Distance (m)	60.7		437.7		168.8		168.8	
Upstream Blk Time (%)					1		1	
Queuing Penalty (veh)					4		5	
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)					0			
Queuing Penalty (veh)					0			

Queuing and Blocking Report
Total Traffic Phase 4 PM

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	B15	B15	SB
Directions Served	L	T	R	L	L	R	T	T	R	T	T	L
Maximum Queue (m)	79.6	78.3	84.3	39.4	41.4	95.8	95.6	105.1	60.0	42.8	43.0	52.8
Average Queue (m)	44.4	46.4	42.0	19.0	21.2	48.1	55.7	53.9	36.5	13.6	14.6	24.6
95th Queue (m)	74.2	73.9	69.8	33.2	35.0	81.0	102.9	105.8	63.7	91.4	96.6	41.8
Link Distance (m)	326.8				195.9		195.9		115.0		115.0	
Upstream Blk Time (%)							7		8		1	
Queuing Penalty (veh)							39		42		3	
Storage Bay Dist (m)	125.0		250.0		65.0				30.0			
Storage Blk Time (%)									31		7	
Queuing Penalty (veh)									122		23	

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB	SB	SB
Directions Served	L	T	T
Maximum Queue (m)	51.3	37.8	36.6
Average Queue (m)	27.6	16.4	16.0
95th Queue (m)	44.6	30.5	31.8
Link Distance (m)	168.8	168.8	168.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)	3		
Queuing Penalty (veh)	7		

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	18.7	64.0	117.7	3.4	51.9	49.2	48.7	46.2	50.2
Average Queue (m)	5.7	18.8	51.8	0.2	26.0	24.0	20.3	20.1	24.9
95th Queue (m)	15.9	47.1	101.4	2.4	45.1	43.3	36.8	37.9	41.8
Link Distance (m)	132.4		154.0		115.7	115.7		209.5	209.5
Upstream Blk Time (%)				3					
Queuing Penalty (veh)			0						
Storage Bay Dist (m)		35.0		90.0			90.0		
Storage Blk Time (%)		0	23						
Queuing Penalty (veh)		1	18						

Queuing and Blocking Report
Total Traffic Phase 4 PM

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	34.9	37.6	23.6	27.7	15.5
Average Queue (m)	5.4	5.4	2.8	4.9	3.7
95th Queue (m)	24.8	26.2	13.1	18.6	11.1
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	EB	EB	NB
Directions Served	T	TR	LR
Maximum Queue (m)	42.6	38.2	51.0
Average Queue (m)	9.4	7.4	24.2
95th Queue (m)	51.1	48.7	48.9
Link Distance (m)	94.7	94.7	52.2
Upstream Blk Time (%)	1	1	6
Queuing Penalty (veh)	7	5	0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	98.7	80.5	33.7	31.3	67.9
Average Queue (m)	59.4	27.0	13.7	13.9	36.0
95th Queue (m)	101.9	55.0	27.4	26.4	63.8
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)	5	0			1
Queuing Penalty (veh)	25	1			0
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
Total Traffic Phase 4 PM

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	B30	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	T	L	T	TR
Maximum Queue (m)	74.5	329.7	110.0	342.5	37.9	125.6	211.2	140.4	42.6	28.3	57.8	50.8
Average Queue (m)	7.2	142.5	98.3	255.8	4.9	89.5	68.8	33.5	6.1	6.7	23.4	13.4
95th Queue (m)	38.9	385.8	132.7	464.2	20.7	151.2	222.6	83.8	45.5	20.7	53.3	44.4
Link Distance (m)		1977.6		329.3			252.0	252.0	103.9		167.7	167.7
Upstream Blk Time (%)				66			6	0	2			
Queuing Penalty (veh)				0			22	0	13			
Storage Bay Dist (m)	45.0		80.0		40.0	100.0				30.0		
Storage Blk Time (%)		57	74	3		35	0				32	
Queuing Penalty (veh)		5	547	20		16	0				7	

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	64.9	94.7	93.3	17.2	59.9	204.3	202.2	60.0	74.9	122.1	115.0	130.0
Average Queue (m)	22.4	58.1	47.2	5.7	36.0	150.8	146.1	54.4	47.1	48.4	114.3	129.2
95th Queue (m)	52.4	86.7	77.0	12.3	72.4	229.3	232.3	74.9	77.7	100.9	119.9	136.8
Link Distance (m)		250.1	250.1			193.4	193.4			131.9		
Upstream Blk Time (%)						13	18			2		
Queuing Penalty (veh)						0	0			0		
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)	1	25	11		2	53	47	11	17	9	59	95
Queuing Penalty (veh)	5	27	10		13	53	186	72	39	30	166	271

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB	B21
Directions Served	T	R	T
Maximum Queue (m)	438.5	20.4	310.3
Average Queue (m)	411.6	7.3	271.2
95th Queue (m)	528.0	16.6	424.5
Link Distance (m)	406.0		305.2
Upstream Blk Time (%)	88		29
Queuing Penalty (veh)	768		255
Storage Bay Dist (m)		35.0	
Storage Blk Time (%)	2		
Queuing Penalty (veh)	15		

Queuing and Blocking Report
Total Traffic Phase 4 PM

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB	B30	B30
Directions Served	L	R	L	T	TR	T	
Maximum Queue (m)	80.0	296.4	56.3	120.1	135.2	260.6	257.7
Average Queue (m)	72.4	185.3	33.3	36.6	123.0	205.7	133.4
95th Queue (m)	96.4	353.4	55.1	90.4	147.6	362.1	318.6
Link Distance (m)		293.0		305.2	103.9	252.0	252.0
Upstream Blk Time (%)		10			83	50	6
Queuing Penalty (veh)		53			556	169	21
Storage Bay Dist (m)	50.0		30.0				
Storage Blk Time (%)	28	62	11	6			
Queuing Penalty (veh)	86	194	46	21			

Intersection: 11: Block 1 Access B & South Service Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	1.3	18.5	25.8
Average Queue (m)	0.0	1.2	8.7
95th Queue (m)	0.9	10.5	18.1
Link Distance (m)	1018.8	173.6	70.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: South Service Rd & Road B

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	30.4	46.6
Average Queue (m)	4.3	21.4
95th Queue (m)	17.5	36.5
Link Distance (m)	173.6	68.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
Total Traffic Phase 4 PM

Total Traffic Phase 4 PM
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	138.4	25.6	9.9
Average Queue (m)	32.5	3.5	3.7
95th Queue (m)	138.6	14.9	10.8
Link Distance (m)	281.0	293.0	70.1
Upstream Blk Time (%)	1		
Queuing Penalty (veh)	3		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 4434

Timings

1: Waterdown Rd & North Service Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

							
Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	39	107	55	323	215	25	111
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	27.0	27.0	27.0	13.0	32.0	11.0	30.0
Total Split (%)	38.6%	38.6%	38.6%	18.6%	45.7%	15.7%	42.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	23.0	23.0	23.0	9.0	35.0	32.0	26.0
Actuated g/C Ratio	0.33	0.33	0.33	0.13	0.50	0.46	0.37
v/c Ratio	0.07	0.17	0.09	0.71	0.14	0.04	0.10
Control Delay	16.6	17.7	1.9	31.6	7.2	7.6	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	17.7	1.9	31.6	7.2	7.6	11.7
LOS	B	B	A	C	A	A	B
Approach Delay		13.2			20.9		11.1
Approach LOS		B			C		B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 21 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.71

Intersection Signal Delay: 17.5

Intersection LOS: B

Intersection Capacity Utilization 32.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd

↰	↱	↰	↱
11 s	32 s	27 s	27 s
↰	↱	↰	↱
13 s	30 s	27 s	27 s

HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

	↰	→	↰	↰	←	↰	↰	↑	↰	↰	↓	↰
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↱	↰	↰	↱		↰	↱	
Volume (vph)	0	0	0	39	107	55	323	215	38	25	111	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Frt				1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1583	3539	3642		1770	3613	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.60	1.00	
Satd. Flow (perm)				1770	1863	1583	3539	3642		1122	3613	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	39	107	55	323	215	38	25	111	28
RTOR Reduction (vph)	0	0	0	0	0	37	0	19	0	0	18	0
Lane Group Flow (vph)	0	0	0	39	107	18	323	234	0	25	121	0
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				20.0	20.0	20.0	7.0	31.2		26.8	24.0	
Effective Green, g (s)				23.0	23.0	23.0	9.0	33.2		24.8	26.0	
Actuated g/C Ratio				0.33	0.33	0.33	0.13	0.47		0.35	0.37	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				581	612	520	455	1727		414	1341	
v/s Ratio Prot				0.02	c0.06		c0.09	c0.06		0.00	0.03	
v/s Ratio Perm						0.01				0.02		
v/c Ratio				0.07	0.17	0.03	0.71	0.14		0.06	0.09	
Uniform Delay, d1				16.1	16.7	16.0	29.2	10.3		14.8	14.3	
Progression Factor				1.00	1.00	1.00	0.74	0.77		1.00	1.00	
Incremental Delay, d2				0.0	0.6	0.1	9.0	0.2		0.1	0.1	
Delay (s)				16.2	17.4	16.1	30.7	8.1		14.9	14.4	
Level of Service				B	B	B	C	A		B	B	
Approach Delay (s)		0.0			16.8			20.7			14.5	
Approach LOS		A			B			C			B	

Intersection Summary

HCM 2000 Control Delay 18.8

HCM 2000 Level of Service

B

HCM 2000 Volume to Capacity ratio 0.25

Actuated Cycle Length (s) 70.0

Sum of lost time (s)

12.0

Intersection Capacity Utilization 32.5%

ICU Level of Service

A

Analysis Period (min) 15

c Critical Lane Group

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

						
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations						
Volume (vph)	1	0	101	4	511	148
Turn Type	Perm	NA	custom	NA	NA	NA
Protected Phases		4	3	7	2	6
Permitted Phases	4		3			
Detector Phase	4	4	3	7	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0
Total Split (s)	13.0	13.0	18.0	31.0	39.0	39.0
Total Split (%)	18.6%	18.6%	25.7%	44.3%	55.7%	55.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0
Lost Time Adjust (s)		-3.0	-3.0	-3.0	-2.0	-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effct Green (s)		8.6	10.4	12.9	52.4	52.4
Actuated g/C Ratio		0.12	0.15	0.18	0.75	0.75
v/c Ratio		0.00	0.19	0.20	0.18	0.05
Control Delay		27.0	26.6	7.6	3.2	5.7
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		27.0	26.6	7.6	3.2	5.7
LOS		C	C	A	A	A
Approach Delay		27.0		19.0	3.2	5.7
Approach LOS		C		B	A	A

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 69 (99%), Referenced to phase 2:NBTL and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.20

Intersection Signal Delay: 6.8

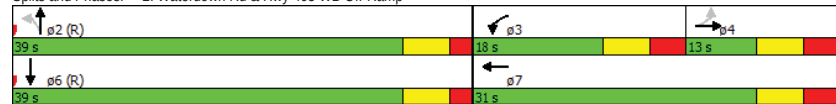
Intersection LOS: A

Intersection Capacity Utilization 25.0%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	1	0	0	101	4	64	0	511	0	0	148		2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0		
Lane Util. Factor		1.00		*1.00	1.00			*1.00			*1.00		
Frt		1.00		1.00	0.86			1.00			1.00		
Flt Protected		0.95		0.95	1.00			1.00			1.00		
Satd. Flow (prot)		1770		3539	1600			3725			3718		
Flt Permitted		0.95		0.95	1.00			1.00			1.00		
Satd. Flow (perm)		1774		3539	1600			3725			3718		
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	0	101	4	64	0	511	0	0	148		2
RTOR Reduction (vph)	0	0	0	0	48	0	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	1	0	101	20	0	0	511	0	0	149	0	0
Turn Type	Perm	NA		custom	NA			NA			NA		
Protected Phases		4		3	7			2			6		
Permitted Phases	4			3			2						
Actuated Green, G (s)		1.2		6.2	14.4			42.6			42.6		
Effective Green, g (s)		4.2		9.2	17.4			44.6			44.6		
Actuated g/C Ratio		0.06		0.13	0.25			0.64			0.64		
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0		
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0		
Lane Grp Cap (vph)		106		465	397			2373			2368		
v/s Ratio Prot				c0.03	c0.01			c0.14			0.04		
v/s Ratio Perm		0.00											
v/c Ratio		0.01		0.22	0.05			0.22			0.06		
Uniform Delay, d1		30.9		27.2	20.0			5.3			4.8		
Progression Factor		1.00		1.00	1.00			0.69			1.27		
Incremental Delay, d2		0.0		0.2	0.1			0.2			0.1		
Delay (s)		31.0		27.4	20.1			3.8			6.1		
Level of Service		C		C	C			A			A		
Approach Delay (s)		31.0			24.5			3.8			6.1		
Approach LOS		C			C			A			A		

Intersection Summary

HCM 2000 Control Delay	8.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	25.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

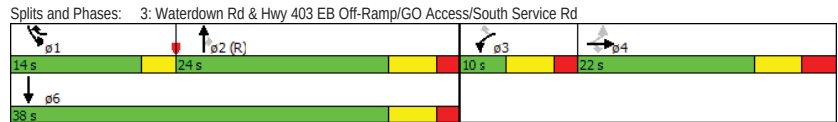
Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 4 Arena

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	46	69	45	67	333	132	72	121	128
Volume (vph)	46	69	45	67	333	132	72	121	128
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3	1	2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	22.0	22.0	22.0	10.0	14.0	24.0	24.0	14.0	38.0
Total Split (%)	31.4%	31.4%	31.4%	14.3%	20.0%	34.3%	34.3%	20.0%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	11.8	11.8	11.8	6.0	19.6	27.2	27.2	16.0	48.0
Actuated g/C Ratio	0.17	0.17	0.17	0.09	0.28	0.39	0.39	0.23	0.69
v/c Ratio	0.15	0.22	0.17	0.22	0.75	0.09	0.10	0.15	0.05
Control Delay	25.8	26.7	26.2	31.8	30.1	17.3	0.3	17.4	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.8	26.7	26.2	31.8	30.1	17.3	0.3	17.4	5.2
LOS	C	C	C	C	C	B	A	B	A
Approach Delay		26.3				11.3			11.1
Approach LOS		C				B			B

Intersection Summary									
Cycle Length: 70									
Actuated Cycle Length: 70									
Offset: 60 (86%), Referenced to phase 2:NBT, Start of Green									
Natural Cycle: 70									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.75									
Intersection Signal Delay: 21.2									
Intersection LOS: C									
Intersection Capacity Utilization 40.9%									
ICU Level of Service A									
Analysis Period (min) 15									



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 4 Arena

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	46	69	45	67	0	333	0	132	72	121	128	0
Volume (vph)	46	69	45	67	0	333	0	132	72	121	128	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	1.00	*1.00	*1.00	
Flpb, ped/bikes	1.00	1.00	0.98	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1558	3539		1583		3725	1583	3539	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1558	3539		1583		3725	1583	3539	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	69	45	67	0	333	0	132	72	121	128	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	48	0	0	0
Lane Group Flow (vph)	46	69	45	67	0	333	0	132	24	121	128	0
Confl. Peds. (#/hr)			3	3								
Turn Type	Perm	NA	Perm	Prot		pm+ov		NA	Perm	Prot	NA	
Protected Phases		4		3		1		2		1	6	
Permitted Phases	4		4			3			2			
Actuated Green, G (s)	7.2	7.2	7.2	2.4		19.4		21.4	21.4	17.0	41.4	
Effective Green, g (s)	10.2	10.2	10.2	4.4		17.4		23.4	23.4	16.0	43.4	
Actuated g/C Ratio	0.15	0.15	0.15	0.06		0.25		0.33	0.33	0.23	0.62	
Clearance Time (s)	7.0	7.0	7.0	6.0		3.0		6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	257	271	227	222		393		1245	529	808	2309	
v/s Ratio Prot		c0.04		c0.02		c0.19		c0.04		0.03	0.03	
v/s Ratio Perm	0.03		0.03			0.02			0.02			
v/c Ratio	0.18	0.25	0.20	0.30		0.85		0.11	0.05	0.15	0.06	
Uniform Delay, d1	26.2	26.5	26.3	31.3		25.0		16.1	15.8	21.6	5.2	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.00	1.00	0.77	0.83	
Incremental Delay, d2	0.3	0.5	0.4	0.8		15.4		0.2	0.2	0.1	0.0	
Delay (s)	26.6	27.0	26.7	32.1		40.5		16.3	15.9	16.6	4.4	
Level of Service	C	C	C	C		D		B	B	B	A	
Approach Delay (s)		26.8			39.1			16.1			10.4	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	5	0	16	0	93	40	197
Volume (vph)	5	0	16	0	93	40	197
Turn Type	Perm	NA	Perm	NA	NA	pm+pt	NA
Protected Phases	4	4	8	8	2	1	6
Permitted Phases	4	4	8	8	2	1	6
Detector Phase	4	4	8	8	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	12.0	36.0
Total Split (s)	29.0	29.0	29.0	29.0	37.0	14.0	51.0
Total Split (%)	36.3%	36.3%	36.3%	36.3%	46.3%	17.5%	63.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)	12.2	12.2	12.2	11.1	11.6	12.5	
Actuated g/C Ratio	0.46	0.46	0.46	0.42	0.43	0.47	
v/c Ratio	0.01	0.03	0.08	0.06	0.06	0.11	
Control Delay	0.0	8.8	0.1	8.1	5.7	5.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	0.0	8.8	0.1	8.1	5.7	5.3	
LOS	A	A	A	A	A	A	
Approach Delay	0.0		1.3	8.1		5.4	
Approach LOS	A		A	A		A	

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 26.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.11
Intersection Signal Delay: 4.8
Intersection Capacity Utilization 22.2%
Analysis Period (min) 15
Intersection LOS: A
ICU Level of Service A

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd

14 s	37 s	29 s	29 s
5 s			

HCM Signalized Intersection Capacity Analysis

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	0	2	16	0	100	0	93	6	40	197	3
Volume (vph)	5	0	2	16	0	100	0	93	6	40	197	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	0.96	1.00	0.85	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1729	1770	1583	3692	1770	3717	3692	1770	3717	3692	1770	3717
Flt Permitted	0.73	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1299	1403	1583	3692	1403	3717	3692	1403	3717	3692	1403	3717
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	0	2	16	0	100	0	93	6	40	197	3
RTOR Reduction (vph)	0	5	0	0	75	0	0	4	0	0	2	0
Lane Group Flow (vph)	0	2	0	16	25	0	0	95	0	40	198	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA	NA
Protected Phases	4	4	8	8	2	2	2	2	1	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	1	6	6	6
Actuated Green, G (s)	4.0	4.0	4.0	4.0	6.5	6.5	6.5	6.5	10.6	10.6	10.6	10.6
Effective Green, g (s)	7.0	7.0	7.0	7.0	8.5	8.5	8.5	8.5	9.6	12.6	12.6	12.6
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.31	0.31	0.31	0.31	0.35	0.46	0.46	0.46
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	3.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	329	355	401	1137	1137	276	1696	1137	276	1696	1137	276
v/s Ratio Prot	0.00	0.01	0.01	0.02	0.03	0.03	0.03	0.03	0.00	0.05	0.05	0.05
v/s Ratio Perm	0.01	0.05	0.06	0.06	0.08	0.14	0.12	0.12	0.14	0.12	0.12	0.12
Uniform Delay, d1	7.7	7.8	7.8	6.8	8.4	4.3	4.3	4.3	8.4	4.3	4.3	4.3
Progression 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
Incremental Delay, d2	0.0	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Delay (s)	7.7	7.8	7.9	6.8	8.6	4.3	4.3	4.3	8.6	4.3	4.3	4.3
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	7.7	7.9	6.8	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A

Intersection Summary

HCM 2000 Control Delay	6.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.12		
Actuated Cycle Length (s)	27.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↑↑	↑↑	↑
Volume (vph)	259	397	3
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.07	0.11	0.01
Control Delay	0.8	0.8	30.0
Queue Delay	0.0	0.0	0.0
Total Delay	0.8	0.8	30.0
LOS	A	A	C
Approach Delay	0.8	0.8	30.0
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 58 (73%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.11
Intersection Signal Delay: 0.9
Intersection LOS: A
Intersection Capacity Utilization 24.3%
ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Volume (vph)	259	3	0	397	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3719			3725	1770	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3719			3725	1770	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	259	3	0	397	3	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	262	0	0	397	3	0
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3133			3138	101	
v/s Ratio Prot	0.07			c0.11	c0.00	
v/s Ratio Perm						
v/c Ratio	0.08			0.13	0.03	
Uniform Delay, d1	1.1			1.1	35.6	
Progression Factor	1.00			0.90	1.00	
Incremental Delay, d2	0.1			0.1	0.1	
Delay (s)	1.1			1.1	35.7	
Level of Service	A			A	D	
Approach Delay (s)	1.1			1.1	35.7	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 1.3
HCM 2000 Volume to Capacity ratio 0.12
Actuated Cycle Length (s) 80.0
Intersection Capacity Utilization 24.3%
Analysis Period (min) 15
c Critical Lane Group

HCM 2000 Level of Service A
Sum of lost time (s) 8.0
ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔	↔	↔	↔↔	↔	↔
Volume (veh/h)	233	26	0	372	25	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	233	26	0	372	25	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked						
vC, conflicting volume			259		432	130
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			259		432	130
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			1303		552	896
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	155	104	124	248	27	
Volume Left	0	0	0	0	25	
Volume Right	0	26	0	0	2	
cSH	1700	1700	1303	1700	568	
Volume to Capacity	0.09	0.06	0.00	0.15	0.05	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	1.2	
Control Delay (s)	0.0	0.0	0.0	0.0	11.7	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		11.7	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			20.3%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	97	136	338	428	7
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	59.0	59.0	59.0	59.0	21.0
Total Split (%)	73.8%	73.8%	73.8%	73.8%	26.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	67.2	67.2	67.2	67.2	12.4
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.16
v/c Ratio	0.11	0.09	0.22	0.31	0.15
Control Delay	2.3	1.9	3.0	1.0	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.3	1.9	3.0	1.0	30.0
LOS	A	A	A	A	C
Approach Delay		2.1	1.9		30.0
Approach LOS		A	A		C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 69 (86%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 45					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.31					
Intersection Signal Delay: 3.0					Intersection LOS: A
Intersection Capacity Utilization 49.8%					ICU Level of Service A
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South 1200 King Rd

Total Traffic Phase 4 Arena

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	97	136	2	0	338	428	34	7	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.96				
Satd. Flow (prot)	1770	1858			1863	1583		1789				
Flt Permitted	0.56	1.00			1.00	1.00		0.96				
Satd. Flow (perm)	1038	1858			1863	1583		1789				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	97	136	2	0	338	428	34	7	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	92	0	0	0	0	0	0
Lane Group Flow (vph)	97	138	0	0	338	336	0	41	0	0	0	0
Confl. Peds. (#/hr)			2									
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2			6			8					
Permitted Phases	2			6			8					
Actuated Green, G (s)	60.8	60.8			60.8	60.8		6.2				
Effective Green, g (s)	62.8	62.8			62.8	62.8		9.2				
Actuated g/C Ratio	0.78	0.78			0.78	0.78		0.11				
Clearance Time (s)	6.0	6.0			6.0	6.0		7.0				
Vehicle Extension (s)	3.0	3.0			3.0	3.0		5.0				
Lane Grp Cap (vph)	814	1458			1462	1242		205				
v/s Ratio Prot	0.07			0.18			0.02					
v/s Ratio Perm	0.09			0.21			0.02					
v/c Ratio	0.12	0.09			0.23	0.27		0.20				
Uniform Delay, d1	2.0	2.0			2.3	2.3		32.1				
Progression Factor	0.72	0.71			1.00	1.00		1.00				
Incremental Delay, d2	0.3	0.1			0.4	0.5		1.0				
Delay (s)	1.8	1.5			2.6	2.9		33.1				
Level of Service	A	A			A	A		C				
Approach Delay (s)	1.6			2.8			33.1			0.0		
Approach LOS	A			A			C			A		
Intersection Summary												
HCM 2000 Control Delay	3.7		HCM 2000 Level of Service		A							
HCM 2000 Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	49.8%		ICU Level of Service		A							
Analysis Period (min)	15											
c Critical Lane Group												

Timings

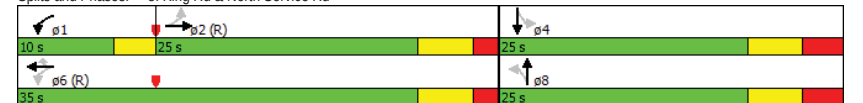
8: King Rd & North Service Rd

Total Traffic Phase 4 Arena

Mixed Use Development 1200 King Rd

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	2	65	102	124	17	52	17	4	7
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2	1	6			8		4
Permitted Phases			6		6	8		4	
Detector Phase	2	2	1	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0
Total Split (s)	25.0	25.0	10.0	35.0	35.0	25.0	25.0	25.0	25.0
Total Split (%)	41.7%	41.7%	16.7%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	30.8	30.8	38.4	39.2	39.2	16.1	16.1	18.0	18.0
Actuated g/C Ratio	0.51	0.51	0.64	0.65	0.65	0.27	0.27	0.30	0.30
v/c Ratio	0.00	0.09	0.13	0.10	0.02	0.14	0.11	0.01	0.01
Control Delay	11.5	10.4	6.5	6.2	0.0	8.8	0.8	15.0	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.5	10.4	6.5	6.2	0.0	8.8	0.8	15.0	13.6
LOS	B	B	A	A	A	A	A	B	B
Approach Delay	10.4		5.9		3.4		14.0		
Approach LOS	B		A		A		B		
Intersection Summary									
Cycle Length: 60									
Actuated Cycle Length: 60									
Offset: 31 (52%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green									
Natural Cycle: 60									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.14									
Intersection Signal Delay: 6.1					Intersection LOS: A				
Intersection Capacity Utilization 31.5%					ICU Level of Service A				
Analysis Period (min) 15									

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

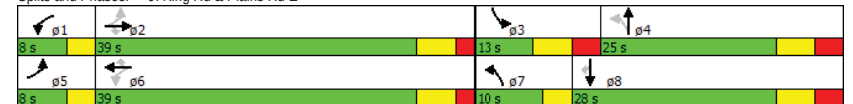
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱	↰	↱		↰	↱	↱
Volume (vph)	2	65	17	102	124	17	52	17	90	4	7	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	*1.00		1.00	*1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.87		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1805		1770	1863	1583	1770	3255		1770	3601	
Flt Permitted	0.68	1.00		0.61	1.00	1.00	0.75	1.00		0.69	1.00	
Satd. Flow (perm)	1262	1805		1130	1863	1583	1400	3255		1281	3601	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	2	65	17	102	124	17	52	17	90	4	7	2
RTOR Reduction (vph)	0	9	0	0	0	7	0	68	0	0	2	0
Lane Group Flow (vph)	2	73	0	102	124	10	52	40	0	4	8	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6		8				4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	26.0	26.0		35.0	35.0	35.0	12.0	12.0		12.0	12.0	
Effective Green, g (s)	28.0	28.0		34.0	37.0	37.0	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.47	0.47		0.57	0.62	0.62	0.25	0.25		0.25	0.25	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	588	842		693	1148	976	350	813		320	900	
v/s Ratio Prot		0.04		c0.01	0.07			0.01			0.00	
v/s Ratio Perm	0.00			c0.07		0.01	c0.04			0.00		
v/c Ratio	0.00	0.09		0.15	0.11	0.01	0.15	0.05		0.01	0.01	
Uniform Delay, d1	8.5	8.9		6.1	4.7	4.4	17.5	17.1		16.9	16.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.51	0.09		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.1	0.2	0.0	0.2	0.0		0.0	0.0	
Delay (s)	8.6	9.1		6.2	4.9	4.5	9.2	1.6		16.9	16.9	
Level of Service	A	A		A	A	A	A	A		B	B	
Approach Delay (s)		9.1			5.4			4.1			16.9	
Approach LOS		A			A			A			B	
Intersection Summary												
HCM 2000 Control Delay		5.9			HCM 2000 Level of Service			A				
HCM 2000 Volume to Capacity ratio		0.15										
Actuated Cycle Length (s)		60.0			Sum of lost time (s)			12.0				
Intersection Capacity Utilization		31.5%			ICU Level of Service			A				
Analysis Period (min)		15										
c Critical Lane Group												

Timings 9: King Rd & Plains Rd E

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	20	177	17	19	243	72	66	36	141	70	17
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	39.0	39.0	8.0	39.0	39.0	10.0	25.0	13.0	28.0	28.0
Total Split (%)	9.4%	45.9%	45.9%	9.4%	45.9%	45.9%	11.8%	29.4%	15.3%	32.9%	32.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	39.1	38.4	38.4	39.1	38.4	38.4	12.4	11.4	10.0	13.1	13.1
Actuated g/C Ratio	0.59	0.58	0.58	0.59	0.58	0.58	0.19	0.17	0.15	0.20	0.20
v/c Ratio	0.03	0.08	0.02	0.03	0.11	0.08	0.20	0.16	0.27	0.19	0.04
Control Delay	7.8	8.6	0.1	7.8	8.6	0.8	18.4	21.5	28.3	24.5	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	8.6	0.1	7.8	8.6	0.8	18.4	21.5	28.3	24.5	0.2
LOS	A	A	A	A	A	A	B	C	C	C	A
Approach Delay		7.8			6.8			19.7		25.1	
Approach LOS		A			A			B		C	
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 66.7											
Natural Cycle: 85											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.27											
Intersection Signal Delay: 13.4						Intersection LOS: B					
Intersection Capacity Utilization 50.6%						ICU Level of Service A					
Analysis Period (min) 15											

Splits and Phases: 9: King Rd & Plains Rd E



HCM Signalized Intersection Capacity Analysis 9: King Rd & Plains Rd E

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

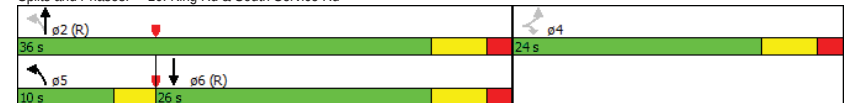
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 					 		
Volume (vph)	20	177	17	19	243	72	66	36	14	141	70	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	*1.00	1.00	1.00	*1.00	1.00	1.00	1.00		*1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1754	3725	1540	1760	3725	1533	1762	1759		3539	1863	1557
Flt Permitted	0.61	1.00	1.00	0.65	1.00	1.00	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1123	3725	1540	1196	3725	1533	1855	1759		3539	1863	1557
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	177	17	19	243	72	66	36	14	141	70	17
RTOR Reduction (vph)	0	0	8	0	0	34	0	12	0	0	0	14
Lane Group Flow (vph)	20	177	9	19	243	38	66	38	0	141	70	3
Confl. Peds. (#/hr)	10		6	6		10	4		33	33		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	37.2	36.3	36.3	37.2	36.3	36.3	8.8	4.8		7.0	11.8	11.8
Effective Green, g (s)	35.3	38.3	38.3	35.3	38.3	38.3	6.8	7.8		10.0	14.8	14.8
Actuated g/C Ratio	0.49	0.53	0.53	0.49	0.53	0.53	0.09	0.11		0.14	0.21	0.21
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	550	1981	819	586	1981	815	171	190		491	382	320
v/s Ratio Prot		0.05			c0.07		0.02	0.02		c0.04	c0.04	
v/s Ratio Perm	0.02		0.01	0.02		0.02						0.00
v/c Ratio	0.04	0.09	0.01	0.03	0.12	0.05	0.39	0.20		0.29	0.18	0.01
Uniform Delay, d1	9.5	8.3	7.9	9.5	8.4	8.1	30.7	29.2		27.8	23.6	22.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.1	0.0	0.0	0.1	0.1	1.4	0.5		0.3	0.2	0.0
Delay (s)	9.6	8.4	8.0	9.5	8.6	8.2	32.1	29.8		28.1	23.8	22.8
Level of Service	A	A	A	A	A	A	C	C		C	C	C
Approach Delay (s)		8.4			8.5			31.1			26.4	
Approach LOS		A			A			C			C	
Intersection Summary												
HCM 2000 Control Delay	16.0			HCM 2000 Level of Service				B				
HCM 2000 Volume to Capacity ratio	0.17											
Actuated Cycle Length (s)	72.0			Sum of lost time (s)				16.0				
Intersection Capacity Utilization	50.6%			ICU Level of Service				A				
Analysis Period (min)	15											
c Critical Lane Group												

Timings 10: King Rd & South Service Rd

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

					
Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	83	118	67	75	106
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	24.0	24.0	10.0	36.0	26.0
Total Split (%)	40.0%	40.0%	16.7%	60.0%	43.3%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	10.2	10.2	44.1	44.9	39.0
Actuated g/C Ratio	0.17	0.17	0.74	0.75	0.65
v/c Ratio	0.28	0.32	0.08	0.05	0.11
Control Delay	23.3	7.4	3.6	3.5	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	7.4	3.6	3.5	2.6
LOS	C	A	A	A	A
Approach Delay	14.0			3.6	2.6
Approach LOS	B			A	A
Intersection Summary					
Cycle Length: 60					
Actuated Cycle Length: 60					
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.32					
Intersection Signal Delay: 7.7			Intersection LOS: A		
Intersection Capacity Utilization 25.3%			ICU Level of Service A		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (vph)	83	118	67	75	106	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1818	
Flt Permitted	0.95	1.00	0.60	1.00	1.00	
Satd. Flow (perm)	1770	1583	1120	1863	1818	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	83	118	67	75	106	23
RTOR Reduction (vph)	0	100	0	0	8	0
Lane Group Flow (vph)	83	18	67	75	121	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	7.1	7.1	40.9	40.9	33.9	
Effective Green, g (s)	9.1	9.1	39.9	42.9	35.9	
Actuated g/C Ratio	0.15	0.15	0.66	0.71	0.60	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	268	240	777	1332	1087	
v/s Ratio Prot			c0.00	0.04	c0.07	
v/s Ratio Perm	c0.05	0.01	0.05			
v/c Ratio	0.31	0.07	0.09	0.06	0.11	
Uniform Delay, d1	22.7	21.8	3.6	2.5	5.2	
Progression Factor	1.00	1.00	1.00	1.00	0.38	
Incremental Delay, d2	0.7	0.1	0.0	0.1	0.2	
Delay (s)	23.3	22.0	3.7	2.6	2.2	
Level of Service	C	C	A	A	A	
Approach Delay (s)	22.5			3.1	2.2	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			11.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.16			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			25.3%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↰	↱	↰	↱	↰	↱
Volume (veh/h)	65	77	2	199	572	14
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	65	77	2	199	572	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			142		306	104
vC1, stage 1 conf vol					104	
vC2, stage 2 conf vol					203	
vCu, unblocked vol			142		306	104
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		27	99
cM capacity (veh/h)			1441		783	951
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	142	201	586			
Volume Left	0	2	572			
Volume Right	77	0	14			
cSH	1700	1441	787			
Volume to Capacity	0.08	0.00	0.75			
Queue Length 95th (m)	0.0	0.0	55.0			
Control Delay (s)	0.0	0.1	21.7			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.1	21.7			
Approach LOS		C				
Intersection Summary						
Average Delay			13.7			
Intersection Capacity Utilization			51.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Volume (veh/h)	8	69	183	8	29	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	69	183	8	29	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	191				272	187
vC1, stage 1 conf vol					187	
vC2, stage 2 conf vol					85	
vCu, unblocked vol	191				272	187
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	98
cM capacity (veh/h)	1383				801	855
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	77	191	47			
Volume Left	8	0	29			
Volume Right	0	8	18			
cSH	1383	1700	821			
Volume to Capacity	0.01	0.11	0.06			
Queue Length 95th (m)	0.1	0.0	1.5			
Control Delay (s)	0.8	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.8	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay		1.6				
Intersection Capacity Utilization		20.3%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↗	↖	
Volume (veh/h)	106	13	10	85	101	77
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	106	13	10	85	101	77
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT		TWLT		
Median storage (veh)		2		2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			119		218	112
vC1, stage 1 conf vol					112	
vC2, stage 2 conf vol					105	
vCu, unblocked vol			119		218	112
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		88	92
cM capacity (veh/h)			1469		843	940
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	119	95	178			
Volume Left	0	10	101			
Volume Right	13	0	77			
cSH	1700	1469	883			
Volume to Capacity	0.07	0.01	0.20			
Queue Length 95th (m)	0.0	0.2	6.0			
Control Delay (s)	0.0	0.8	10.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.8	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay		4.8				
Intersection Capacity Utilization		28.7%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Total Traffic Phase 4 Arena

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	T	TR	L	T	TR
Maximum Queue (m)	23.1	40.4	22.3	48.6	57.4	42.8	31.6	11.3	19.8	24.4
Average Queue (m)	7.7	14.7	7.7	22.0	29.8	8.3	16.9	3.6	7.9	10.4
95th Queue (m)	18.8	30.3	17.0	42.5	49.6	30.6	27.2	10.9	17.2	20.7
Link Distance (m)	341.1				135.0		135.0	130.8		
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	165.0		125.0		60.0	60.0	70.0		70.0	
Storage Blk Time (%)					0	1				
Queuing Penalty (veh)					0	1				

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	8.2	24.5	24.2	19.4	30.3	13.5	19.9	22.6
Average Queue (m)	0.5	10.2	10.2	9.7	7.8	2.5	4.4	4.8
95th Queue (m)	3.7	21.6	19.6	17.4	20.2	9.1	13.5	15.1
Link Distance (m)	60.7	437.7		168.8		168.8	135.0	135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Total Traffic Phase 4 Arena

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	T	R	L	L	T
Maximum Queue (m)	25.0	29.7	24.8	15.8	21.5	75.7	26.5	16.1	11.9	21.5	25.2	8.2
Average Queue (m)	10.4	11.9	8.3	5.0	9.6	42.6	10.8	5.2	5.6	7.3	9.9	1.0
95th Queue (m)	21.4	24.2	18.9	13.5	19.1	70.5	22.0	13.8	11.2	16.2	20.5	4.8
Link Distance (m)	326.8			195.9			195.9	115.0		168.8		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	125.0	250.0		65.0						30.0	35.0	
Storage Blk Time (%)	0											
Queuing Penalty (veh)	0											

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB
Directions Served	T
Maximum Queue (m)	5.7
Average Queue (m)	0.4
95th Queue (m)	2.6
Link Distance (m)	168.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	T	TR	L	T	TR
Maximum Queue (m)	8.6	10.4	19.1	15.0	11.9	12.2	15.9	15.1
Average Queue (m)	0.8	2.6	9.4	4.7	3.4	4.2	4.2	5.5
95th Queue (m)	4.8	9.5	17.2	12.7	10.3	11.0	11.2	13.2
Link Distance (m)	132.4		154.0	115.7	115.7		209.5	209.5
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	35.0				90.0			
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Total Traffic Phase 4 Arena

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	10.8	16.6	10.2	27.0	7.6
Average Queue (m)	0.8	1.0	0.6	1.8	1.1
95th Queue (m)	5.9	7.6	4.5	11.7	5.2
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	NB
Directions Served	LR
Maximum Queue (m)	14.4
Average Queue (m)	5.4
95th Queue (m)	13.5
Link Distance (m)	52.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	28.8	25.6	36.2	31.8	19.2
Average Queue (m)	11.5	5.1	11.5	12.9	8.6
95th Queue (m)	22.2	16.7	28.7	26.9	17.2
Link Distance (m)	95.2	95.2	1019.4		63.5
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
Total Traffic Phase 4 Arena

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	1.4	29.8	17.8	21.2	8.5	28.1	9.4	30.3	7.8	8.4	3.6
Average Queue (m)	0.1	5.8	6.4	5.6	1.0	7.9	1.9	8.9	0.7	1.1	0.2
95th Queue (m)	1.4	17.9	15.8	16.0	5.2	19.3	7.2	20.1	4.4	5.4	1.7
Link Distance (m)		1977.6		329.3			252.0	252.0		167.7	167.7
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)		0									
Queuing Penalty (veh)		0									

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	12.4	28.4	12.5	6.4	13.0	33.6	25.2	16.1	20.8	21.6	26.8	30.6
Average Queue (m)	2.8	11.8	2.0	1.1	3.1	16.5	5.2	6.2	9.6	7.2	8.0	15.7
95th Queue (m)	9.4	23.2	8.1	4.4	10.5	28.9	16.0	14.0	18.3	16.5	19.3	25.6
Link Distance (m)		250.1	250.1				193.4	193.4		131.9		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)		0				1	0					
Queuing Penalty (veh)		0				0	0					

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	24.8	10.1
Average Queue (m)	10.0	2.3
95th Queue (m)	20.6	7.7
Link Distance (m)	406.0	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		35.0
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report
Total Traffic Phase 4 Arena

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (m)	37.1	18.6	14.9	21.3	18.5
Average Queue (m)	15.4	9.8	5.5	4.1	4.7
95th Queue (m)	29.2	16.5	14.9	13.9	14.2
Link Distance (m)	293.0		305.2		103.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	50.0	30.0			
Storage Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			

Intersection: 11: Block 1 Access B & South Service Rd

Movement	NB
Directions Served	LR
Maximum Queue (m)	82.8
Average Queue (m)	50.6
95th Queue (m)	84.8
Link Distance (m)	70.3
Upstream Blk Time (%)	17
Queuing Penalty (veh)	0
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 12: South Service Rd & Road B

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	8.7	15.7
Average Queue (m)	0.4	8.1
95th Queue (m)	3.9	14.0
Link Distance (m)	173.0	68.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
Total Traffic Phase 4 Arena

Total Traffic Phase 4 Arena
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	8.8	27.7
Average Queue (m)	0.5	13.2
95th Queue (m)	4.1	21.8
Link Distance (m)	293.0	70.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 2

Appendix I

Total Traffic Operations - Phase 5

Timings

1: Waterdown Rd & North Service Rd

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

	←	←	←	←	↑	↓	↓
Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↰	↱	↰	↰	↱	↰	↱
Volume (vph)	64	123	72	264	458	281	983
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	27.0	27.0	27.0	16.0	41.0	22.0	47.0
Total Split (%)	30.0%	30.0%	30.0%	17.8%	45.6%	24.4%	52.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	23.0	23.0	23.0	12.0	43.8	54.1	43.0
Actuated g/C Ratio	0.26	0.26	0.26	0.13	0.49	0.60	0.48
v/c Ratio	0.14	0.26	0.14	0.56	0.48	0.63	0.66
Control Delay	27.0	28.5	0.6	50.4	4.3	13.5	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	28.5	0.6	50.4	4.3	13.5	19.6
LOS	C	C	A	D	A	B	B
Approach Delay		20.4			14.9		18.4
Approach LOS		C			B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 69 (77%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.66

Intersection Signal Delay: 17.2

Intersection LOS: B

Intersection Capacity Utilization 66.6%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

	↰	→	↰	↰	←	↰	↰	↑	↰	↰	↓	↰
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↱	↰	↰	↱		↰	↱	
Volume (vph)	0	0	0	64	123	72	264	458	418	281	983	177
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	*1.00	*1.00		1.00	*1.00	
Flpb, ped/bikes				1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt				1.00	1.00	0.85	1.00	0.93		1.00	0.98	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1562	3539	3459		1770	3633	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.25	1.00	
Satd. Flow (perm)				1770	1863	1562	3539	3459		472	3633	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	64	123	72	264	458	418	281	983	177
RTOR Reduction (vph)	0	0	0	0	0	54	0	160	0	0	18	0
Lane Group Flow (vph)	0	0	0	64	123	18	264	716	0	281	1142	0
Confl. Peds. (#/hr)	1						1	1				1
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				20.0	20.0	20.0	10.0	41.8		53.2	41.0	
Effective Green, g (s)				23.0	23.0	23.0	12.0	43.8		51.2	43.0	
Actuated g/C Ratio				0.26	0.26	0.26	0.13	0.49		0.57	0.48	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				452	476	399	471	1683		430	1735	
v/s Ratio Prot				0.04	c0.07		0.07	0.21		c0.08	c0.31	
v/s Ratio Perm						0.01				0.29		
v/c Ratio				0.14	0.26	0.05	0.56	0.43		0.65	0.66	
Uniform Delay, d1				25.9	26.7	25.2	36.5	15.0		11.0	17.9	
Progression Factor				1.00	1.00	1.00	1.24	0.34		1.00	1.00	
Incremental Delay, d2				0.1	1.3	0.2	4.5	0.7		3.6	2.0	
Delay (s)				26.0	28.0	25.5	49.9	5.9		14.5	19.9	
Level of Service				C	C	C	D	A		B	B	
Approach Delay (s)		0.0			26.8			16.1			18.8	
Approach LOS		A			C			B			B	

Intersection Summary

HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	1	0	413	0	3	893	1040
Volume (vph)	1	0	413	0	3	893	1040
Turn Type	Perm	NA	custom	NA	Perm	NA	NA
Protected Phases	4	4	3	7	2	2	6
Permitted Phases	4	4	3	7	2	2	6
Detector Phase	4	4	3	7	2	2	6
Switch Phase							
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0	31.0
Total Split (s)	11.0	11.0	25.0	36.0	54.0	54.0	54.0
Total Split (%)	12.2%	12.2%	27.8%	40.0%	60.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max
Act Effct Green (s)	8.0	18.3	20.5		61.5	61.5	
Actuated g/C Ratio	0.09	0.20	0.23		0.68	0.68	
v/c Ratio	0.02	0.57	0.54		0.37	0.41	
Control Delay	0.2	35.4	17.5		8.4	1.8	
Queue Delay	0.0	0.0	0.0		0.0	0.0	
Total Delay	0.2	35.4	17.5		8.4	1.9	
LOS	A	D	B		A	A	
Approach Delay	0.3		28.7		8.4	1.9	
Approach LOS	A		C		A	A	

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 67 (74%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.57

Intersection Signal Delay: 10.9

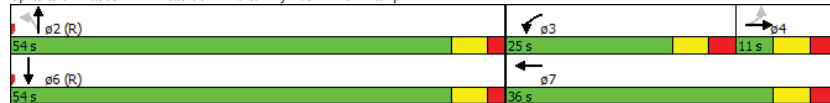
Intersection LOS: B

Intersection Capacity Utilization 54.1%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	0	3	413	0	246	3	893	0	0	1040	7
Volume (vph)	1	0	3	413	0	246	3	893	0	0	1040	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00			*1.00	1.00			*1.00			*1.00	
Frpb, ped/bikes	1.00			1.00	0.99			1.00			1.00	
Flpb, ped/bikes	1.00			1.00	1.00			1.00			1.00	
Frt	0.90			1.00	0.85			1.00			1.00	
Flt Protected	0.99			0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1651			3539	1563			3725			3721	
Flt Permitted	0.84			0.95	1.00			0.95			1.00	
Satd. Flow (perm)	1399			3539	1563			3549			3721	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	3	413	0	246	3	893	0	0	1040	7
RTOR Reduction (vph)	0	4	0	0	93	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	413	153	0	0	896	0	0	1047	0
Confl. Peds. (#/hr)	1					1	3					3
Turn Type	Perm	NA		custom	NA		Perm	NA			NA	
Protected Phases		4		3	7			2			6	
Permitted Phases	4			3			2					
Actuated Green, G (s)		0.8		15.3	23.1			53.9			53.9	
Effective Green, g (s)		3.8		18.3	26.1			55.9			55.9	
Actuated g/C Ratio		0.04		0.20	0.29			0.62			0.62	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		59		719	453			2204			2311	
v/s Ratio Prot				c0.12	c0.10						c0.28	
v/s Ratio Perm		0.00						0.25				
v/c Ratio		0.00		0.57	0.34			0.41			0.45	
Uniform Delay, d1		41.3		32.3	25.1			8.6			9.0	
Progression Factor		1.00		1.00	1.00			1.14			0.20	
Incremental Delay, d2		0.0		1.1	0.4			0.5			0.5	
Delay (s)		41.3		33.5	25.6			10.4			2.3	
Level of Service		D		C	C			B			A	
Approach Delay (s)		41.3			30.5			10.4			2.3	
Approach LOS		D			C			B			A	

Intersection Summary

HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

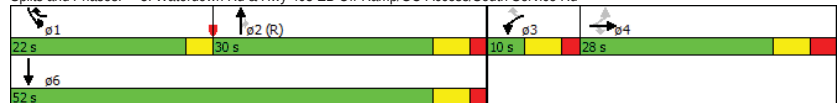
Total Traffic Phase 5 AM

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↩	↑	↩	↩	↩	↩	↩	↩	↩
Volume (vph)	237	502	302	113	229	430	559	700	756
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3		2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	28.0	28.0	28.0	10.0	22.0	30.0	30.0	22.0	52.0
Total Split (%)	31.1%	31.1%	31.1%	11.1%	24.4%	33.3%	33.3%	24.4%	57.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	25.8	25.8	25.8	6.0	23.0	26.0	26.0	18.2	48.2
Actuated g/C Ratio	0.29	0.29	0.29	0.07	0.26	0.29	0.29	0.20	0.54
v/c Ratio	0.47	0.94	0.67	0.48	0.57	0.40	0.98	1.01	0.38
Control Delay	31.0	60.7	37.7	47.7	24.3	14.4	45.4	67.7	5.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	60.7	37.7	47.7	24.3	14.4	45.4	67.7	5.8
LOS	C	E	D	D	C	B	D	E	A
Approach Delay		47.3				31.9			35.6
Approach LOS		D				C			D

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 30 (33%), Referenced to phase 2:NBT, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 37.5
Intersection Capacity Utilization 91.0%
Analysis Period (min) 15
Intersection LOS: D
ICU Level of Service F

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Total Traffic Phase 5 AM

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↑	↩	↩		↩		↩	↩	↩	↩	
Volume (vph)	237	502	302	113	0	229	0	430	559	700	756	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	1.00	0.97	*1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583	3539		1583		3725	1583	3433	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1583	3539		1583		3725	1583	3433	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	237	502	302	113	0	229	0	430	559	700	756	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	114	0	0	0
Lane Group Flow (vph)	237	502	302	113	0	229	0	430	445	700	756	0
Confl. Peds. (#/hr)							2					2
Turn Type	Perm	NA	Perm	Prot		pm+ov		NA	Perm	Prot	NA	
Protected Phases		4		3		1		2		1	6	
Permitted Phases	4		4			3			2			
Actuated Green, G (s)	22.8	22.8	22.8	3.2		22.4		22.8	22.8	19.2	45.0	
Effective Green, g (s)	25.8	25.8	25.8	5.2		20.4		24.8	24.8	18.2	47.0	
Actuated g/C Ratio	0.29	0.29	0.29	0.06		0.23		0.28	0.28	0.20	0.52	
Clearance Time (s)	7.0	7.0	7.0	6.0		3.0		6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	507	534	453	204		358		1026	436	694	1945	
v/s Ratio Prot		c0.27		c0.03		0.13		0.12		c0.20	0.20	
v/s Ratio Perm	0.13		0.19			0.02			c0.28			
v/c Ratio	0.47	0.94	0.67	0.55		0.64		0.42	1.02	1.01	0.39	
Uniform Delay, d1	26.4	31.3	28.3	41.3		31.5		26.7	32.6	35.9	12.9	
Progression Factor	1.00	1.00	1.00	1.00		1.00		0.52	0.40	0.84	0.43	
Incremental Delay, d2	0.7	24.9	3.7	3.2		3.7		1.2	46.5	34.8	0.5	
Delay (s)	27.1	56.2	32.0	44.5		35.2		14.9	59.6	64.9	6.1	
Level of Service	C	E	C	D		D		B	E	E	A	
Approach Delay (s)		42.6			38.3			40.2			34.4	
Approach LOS		D			D			D			C	

Intersection Summary

HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	27	0	29	0	8	816	465	685
Volume (vph)	27	0	29	0	8	816	465	685
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases	4	4	8	8	2	2	1	6
Permitted Phases	4	4	8	8	2	2	1	6
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	12.0	36.0
Total Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	28.0	64.0
Total Split (%)	28.9%	28.9%	28.9%	28.9%	40.0%	40.0%	31.1%	71.1%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)	11.5	11.5	11.5	11.5	47.8	47.8	73.5	74.3
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.53	0.53	0.82	0.83
v/c Ratio	0.18	0.14	0.17	0.02	0.48	0.71	0.23	
Control Delay	4.1	36.4	0.6	15.6	16.5	16.7	5.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.1	36.4	0.6	15.6	16.5	16.7	5.0	
LOS	A	D	A	B	B	B	A	
Approach Delay	4.1		7.8		16.5		9.7	
Approach LOS	A		A		B		A	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 6 (7%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 12.3
Intersection Capacity Utilization 71.2%
Analysis Period (min) 15

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd

28 s	36 s	26 s
64 s		26 s

HCM Signalized Intersection Capacity Analysis

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	27	0	10	29	0	114	8	816	128	465	685	21
Volume (vph)	27	0	10	29	0	114	8	816	128	465	685	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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
Flt Protected	0.96	0.96	0.95	1.00	0.85	1.00	0.98	1.00	0.98	1.00	1.00	1.00
Satd. Flow (prot)	1732	1732	1770	1583	1770	1770	1770	1770	1770	1770	1770	1770
Flt Permitted	0.61	0.61	0.84	1.00	0.40	1.00	0.21	1.00	0.21	1.00	0.21	1.00
Satd. Flow (perm)	1096	1096	1567	1583	739	3650	399	3709	399	3709	399	3709
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	27	0	10	29	0	114	8	816	128	465	685	21
RTOR Reduction (vph)	0	33	0	0	101	0	0	11	0	0	2	0
Lane Group Flow (vph)	0	4	0	29	13	0	8	933	0	465	704	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA	NA
Protected Phases	4	4	8	8	2	2	1	6	1	6	1	6
Permitted Phases	4	4	8	8	2	2	1	6	1	6	1	6
Actuated Green, G (s)	6.9	6.9	6.9	6.9	44.5	44.5	70.1	70.1	70.1	70.1	70.1	70.1
Effective Green, g (s)	9.9	9.9	9.9	9.9	46.5	46.5	69.1	69.1	69.1	69.1	69.1	69.1
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.52	0.52	0.77	0.77	0.77	0.77	0.77	0.77
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	120	172	174	381	1885	635	2971	0.19	0.19	0.19	0.19	0.19
v/s Ratio Prot	0.00	0.00	0.02	0.01	0.01	0.01	0.39	0.39	0.39	0.39	0.39	0.39
v/s Ratio Perm	0.03	0.17	0.07	0.02	0.49	0.73	0.24	0.24	0.24	0.24	0.24	0.24
Uniform Delay, d1	35.8	36.3	35.9	10.6	14.1	10.8	2.2	2.2	2.2	2.2	2.2	2.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.43	2.07	1.43	2.07	1.43	2.07
Incremental Delay, d2	0.1	0.5	0.2	0.1	0.9	3.9	0.2	0.2	0.2	0.2	0.2	0.2
Delay (s)	35.9	36.8	36.1	10.7	15.1	19.4	4.7	4.7	4.7	4.7	4.7	4.7
Level of Service	D	D	D	B	B	B	A	A	A	A	A	A
Approach Delay (s)	35.9		36.2		15.0		10.5	10.5				
Approach LOS	D		D		B		B	B				

Intersection Summary

HCM 2000 Control Delay	14.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↔↔	↔↔	↔
Volume (vph)	1742	328	14
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.50	0.09	0.07
Control Delay	1.8	0.8	28.4
Queue Delay	0.0	0.0	0.0
Total Delay	1.8	0.8	28.4
LOS	A	A	C
Approach Delay	1.8	0.8	28.4
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 62 (78%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 1.8
 Intersection LOS: A
 Intersection Capacity Utilization 62.1%
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (vph)	1742	19	0	328	14	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Flpb, ped/bikes	1.00			1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3718			3725	1755	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3718			3725	1755	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1742	19	0	328	14	2
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	1761	0	0	328	14	0
Confl. Peds. (#/hr)		2	2			
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3132			3138	100	
v/s Ratio Prot	c0.47			0.09	c0.01	
v/s Ratio Perm						
v/c Ratio	0.56			0.10	0.14	
Uniform Delay, d1	1.9			1.1	35.8	
Progression Factor	1.00			0.96	1.00	
Incremental Delay, d2	0.7			0.1	0.6	
Delay (s)	2.6			1.1	36.5	
Level of Service	A			A	D	
Approach Delay (s)	2.6			1.1	36.5	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 2.6 HCM 2000 Level of Service A
 HCM 2000 Volume to Capacity ratio 0.54
 Actuated Cycle Length (s) 80.0 Sum of lost time (s) 8.0
 Intersection Capacity Utilization 62.1% ICU Level of Service B
 Analysis Period (min) 15
 c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Total Traffic Phase 5 AM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (veh/h)	1603	141	0	280	48	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1603	141	0	280	48	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.82		0.82	0.82
vC, conflicting volume			1744		1814	872
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1468		1553	404
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		44	99
cM capacity (veh/h)			374		85	488
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	1069	675	93	187	55	
Volume Left	0	0	0	0	48	
Volume Right	0	141	0	0	7	
cSH	1700	1700	374	1700	95	
Volume to Capacity	0.63	0.40	0.00	0.11	0.58	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	21.4	
Control Delay (s)	0.0	0.0	0.0	0.0	84.9	
Lane LOS					F	
Approach Delay (s)	0.0		0.0		84.9	
Approach LOS					F	
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			58.8%		ICU Level of Service	B
Analysis Period (min)			15			

Timings

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 5 AM

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	668	669	267	243	22
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	65.0	65.0	65.0	65.0	15.0
Total Split (%)	81.3%	81.3%	81.3%	81.3%	18.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	68.6	68.6	68.6	68.6	11.0
Actuated g/C Ratio	0.86	0.86	0.86	0.86	0.14
v/c Ratio	0.70	0.62	0.17	0.17	0.14
Control Delay	8.5	4.0	2.3	0.7	32.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	4.1	2.3	0.7	32.0
LOS	A	A	A	A	C
Approach Delay		5.9	1.5		32.0
Approach LOS		A	A		C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 66 (83%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.70					
Intersection Signal Delay: 5.3					Intersection LOS: A
Intersection Capacity Utilization 71.9%					ICU Level of Service C
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 5 AM

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	668	669	273	0	267	243	13	22	0	0	0	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0					
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00					
Flpb, ped/bikes	1.00	0.99			1.00	1.00		1.00					
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00					
Flt	1.00	0.96			1.00	0.85		1.00					
Flt Protected	0.95	1.00			1.00	1.00		0.98					
Satd. Flow (prot)	1770	1770			1863	1583		1829					
Flt Permitted	0.59	1.00			1.00	1.00		0.98					
Satd. Flow (perm)	1108	1770			1863	1583		1829					
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Adj. Flow (vph)	668	669	273	0	267	243	13	22	0	0	0	0	
RTOR Reduction (vph)	0	15	0	0	0	48	0	0	0	0	0	0	
Lane Group Flow (vph)	668	927	0	0	267	195	0	35	0	0	0	0	
Confl. Peds. (#/hr)	2												
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA					
Protected Phases	2				6		8						
Permitted Phases	2		6		6		8						
Actuated Green, G (s)	62.2	62.2			62.2	62.2	4.8						
Effective Green, g (s)	64.2	64.2			64.2	64.2	7.8						
Actuated g/C Ratio	0.80	0.80			0.80	0.80	0.10						
Clearance Time (s)	6.0	6.0			6.0	6.0	7.0						
Vehicle Extension (s)	3.0	3.0			3.0	3.0	5.0						
Lane Grp Cap (vph)	889	1420			1495	1270	178						
v/s Ratio Prot	0.52				0.14								
v/s Ratio Perm	0.60				0.12		0.02						
v/c Ratio	0.75	0.65			0.18	0.15	0.20						
Uniform Delay, d1	3.9	3.3			1.8	1.8	33.2						
Progression Factor	0.75	0.67			1.00	1.00	1.00						
Incremental Delay, d2	5.2	2.1			0.3	0.3	1.1						
Delay (s)	8.1	4.3			2.1	2.0	34.4						
Level of Service	A	A			A	A	C						
Approach Delay (s)	5.9				2.1		34.4				0.0		
Approach LOS	A				A		C				A		
Intersection Summary													
HCM 2000 Control Delay	5.4		HCM 2000 Level of Service		A								
HCM 2000 Volume to Capacity ratio	0.69												
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0								
Intersection Capacity Utilization	71.9%		ICU Level of Service		C								
Analysis Period (min)	15												
c Critical Lane Group													

Timings

8: King Rd & North Service Rd

Total Traffic Phase 5 AM

Mixed Use Development 1200 King Rd

										
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT	
Lane Configurations										
Volume (vph)	6	470	271	250	23	60	26	21	32	
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA	
Protected Phases		2	1	6			8		4	
Permitted Phases			6		6	8		4		
Detector Phase	2	2	1	6	6	8	8	4	4	
Switch Phase										
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0	
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0	
Total Split (s)	68.0	68.0	25.0	93.0	93.0	27.0	27.0	27.0	27.0	
Total Split (%)	56.7%	56.7%	20.8%	77.5%	77.5%	22.5%	22.5%	22.5%	22.5%	
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0	
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lead/Lag	Lag	Lag	Lead							
Lead-Lag Optimize?										
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None	
Act Effct Green (s)	80.3	80.3	93.6	93.6	93.6	18.4	18.4	18.4	18.4	
Actuated g/C Ratio	0.67	0.67	0.78	0.78	0.78	0.15	0.15	0.15	0.15	
v/c Ratio	0.01	0.49	0.47	0.17	0.02	0.29	0.53	0.33	0.08	
Control Delay	7.5	11.5	6.3	3.7	0.6	39.3	4.9	60.6	36.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.5	11.5	6.3	3.7	0.6	39.3	4.9	60.6	36.8	
LOS	A	B	A	A	A	D	A	E	D	
Approach Delay		11.5		4.9			9.2		45.0	
Approach LOS		B		A			A		D	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 27 (23%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green										
Natural Cycle: 65										
Control Type: Actuated-Coordinated										
Maximum v/c Ratio: 0.53										
Intersection Signal Delay: 9.9					Intersection LOS: A					
Intersection Capacity Utilization 74.8%					ICU Level of Service D					
Analysis Period (min) 15										

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	6	470	125	271	250	23	60	26	395	21	32	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.86		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1799		1770	1863	1583	1770	3041		1770	3433	
Flt Permitted	0.60	1.00		0.33	1.00	1.00	0.73	1.00		0.22	1.00	
Satd. Flow (perm)	1125	1799		622	1863	1583	1359	3041		417	3433	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	6	470	125	271	250	23	60	26	395	21	32	8
RTOR Reduction (vph)	0	6	0	0	0	5	0	334	0	0	7	0
Lane Group Flow (vph)	6	589	0	271	250	18	60	87	0	21	33	0
Confl. Peds. (#/hr)			1	1								
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	78.3	78.3		91.6	91.6	91.6	15.4	15.4		15.4	15.4	
Effective Green, g (s)	80.3	80.3		90.6	93.6	93.6	18.4	18.4		18.4	18.4	
Actuated g/C Ratio	0.67	0.67		0.75	0.78	0.78	0.15	0.15		0.15	0.15	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	752	1203		558	1453	1234	208	466		63	526	
v/s Ratio Prot		c0.33		c0.04	0.13			0.03			0.01	
v/s Ratio Perm	0.01			0.33		0.01	0.04			c0.05		
v/c Ratio	0.01	0.49		0.49	0.17	0.01	0.29	0.19		0.33	0.06	
Uniform Delay, d1	6.6	9.8		6.6	3.4	2.9	45.0	44.3		45.3	43.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.79	0.42		1.00	1.00	
Incremental Delay, d2	0.0	1.4		0.7	0.3	0.0	0.7	0.2		3.1	0.1	
Delay (s)	6.6	11.2		7.3	3.6	3.0	36.3	18.7		48.4	43.5	
Level of Service	A	B		A	A	A	D	B		D	D	
Approach Delay (s)		11.2			5.4			20.9			45.2	
Approach LOS		B			A			C			D	
Intersection Summary												
HCM 2000 Control Delay		13.3										
HCM 2000 Volume to Capacity ratio		0.46										
Actuated Cycle Length (s)		120.0						12.0				
Intersection Capacity Utilization		74.8%										
Analysis Period (min)		15										
c Critical Lane Group												

Timings 9: King Rd & Plains Rd E

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR																																																
Lane Configurations																																																											
Volume (vph)	98	801	147	54	345	551	184	128	328	90	32																																																
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm																																																
Protected Phases	5	2		1	6		7	4	3	8																																																	
Permitted Phases	2		2	6		6	4				8																																																
Detector Phase	5	2	2	1	6	6	7	4	3	8	8																																																
Switch Phase																																																											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0																																																
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0																																																
Total Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	11.0	25.0	15.0	29.0	29.0																																																
Total Split (%)	9.4%	43.5%	43.5%	9.4%	43.5%	43.5%	12.9%	29.4%	17.6%	34.1%	34.1%																																																
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0																																																
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0																																																
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0																																																
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0																																																
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag																																																
Lead-Lag Optimize?																																																											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None																																																
Act Effct Green (s)	37.1	34.9	34.9	36.3	33.2	33.2	24.9	16.0	11.1	19.1	19.1																																																
Actuated g/C Ratio	0.47	0.44	0.44	0.46	0.42	0.42	0.32	0.20	0.14	0.24	0.24																																																
v/c Ratio	0.20	0.48	0.19	0.18	0.22	0.57	0.39	0.54	0.68	0.20	0.07																																																
Control Delay	12.5	18.0	4.6	12.6	16.0	4.3	20.1	29.1	41.5	24.4	0.3																																																
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0																																																
Total Delay	12.5	18.0	4.6	12.6	16.0	4.3	20.1	29.1	41.5	24.4	0.3																																																
LOS	B	B	A	B	B	A	C	C	D	C	A																																																
Approach Delay		15.6			9.1			24.8		35.1																																																	
Approach LOS		B			A			C		D																																																	
Intersection Summary																																																											
Cycle Length: 85																																																											
Actuated Cycle Length: 78.6																																																											
Natural Cycle: 85																																																											
Control Type: Semi Act-Uncoord																																																											
Maximum v/c Ratio: 0.68																																																											
Intersection Signal Delay: 17.8						Intersection LOS: B																																																					
Intersection Capacity Utilization 66.3%						ICU Level of Service C																																																					
Analysis Period (min) 15																																																											
Splits and Phases: 9: King Rd & Plains Rd E																																																											
<table><tr><td></td><td></td><td colspan="4"></td><td></td><td></td><td colspan="4"></td></tr><tr><td>8 s</td><td>37 s</td><td colspan="4"></td><td>15 s</td><td>25 s</td><td colspan="4"></td></tr><tr><td></td><td></td><td colspan="4"></td><td></td><td></td><td colspan="4"></td></tr><tr><td>8 s</td><td>37 s</td><td colspan="4"></td><td>11 s</td><td>29 s</td><td colspan="4"></td></tr></table>																								8 s	37 s					15 s	25 s																	8 s	37 s					11 s	29 s				
																																																											
8 s	37 s					15 s	25 s																																																				
																																																											
8 s	37 s					11 s	29 s																																																				

HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	124	185	490	370	271	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1769	
Flt Permitted	0.95	1.00	0.42	1.00	1.00	
Satd. Flow (perm)	1770	1583	779	1863	1769	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	124	185	490	370	271	161
RTOR Reduction (vph)	0	161	0	0	11	0
Lane Group Flow (vph)	124	24	490	370	421	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	13.7	13.7	94.3	94.3	73.7	
Effective Green, g (s)	15.7	15.7	93.3	96.3	75.7	
Actuated g/C Ratio	0.13	0.13	0.78	0.80	0.63	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	231	207	742	1495	1115	
v/s Ratio Prot			c0.09	0.20	0.24	
v/s Ratio Perm	c0.07	0.02	c0.42			
v/c Ratio	0.54	0.12	0.66	0.25	0.38	
Uniform Delay, d1	48.8	46.0	5.8	2.9	10.7	
Progression Factor	1.00	1.00	1.00	1.00	1.19	
Incremental Delay, d2	2.4	0.3	2.2	0.4	0.9	
Delay (s)	51.1	46.3	8.0	3.3	13.7	
Level of Service	D	D	A	A	B	
Approach Delay (s)	48.2			6.0	13.7	
Approach LOS	D			A	B	
Intersection Summary						
HCM 2000 Control Delay			16.2	HCM 2000 Level of Service		B
HCM 2000 Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		14.0
Intersection Capacity Utilization			68.1%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	586	22	1	349	25	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	586	22	1	349	25	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			608		948	597
vC1, stage 1 conf vol					597	
vC2, stage 2 conf vol					351	
vCu, unblocked vol			608		948	597
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			970		488	503
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	608	350	26			
Volume Left	0	1	25			
Volume Right	22	0	1			
cSH	1700	970	489			
Volume to Capacity	0.36	0.00	0.05			
Queue Length 95th (m)	0.0	0.0	1.3			
Control Delay (s)	0.0	0.0	12.8			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.0	12.8			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization		42.2%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Volume (veh/h)	137	437	332	130	29	18
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	137	437	332	130	29	18
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL	TWLTL			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	462				1108	397
vC1, stage 1 conf vol					397	
vC2, stage 2 conf vol					711	
vCu, unblocked vol	462				1108	397
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	88				93	97
cM capacity (veh/h)	1099				388	652
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	574	462	47			
Volume Left	137	0	29			
Volume Right	0	130	18			
cSH	1099	1700	459			
Volume to Capacity	0.12	0.27	0.10			
Queue Length 95th (m)	3.4	0.0	2.7			
Control Delay (s)	3.2	0.0	13.7			
Lane LOS	A		B			
Approach Delay (s)	3.2	0.0	13.7			
Approach LOS			B			
Intersection Summary						
Average Delay		2.3				
Intersection Capacity Utilization		69.3%		ICU Level of Service	C	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↖			↗	↖	↗
Volume (veh/h)	381	4	3	562	4	3
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	381	4	3	562	4	3
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLTL		TWLTL		
Median storage (veh)		2		2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			385		951	383
vC1, stage 1 conf vol					383	
vC2, stage 2 conf vol					568	
vCu, unblocked vol			385		951	383
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1173		492	664
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	385	565	7			
Volume Left	0	3	4			
Volume Right	4	0	3			
cSH	1700	1173	554			
Volume to Capacity	0.23	0.00	0.01			
Queue Length 95th (m)	0.0	0.1	0.3			
Control Delay (s)	0.0	0.1	11.6			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	11.6			
Approach LOS			B			
Intersection Summary						
Average Delay		0.1				
Intersection Capacity Utilization		42.0%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Total Traffic Phase 5 AM

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	T	TR	L	T	TR
Maximum Queue (m)	28.2	54.1	23.7	47.7	51.6	47.7	83.5	73.2	109.7	94.9
Average Queue (m)	11.9	20.8	10.1	21.8	26.9	18.6	35.7	34.3	60.0	67.2
95th Queue (m)	24.1	40.2	19.9	40.9	45.3	37.8	61.8	58.9	90.8	93.2
Link Distance (m)	341.1			135.0				130.8		
Upstream Blk Time (%)	0									
Queuing Penalty (veh)	0									
Storage Bay Dist (m)	165.0	125.0		60.0	60.0	70.0			70.0	
Storage Blk Time (%)	0			1	0	0			2	6
Queuing Penalty (veh)	0			2	0	3			16	46

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	8.4	62.6	67.6	58.7	61.4	59.7	42.4	38.0
Average Queue (m)	1.0	33.6	35.6	22.6	22.7	27.8	11.2	10.8
95th Queue (m)	5.5	53.3	57.5	42.1	48.1	54.1	34.2	29.9
Link Distance (m)	60.7	437.7			168.8	168.8	135.0	135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Total Traffic Phase 5 AM

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	B15	SB	SB
Directions Served	L	T	R	L	L	R	T	T	R	T	L	L
Maximum Queue (m)	155.0	340.4	280.0	28.7	28.7	53.7	96.7	122.1	60.0	5.2	65.0	174.3
Average Queue (m)	147.9	321.5	260.0	13.0	12.8	28.6	27.4	46.8	47.1	0.2	56.9	97.6
95th Queue (m)	192.0	391.5	367.3	24.1	23.6	49.9	58.9	104.2	70.7	3.6	77.0	181.7
Link Distance (m)	326.8				195.9	195.9	115.0	115.0	209.5		168.8	
Upstream Blk Time (%)	55						0	1			4	
Queuing Penalty (veh)	0						0	3			17	
Storage Bay Dist (m)	125.0	250.0		65.0					30.0	35.0		
Storage Blk Time (%)	79								3	31	45	52
Queuing Penalty (veh)	427								17	67	158	182

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB	SB
Directions Served	T	T
Maximum Queue (m)	114.0	84.8
Average Queue (m)	33.2	19.7
95th Queue (m)	95.9	53.3
Link Distance (m)	168.8	168.8
Upstream Blk Time (%)	0	0
Queuing Penalty (veh)	2	0
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	27.8	22.2	32.3	8.6	105.7	119.5	99.8	44.0	49.7
Average Queue (m)	8.9	7.0	14.1	1.6	49.1	72.3	53.4	20.3	25.8
95th Queue (m)	20.8	18.0	24.8	6.9	95.0	120.3	89.3	39.9	45.7
Link Distance (m)	132.4	154.0		115.7		115.7	209.5		209.5
Upstream Blk Time (%)						0	2		
Queuing Penalty (veh)						0	0		
Storage Bay Dist (m)	35.0		90.0				90.0		
Storage Blk Time (%)	0			0		1			
Queuing Penalty (veh)	0			0		3			

Queuing and Blocking Report
Total Traffic Phase 5 AM

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	64.7	75.0	14.5	23.8	15.3
Average Queue (m)	12.3	18.1	1.9	3.8	4.0
95th Queue (m)	44.3	58.3	9.2	15.3	11.5
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	EB	EB	NB
Directions Served	T	TR	LR
Maximum Queue (m)	73.2	67.7	45.1
Average Queue (m)	11.4	9.7	18.1
95th Queue (m)	48.0	43.2	37.9
Link Distance (m)	94.7	94.7	52.2
Upstream Blk Time (%)	0	0	2
Queuing Penalty (veh)	0	1	0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	99.2	102.4	32.6	28.4	19.2
Average Queue (m)	61.8	37.8	8.7	9.4	7.2
95th Queue (m)	105.9	88.9	25.1	21.7	15.8
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)	4	0			
Queuing Penalty (veh)	34	3			
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Queuing and Blocking Report
Total Traffic Phase 5 AM

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	6.5	109.9	65.9	35.4	8.8	28.4	17.4	92.4	21.9	27.0	6.8
Average Queue (m)	0.9	52.9	26.5	15.1	1.6	11.0	4.1	34.2	6.8	7.1	1.9
95th Queue (m)	4.9	88.8	50.3	29.3	6.8	24.4	12.0	69.5	18.4	19.0	6.6
Link Distance (m)		1977.6		329.3			252.0	252.0		167.7	167.7
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)		9	0	0					0	1	
Queuing Penalty (veh)		1	0	0					0	0	

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	52.5	76.3	65.2	30.3	25.2	50.8	73.5	59.0	62.5	70.0	77.6	78.0
Average Queue (m)	15.4	40.3	30.0	8.6	10.0	26.3	16.1	37.0	22.9	28.9	34.3	39.0
95th Queue (m)	33.7	63.1	54.6	19.6	21.0	43.1	50.0	60.4	43.9	54.3	64.6	67.5
Link Distance (m)		250.1	250.1				193.4	193.4			131.9	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)	1	10	2	0	0	6	0	14	1	3	0	0
Queuing Penalty (veh)	3	10	4	0	1	3	0	24	1	6	0	0

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	33.4	15.9
Average Queue (m)	13.9	3.9
95th Queue (m)	27.8	10.4
Link Distance (m)	406.0	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		35.0
Storage Blk Time (%)	0	
Queuing Penalty (veh)	1	

Queuing and Blocking Report
Total Traffic Phase 5 AM

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB	B30
Directions Served	L	R	L	T	TR	T
Maximum Queue (m)	53.4	48.1	59.8	91.8	100.3	0.9
Average Queue (m)	26.4	17.8	39.2	25.9	40.5	0.0
95th Queue (m)	43.9	33.6	60.9	64.0	80.4	0.6
Link Distance (m)	293.0		305.2		103.9	252.0
Upstream Blk Time (%)					0	
Queuing Penalty (veh)					1	
Storage Bay Dist (m)	50.0	30.0				
Storage Blk Time (%)	1	0	14	2		
Queuing Penalty (veh)	1	0	52	10		

Intersection: 11: Block 1 Access B & South Service Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	6.9	14.8
Average Queue (m)	0.4	6.1
95th Queue (m)	4.2	13.8
Link Distance (m)	173.6	70.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: South Service Rd & Road B

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	57.9	9.2	18.2
Average Queue (m)	20.2	0.5	7.7
95th Queue (m)	44.1	3.9	14.9
Link Distance (m)	173.6	281.0	68.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
Total Traffic Phase 5 AM

Total Traffic Phase 5 AM
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	9.6	8.6
Average Queue (m)	0.4	1.7
95th Queue (m)	4.3	7.2
Link Distance (m)	293.0	70.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1102

Timings

1: Waterdown Rd & North Service Rd

Total Traffic Phase 5 PM

Mixed Use Development 1200 King Rd

Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations	↩	↩	↩	↩	↩	↩	↩
Volume (vph)	202	575	300	562	998	135	585
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	31.0	31.0	31.0	18.0	38.0	11.0	31.0
Total Split (%)	38.8%	38.8%	38.8%	22.5%	47.5%	13.8%	38.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	27.0	27.0	27.0	14.0	34.3	33.7	27.0
Actuated g/C Ratio	0.34	0.34	0.34	0.18	0.43	0.42	0.34
v/c Ratio	0.35	0.91	0.41	0.93	0.77	0.53	0.58
Control Delay	17.9	40.8	3.2	57.8	13.3	18.1	22.6
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	17.9	40.8	3.2	57.8	13.4	18.1	22.6
LOS	B	D	A	E	B	B	C
Approach Delay		26.0			27.6		21.9
Approach LOS		C			C		C

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 13 (16%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 25.8

Intersection LOS: C

Intersection Capacity Utilization 81.8%

ICU Level of Service D

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd

ø1	ø2 (R)	ø4
11 s	38 s	31 s
ø5	ø6 (R)	ø8
18 s	31 s	31 s

HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Total Traffic Phase 5 PM

Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↩	↩	↩	↩	↩		↩	↩	
Volume (vph)	0	0	0	202	575	300	562	998	202	135	585	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0			4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	*1.00		1.00	*1.00	
Frt				1.00	1.00	0.85	1.00	0.97		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1736	1881	1615	3467	3579		1805	3656	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.17	1.00	
Satd. Flow (perm)				1736	1881	1615	3467	3579		317	3656	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	202	575	300	562	998	202	135	585	147
RTOR Reduction (vph)	0	0	0	0	0	193	0	23	0	0	30	0
Lane Group Flow (vph)	0	0	0	202	575	107	562	1177	0	135	702	0
Heavy Vehicles (%)	0%	0%	0%	4%	1%	0%	1%	3%	6%	0%	1%	0%
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				24.0	24.0	24.0	12.0	32.3		32.7	25.0	
Effective Green, g (s)				27.0	27.0	27.0	14.0	34.3		30.7	27.0	
Actuated g/C Ratio				0.34	0.34	0.34	0.18	0.43		0.38	0.34	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				585	634	545	606	1534		246	1233	
v/s Ratio Prot				0.12	c0.31		c0.16	c0.33		0.05	0.19	
v/s Ratio Perm						0.07				0.16		
v/c Ratio				0.35	0.91	0.20	0.93	0.77		0.55	0.57	
Uniform Delay, d1				19.9	25.3	18.8	32.5	19.5		17.5	21.7	
Progression Factor				0.81	0.87	0.59	1.15	0.53		1.00	1.00	
Incremental Delay, d2				0.3	16.7	0.7	19.2	3.0		2.5	1.9	
Delay (s)				16.5	38.7	11.7	56.4	13.4		20.0	23.6	
Level of Service				B	D	B	E	B		B	C	
Approach Delay (s)		0.0			27.0			27.1			23.1	
Approach LOS		A			C			C			C	

Intersection Summary

HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 5 PM

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations		↔	↔	↔	↔	↔
Volume (vph)	3	0	462	0	1423	780
Turn Type	Perm	NA	custom	NA	NA	NA
Protected Phases		4	3	7	2	6
Permitted Phases	4		3			
Detector Phase	4	4	3	7	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0
Total Split (s)	11.0	11.0	21.0	32.0	48.0	48.0
Total Split (%)	13.8%	13.8%	26.3%	40.0%	60.0%	60.0%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0
Lost Time Adjust (s)		-3.0	-3.0	-3.0	-2.0	-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effct Green (s)		7.4	20.3	22.5	49.5	49.5
Actuated g/C Ratio		0.09	0.25	0.28	0.62	0.62
v/c Ratio		0.02	0.50	0.69	0.61	0.34
Control Delay		0.2	27.6	29.7	7.2	8.4
Queue Delay		0.0	0.0	0.0	0.0	0.0
Total Delay		0.2	27.6	29.7	7.2	8.4
LOS		A	C	C	A	A
Approach Delay		0.2		28.5	7.2	8.4
Approach LOS		A		C	A	A

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 80

Offset: 74 (93%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 60

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.69

Intersection Signal Delay: 13.2

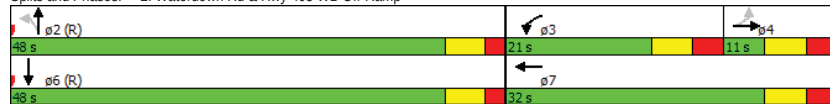
Intersection LOS: B

Intersection Capacity Utilization 66.8%

ICU Level of Service C

Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp



HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 5 PM

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔		↔	↔			↔			↔	
Volume (vph)	3	0	2	462	0	336	0	1423	0	0	780	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		*1.00	1.00			*1.00			*1.00	
Frt		0.95		1.00	0.85			1.00			1.00	
Flt Protected		0.97		0.95	1.00			1.00			1.00	
Satd. Flow (prot)		1711		3610	1615			3800			3689	
Flt Permitted		0.84		0.95	1.00			1.00			1.00	
Satd. Flow (perm)		1484		3610	1615			3800			3689	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	3	0	2	462	0	336	0	1423	0	0	780	7
RTOR Reduction (vph)	0	5	0	0	27	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	0	0	462	309	0	0	1423	0	0	786	0
Heavy Vehicles (%)	0%	0%	5%	0%	2%	0%	7%	0%	4%	0%	2%	100%
Turn Type	Perm	NA		custom	NA			NA			NA	
Protected Phases		4		3	7			2			6	
Permitted Phases	4			3			2					
Actuated Green, G (s)		0.8		17.3	25.1			41.9			41.9	
Effective Green, g (s)		3.8		20.3	28.1			43.9			43.9	
Actuated g/C Ratio		0.05		0.25	0.35			0.55			0.55	
Clearance Time (s)		7.0		7.0	7.0			6.0			6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		70		916	567			2085			2024	
v/s Ratio Prot				0.13	c0.19			c0.37			0.21	
v/s Ratio Perm		0.00										
v/c Ratio		0.00		0.50	0.55			0.68			0.39	
Uniform Delay, d1		36.3		25.5	20.8			13.0			10.4	
Progression Factor		1.00		1.00	1.00			0.63			0.98	
Incremental Delay, d2		0.0		0.4	1.1			1.1			0.5	
Delay (s)		36.3		26.0	21.9			9.3			10.6	
Level of Service		D		C	C			A			B	
Approach Delay (s)		36.3			24.3			9.3			10.6	
Approach LOS		D			C			A			B	

Intersection Summary

HCM 2000 Control Delay 13.6

HCM 2000 Level of Service B

HCM 2000 Volume to Capacity ratio 0.67

Actuated Cycle Length (s) 80.0

Sum of lost time (s) 12.0

Intersection Capacity Utilization 66.8%

ICU Level of Service C

Analysis Period (min) 15

c Critical Lane Group

4: Waterdown Rd & Masonry Crt/Railway Rd

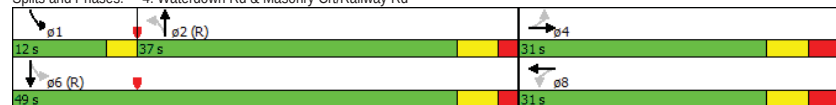
Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

								
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	26	0	79	0	1	554	204	933
Turn Type	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA
Protected Phases		4		8		2	1	6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	1	6
Switch Phase								
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	36.0	12.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	37.0	37.0	12.0	49.0
Total Split (%)	38.8%	38.8%	38.8%	38.8%	46.3%	46.3%	15.0%	61.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)		-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lag	Lead	
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	C-Max	C-Max	None	C-Max
Act Effct Green (s)		18.7	18.7	18.7	41.4	41.4	53.3	53.3
Actuated g/C Ratio		0.23	0.23	0.23	0.52	0.52	0.67	0.67
v/c Ratio		0.25	0.24	0.81	0.01	0.32	0.36	0.39
Control Delay		4.7	24.2	17.5	14.0	13.0	5.2	3.5
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		4.7	24.2	17.5	14.0	13.0	5.2	3.5
LOS		A	C	B	B	B	A	A
Approach Delay		4.7		18.3		13.0		3.8
Approach LOS		A		B		B		A

Intersection Summary

Cycle Length: 80	
Actuated Cycle Length: 80	
Offset: 58 (73%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 9.9	Intersection
Intersection Capacity Utilization 76.6%	ICU Level
Analysis Period (min) 15	

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd



4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	26	0	8	79	0	545	1	554	40	204	933	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	0.97	1.00	0.85	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.96	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1217	1805	1615	902	3594	1805	3679	1805	3679	1805	3679	1805
Flt Permitted	0.24	0.73	1.00	0.32	1.00	0.32	1.00	0.32	1.00	0.32	1.00	1.00
Satd. Flow (perm)	307	1396	1615	301	3594	301	3594	301	3594	301	3594	301
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	26	0	8	79	0	545	1	554	40	204	933	14
RTOR Reduction (vph)	0	26	0	0	300	0	0	6	0	0	1	0
Lane Group Flow (vph)	0	8	0	79	245	0	1	588	0	204	946	0
Heavy Vehicles (%)	52%	0%	25%	0%	0%	0%	100%	5%	0%	0%	2%	73%
Turn Type	Perm	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		15.7		15.7	15.7		39.4	39.4		51.3	51.3	
Effective Green, g (s)		18.7		18.7	18.7		41.4	41.4		50.3	53.3	
Actuated g/C Ratio		0.23		0.23	0.23		0.52	0.52		0.63	0.67	
Clearance Time (s)		7.0		7.0	7.0		6.0	6.0		3.0	6.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		71		326	377		155	1859		541	2451	
v/s Ratio Prot					c0.15			0.16		0.04	c0.26	
v/s Ratio Perm		0.03		0.06			0.00			0.20		
v/c Ratio		0.11		0.24	0.65		0.01	0.32		0.38	0.39	
Uniform Delay, d1		24.1		24.9	27.7		9.3	11.1		6.7	6.0	
Progression Factor		1.00		1.00	1.00		1.00	1.00		0.56	0.44	
Incremental Delay, d2		0.7		0.4	4.0		0.1	0.4		0.4	0.4	
Delay (s)		24.8		25.3	31.7		9.4	11.6		4.1	3.0	
Level of Service		C		C	C		A	B		A	A	
Approach Delay (s)		24.8			30.9			11.6			3.2	
Approach LOS		C			C			B			A	

Intersection Summary

HCM 2000 Control Delay	12.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Timings

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 5 PM

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↑↑	↑↑	↑
Volume (vph)	1353	706	13
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.0	76.0	11.2
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.39	0.20	0.11
Control Delay	0.5	0.7	29.6
Queue Delay	0.0	0.0	0.0
Total Delay	0.5	0.7	29.6
LOS	A	A	C
Approach Delay	0.5	0.7	29.6
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 61 (76%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 0.8
 Intersection LOS: A
 Intersection Capacity Utilization 51.2%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 5 PM

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↑	
Volume (vph)	1353	16	0	706	13	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Frt	1.00			1.00	0.98	
Flt Protected	1.00			1.00	0.96	
Satd. Flow (prot)	3651			3800	995	
Flt Permitted	1.00			1.00	0.96	
Satd. Flow (perm)	3651			3800	995	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1353	16	0	706	13	2
RTOR Reduction (vph)	0	0	0	0	2	0
Lane Group Flow (vph)	1369	0	0	706	13	0
Heavy Vehicles (%)	3%	81%	0%	0%	92%	0%
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.2			64.2	1.8	
Effective Green, g (s)	67.2			67.2	4.8	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3066			3192	59	
v/s Ratio Prot	c0.37			0.19	c0.01	
v/s Ratio Perm						
v/c Ratio	0.45			0.22	0.22	
Uniform Delay, d1	1.6			1.3	35.8	
Progression Factor	0.30			0.68	1.00	
Incremental Delay, d2	0.3			0.2	1.9	
Delay (s)	0.8			1.0	37.7	
Level of Service	A			A	D	
Approach Delay (s)	0.8			1.0	37.7	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 1.1
 HCM 2000 Level of Service A
 HCM 2000 Volume to Capacity ratio 0.43
 Actuated Cycle Length (s) 80.0
 Sum of lost time (s) 8.0
 Intersection Capacity Utilization 51.2%
 ICU Level of Service A
 Analysis Period (min) 15

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Total Traffic Phase 5 PM

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (veh/h)	1221	134	0	574	132	8
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	1221	134	0	574	132	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked			0.89		0.89	0.89
vC, conflicting volume			1355		1575	678
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1157		1403	398
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		0	99
cM capacity (veh/h)			545		119	542
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	814	541	191	383	140	
Volume Left	0	0	0	0	132	
Volume Right	0	134	0	0	8	
cSH	1700	1700	545	1700	124	
Volume to Capacity	0.48	0.32	0.00	0.23	1.13	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	66.3	
Control Delay (s)	0.0	0.0	0.0	0.0	186.8	
Lane LOS					F	
Approach Delay (s)	0.0		0.0		186.8	
Approach LOS					F	
Intersection Summary						
Average Delay			12.6			
Intersection Capacity Utilization			52.5%		ICU Level of Service	A
Analysis Period (min)			15			

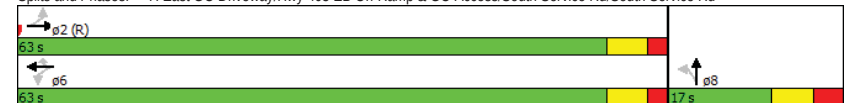
Timings

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 5 PM

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	520	700	397	344	39
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	63.0	63.0	63.0	63.0	17.0
Total Split (%)	78.8%	78.8%	78.8%	78.8%	21.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	59.0	59.0	59.0	59.0	13.0
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.16
v/c Ratio	0.75	0.51	0.28	0.27	0.73
Control Delay	10.5	2.2	2.5	0.7	48.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	2.2	2.5	0.7	48.0
LOS	B	A	A	A	D
Approach Delay		5.7	1.7		48.0
Approach LOS		A	A		D
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 65 (81%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.75					
Intersection Signal Delay: 8.5					Intersection LOS: A
Intersection Capacity Utilization 72.0%					ICU Level of Service C
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 5 PM

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↱		↰	↱	↱		↱				
Volume (vph)	520	700	9	0	397	344	177	39	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.96				
Satd. Flow (prot)	1752	1896			1900	1615		1825				
Flt Permitted	0.51	1.00			1.00	1.00		0.96				
Satd. Flow (perm)	942	1896			1900	1615		1825				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	520	700	9	0	397	344	177	39	0	0	0	0
RTOR Reduction (vph)	0	1	0	0	0	90	0	0	0	0	0	0
Lane Group Flow (vph)	520	708	0	0	397	254	0	216	0	0	0	0
Confl. Peds. (#/hr)	2											
Heavy Vehicles (%)	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2			6		6		8				
Permitted Phases	2			6		6		8				
Actuated Green, G (s)	57.0	57.0			57.0	57.0		10.0				
Effective Green, g (s)	59.0	59.0			59.0	59.0		13.0				
Actuated g/C Ratio	0.74	0.74			0.74	0.74		0.16				
Clearance Time (s)	6.0	6.0			6.0	6.0		7.0				
Vehicle Extension (s)	3.0	3.0			3.0	3.0		5.0				
Lane Grp Cap (vph)	694	1398			1401	1191		296				
v/s Ratio Prot	0.37			0.21								
v/s Ratio Perm	0.55					0.16		0.12				
v/c Ratio	0.75	0.51			0.28	0.21		0.73				
Uniform Delay, d1	6.2	4.4			3.5	3.3		31.8				
Progression Factor	0.45	0.20			0.59	0.77		1.00				
Incremental Delay, d2	6.8	1.2			0.4	0.3		10.6				
Delay (s)	9.6	2.1			2.5	2.8		42.4				
Level of Service	A	A			A	A		D				
Approach Delay (s)	5.3			2.6		42.4		0.0				
Approach LOS	A			A		D		A				

Intersection Summary

HCM 2000 Control Delay	8.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Timings

8: King Rd & North Service Rd

Total Traffic Phase 5 PM

Mixed Use Development 1200 King Rd

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	8	342	565	651	91	290	93	21	38
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2	1	6			8		4
Permitted Phases			6		6	8		4	
Detector Phase	2	2	1	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0
Total Split (s)	27.0	27.0	28.0	55.0	55.0	25.0	25.0	25.0	25.0
Total Split (%)	33.8%	33.8%	35.0%	68.8%	68.8%	31.3%	31.3%	31.3%	31.3%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	25.6	25.6	51.5	51.5	51.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.32	0.32	0.64	0.64	0.64	0.26	0.26	0.26	0.26
v/c Ratio	0.03	0.75	0.94	0.54	0.09	0.84	0.42	0.12	0.06
Control Delay	9.9	22.0	41.9	10.0	1.6	41.6	4.1	24.6	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	22.0	41.9	10.0	1.6	41.6	4.1	24.6	18.0
LOS	A	C	D	B	A	D	A	C	B
Approach Delay		21.8		23.2			18.8		19.9
Approach LOS		C		C			B		B
Intersection Summary									
Cycle Length: 80									
Actuated Cycle Length: 80									
Offset: 3 (4%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green									
Natural Cycle: 90									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.94									
Intersection Signal Delay: 21.6					Intersection LOS: C				
Intersection Capacity Utilization 87.9%					ICU Level of Service E				
Analysis Period (min) 15									

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰		↰	↰	↰	↰	↰	↰	↰	↰	↰
Volume (vph)	8	342	97	565	651	91	290	93	355	21	38	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.88		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1801		1770	1863	1583	1770	3119		1770	3404	
Flt Permitted	0.42	1.00		0.17	1.00	1.00	0.72	1.00		0.37	1.00	
Satd. Flow (perm)	778	1801		322	1863	1583	1345	3119		696	3404	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	8	342	97	565	651	91	290	93	355	21	38	13
RTOR Reduction (vph)	0	12	0	0	0	32	0	264	0	0	10	0
Lane Group Flow (vph)	8	427	0	565	651	59	290	184	0	21	41	0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6		6	8		4			
Actuated Green, G (s)	23.6	23.6		49.5	49.5	49.5	17.5	17.5		17.5	17.5	
Effective Green, g (s)	25.6	25.6		48.5	51.5	51.5	20.5	20.5		20.5	20.5	
Actuated g/C Ratio	0.32	0.32		0.61	0.64	0.64	0.26	0.26		0.26	0.26	
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	576		591	1199	1019	344	799		178	872	
v/s Ratio Prot		0.24		0.26	0.35			0.06			0.01	
v/s Ratio Perm	0.01			0.32		0.04	0.22		0.03			
v/c Ratio	0.03	0.74		0.96	0.54	0.06	0.84	0.23		0.12	0.05	
Uniform Delay, d1	18.7	24.2		19.7	7.8	5.3	28.2	23.5		22.8	22.4	
Progression Factor	0.46	0.52		1.00	1.00	1.00	0.71	0.51		1.00	1.00	
Incremental Delay, d2	0.2	7.4		26.2	1.8	0.1	15.0	0.1		0.3	0.0	
Delay (s)	8.9	19.9		45.9	9.6	5.4	35.0	12.2		23.1	22.4	
Level of Service	A	B		D	A	A	D	B		C	C	
Approach Delay (s)		19.7			25.0			21.2			22.6	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay		22.9			HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio		0.92										
Actuated Cycle Length (s)		80.0			Sum of lost time (s)					12.0		
Intersection Capacity Utilization		87.9%			ICU Level of Service					E		
Analysis Period (min)		15										
c Critical Lane Group												

Timings 9: King Rd & Plains Rd E

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations											
Volume (vph)	110	933	88	100	1277	437	346	164	650	193	91
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	15.0	25.0	15.0	25.0	25.0
Total Split (%)	9.4%	43.5%	43.5%	9.4%	43.5%	43.5%	17.6%	29.4%	17.6%	29.4%	29.4%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	36.3	33.3	33.3	36.3	33.3	33.3	28.2	17.3	11.1	17.5	17.5
Actuated g/C Ratio	0.45	0.42	0.42	0.45	0.42	0.42	0.35	0.22	0.14	0.22	0.22
v/c Ratio	0.59	0.60	0.12	0.43	0.82	0.57	0.80	0.59	1.37	0.47	0.19
Control Delay	27.1	21.2	0.3	18.3	27.7	12.5	35.2	32.0	208.4	31.7	1.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.1	21.2	0.3	18.3	27.7	12.5	35.2	32.0	208.4	31.7	1.1
LOS	C	C	A	B	C	B	D	C	F	C	A
Approach Delay		20.2			23.5			33.9		151.7	
Approach LOS		C			C			C		F	
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 79.9											
Natural Cycle: 85											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 1.37											
Intersection Signal Delay: 50.9											
Intersection Capacity Utilization 87.9%											
Analysis Period (min) 15											
Splits and Phases: 9: King Rd & Plains Rd E											
 ϕ1	8 s		 ϕ2	37 s		 ϕ3	15 s		 ϕ4	25 s	
 ϕ5	8 s		 ϕ6	37 s		 ϕ7	15 s		 ϕ8	25 s	

HCM Signalized Intersection Capacity Analysis
9: King Rd & Plains Rd E

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↰↱	↰	↰	↰↱	↰	↰	↰	↰	↰↱	↰	↰
Volume (vph)	110	933	88	100	1277	437	346	164	72	650	193	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	*1.00	1.00	1.00	*1.00	1.00	1.00	1.00		0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.98		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1769	3725	1539	1769	3725	1531	1767	1747		3433	1863	1556
Flt Permitted	0.13	1.00	1.00	0.19	1.00	1.00	0.48	1.00		0.95	1.00	1.00
Satd. Flow (perm)	247	3725	1539	349	3725	1531	884	1747		3433	1863	1556
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	110	933	88	100	1277	437	346	164	72	650	193	91
RTOR Reduction (vph)	0	0	52	0	0	132	0	20	0	0	0	71
Lane Group Flow (vph)	110	933	36	100	1277	305	346	216	0	650	193	20
Confl. Peds. (#/hr)	10		6	6		10	4		33	33		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	35.1	31.2	31.2	35.1	31.2	31.2	26.2	14.3		8.1	14.5	14.5
Effective Green, g (s)	33.1	33.2	33.2	33.1	33.2	33.2	24.2	17.3		11.1	17.5	17.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41	0.30	0.21		0.14	0.22	0.22
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	156	1536	634	194	1536	631	385	375		473	405	338
v/s Ratio Prot	c0.03	0.25		0.02	c0.34		0.12	0.12		c0.19	0.10	
v/s Ratio Perm	0.26		0.02	0.19		0.20	c0.15					0.01
v/c Ratio	0.71	0.61	0.06	0.52	0.83	0.48	0.90	0.58		1.37	0.48	0.06
Uniform Delay, d1	19.4	18.5	14.2	16.0	21.1	17.4	25.4	28.3		34.7	27.5	25.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.5	1.8	0.2	2.3	5.4	2.6	22.8	2.1		181.4	0.9	0.1
Delay (s)	33.0	20.3	14.4	18.3	26.5	20.0	48.2	30.5		216.1	28.4	25.0
Level of Service	C	C	B	B	C	B	D	C		F	C	C
Approach Delay (s)		21.1			24.5			41.0			158.7	
Approach LOS		C			C			D			F	
Intersection Summary												
HCM 2000 Control Delay		53.9			HCM 2000 Level of Service			D				
HCM 2000 Volume to Capacity ratio		0.88										
Actuated Cycle Length (s)		80.5			Sum of lost time (s)			16.0				
Intersection Capacity Utilization		87.9%			ICU Level of Service			E				
Analysis Period (min)		15										
c Critical Lane Group												

Timings
10: King Rd & South Service Rd

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	327	348	380	409	564
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	24.0	24.0	18.0	56.0	38.0
Total Split (%)	30.0%	30.0%	22.5%	70.0%	47.5%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	19.0	19.0	53.0	53.0	35.4
Actuated g/C Ratio	0.24	0.24	0.66	0.66	0.44
v/c Ratio	0.78	0.54	0.95	0.33	0.88
Control Delay	38.7	5.9	54.1	6.9	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	5.9	54.1	6.9	28.3
LOS	D	A	D	A	C
Approach Delay	21.8			29.7	28.3
Approach LOS	C			C	C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 27 (34%), Referenced to phase 2:NBTL and 6:SBT, Start of Green					
Natural Cycle: 90					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.95					
Intersection Signal Delay: 26.8			Intersection LOS: C		
Intersection Capacity Utilization 88.0%			ICU Level of Service E		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	327	348	380	409	564	151
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1810	
Flt Permitted	0.95	1.00	0.11	1.00	1.00	
Satd. Flow (perm)	1770	1583	205	1863	1810	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	327	348	380	409	564	151
RTOR Reduction (vph)	0	265	0	0	12	0
Lane Group Flow (vph)	327	83	380	409	703	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	17.0	17.0	51.0	51.0	33.4	
Effective Green, g (s)	19.0	19.0	50.0	53.0	35.4	
Actuated g/C Ratio	0.24	0.24	0.62	0.66	0.44	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	420	375	394	1234	800	
v/s Ratio Prot			c0.16	0.22	0.39	
v/s Ratio Perm	c0.18	0.05	c0.44			
v/c Ratio	0.78	0.22	0.96	0.33	0.88	
Uniform Delay, d1	28.5	24.5	23.1	5.8	20.3	
Progression Factor	0.86	0.82	1.00	1.00	0.89	
Incremental Delay, d2	8.7	0.3	35.8	0.7	8.2	
Delay (s)	33.3	20.3	58.9	6.6	26.3	
Level of Service	C	C	E	A	C	
Approach Delay (s)	26.6			31.8	26.3	
Approach LOS	C			C	C	
Intersection Summary						
HCM 2000 Control Delay			28.4		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.93			
Actuated Cycle Length (s)			80.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			88.0%		ICU Level of Service	E
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	425	143	3	616	48	1
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	425	143	3	616	48	1
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			568		1118	496
vC1, stage 1 conf vol					496	
vC2, stage 2 conf vol					622	
vCu, unblocked vol			568		1118	496
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		89	100
cM capacity (veh/h)			1014		446	577
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	568	619	49			
Volume Left	0	3	48			
Volume Right	143	0	1			
cSH	1700	1014	449			
Volume to Capacity	0.33	0.00	0.11			
Queue Length 95th (m)	0.0	0.1	2.9			
Control Delay (s)	0.0	0.1	14.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.1	14.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			44.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↘		↖	↗
Volume (veh/h)	39	362	523	36	134	80
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	39	362	523	36	134	80
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	559				981	541
vC1, stage 1 conf vol					541	
vC2, stage 2 conf vol					440	
vCu, unblocked vol	559				981	541
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	96				72	85
cM capacity (veh/h)	1022				482	545
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	401	559	214			
Volume Left	39	0	134			
Volume Right	0	36	80			
cSH	1022	1700	504			
Volume to Capacity	0.04	0.33	0.42			
Queue Length 95th (m)	1.0	0.0	16.8			
Control Delay (s)	1.2	0.0	17.3			
Lane LOS	A		C			
Approach Delay (s)	1.2	0.0	17.3			
Approach LOS			C			
Intersection Summary						
Average Delay		3.6				
Intersection Capacity Utilization		70.6%		ICU Level of Service	C	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↘	↖	↗
Volume (veh/h)	593	25	18	539	9	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	593	25	18	539	9	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT		TWLT		
Median storage (veh)		2		2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			618		1180	606
vC1, stage 1 conf vol					606	
vC2, stage 2 conf vol					575	
vCu, unblocked vol			618		1180	606
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			98		98	99
cM capacity (veh/h)			972		427	501
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	618	557	14			
Volume Left	0	18	9			
Volume Right	25	0	5			
cSH	1700	972	451			
Volume to Capacity	0.36	0.02	0.03			
Queue Length 95th (m)	0.0	0.5	0.8			
Control Delay (s)	0.0	0.5	13.2			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.5	13.2			
Approach LOS			B			
Intersection Summary						
Average Delay		0.4				
Intersection Capacity Utilization		52.9%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Total Traffic Phase 5 PM

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	B19	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	T	L	L	T	TR	L	T	TR
Maximum Queue (m)	132.2	225.6	132.0	3.3	71.2	85.3	121.1	119.2	33.8	88.8	83.5
Average Queue (m)	28.7	75.3	33.6	0.1	55.2	62.3	65.6	66.0	18.2	38.9	46.7
95th Queue (m)	104.0	196.1	111.4	2.3	83.3	93.9	125.9	118.5	29.8	64.7	73.1
Link Distance (m)	341.1		1977.6				135.0	135.0	130.8		
Upstream Blk Time (%)	1						2	1	0		
Queuing Penalty (veh)	5						13	7	0		
Storage Bay Dist (m)	165.0	125.0		60.0		60.0			70.0	70.0	
Storage Blk Time (%)	10				10	24	3		0		1
Queuing Penalty (veh)	50				51	121	15		2		6

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	10.9	64.3	66.1	69.0	64.6	63.4	54.5	64.8
Average Queue (m)	1.7	32.7	37.5	38.4	28.4	27.6	22.7	28.4
95th Queue (m)	7.7	52.6	56.3	59.9	52.1	51.4	44.7	54.1
Link Distance (m)	60.7	437.7			168.8	168.8	135.0	135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Total Traffic Phase 5 PM

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	B15	B15	SB
Directions Served	L	T	R	L	L	R	T	T	R	T	T	L
Maximum Queue (m)	140.6	235.6	171.7	68.5	106.4	119.3	98.0	116.8	60.0	40.6	45.7	57.4
Average Queue (m)	66.4	117.8	75.7	38.4	47.7	64.1	51.5	53.8	44.1	1.4	2.9	29.3
95th Queue (m)	144.7	259.7	188.2	75.7	96.2	107.2	81.7	94.0	69.7	28.6	43.4	50.6
Link Distance (m)	326.8				195.9	195.9	115.0	115.0	209.5		209.5	
Upstream Blk Time (%)	3						0	0			0	
Queuing Penalty (veh)	0						0		3			0
Storage Bay Dist (m)	125.0	250.0		65.0					30.0			35.0
Storage Blk Time (%)	19		7		12			27	17			4
Queuing Penalty (veh)	90		9		15			122	60			11

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB	SB	SB
Directions Served	L	T	T
Maximum Queue (m)	77.6	37.8	43.6
Average Queue (m)	34.9	15.1	13.3
95th Queue (m)	59.7	30.4	32.1
Link Distance (m)	168.8	168.8	168.8
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)	8		
Queuing Penalty (veh)	23		

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	33.6	64.8	90.7	2.8	62.9	71.2	35.9	52.3	58.9
Average Queue (m)	9.4	16.5	45.6	0.1	29.2	28.9	17.7	21.8	27.6
95th Queue (m)	25.3	41.7	75.0	2.0	50.5	53.9	30.8	40.0	45.9
Link Distance (m)	132.4	154.0		115.7		115.7	209.5		209.5
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)	35.0		90.0				90.0		
Storage Blk Time (%)	0		18						
Queuing Penalty (veh)	1		14						

Queuing and Blocking Report
Total Traffic Phase 5 PM

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	81.4	85.9	24.7	36.3	29.0
Average Queue (m)	12.1	15.8	3.8	7.4	7.3
95th Queue (m)	57.1	65.9	15.3	25.3	21.8
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	EB	EB	NB
Directions Served	T	TR	LR
Maximum Queue (m)	86.8	89.1	54.0
Average Queue (m)	29.5	23.4	26.9
95th Queue (m)	93.5	88.9	50.5
Link Distance (m)	94.7	94.7	52.2
Upstream Blk Time (%)	5	3	6
Queuing Penalty (veh)	32	19	0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	102.0	83.2	40.9	31.7	65.2
Average Queue (m)	78.5	22.3	15.2	13.2	38.5
95th Queue (m)	118.6	60.4	32.9	25.1	62.5
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)	16	0			2
Queuing Penalty (veh)	100	1			0
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queuing and Blocking Report
Total Traffic Phase 5 PM

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	B30	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	T	L	T	TR
Maximum Queue (m)	61.4	289.4	110.0	344.0	38.7	129.7	206.1	138.6	34.2	19.5	43.1	38.0
Average Queue (m)	3.6	136.3	100.3	278.9	4.7	103.0	89.7	42.7	3.6	4.8	17.8	7.9
95th Queue (m)	23.6	292.2	137.3	463.7	20.8	156.4	254.6	101.1	32.9	13.4	40.2	28.5
Link Distance (m)		1977.6		329.3			252.0	252.0	103.9		167.7	167.7
Upstream Blk Time (%)				76			5	0	0			
Queuing Penalty (veh)				0			20	0	3			
Storage Bay Dist (m)	45.0		80.0		40.0	100.0				30.0		
Storage Blk Time (%)		55	81	2	0	47	0			0	19	
Queuing Penalty (veh)		4	604	12	0	22	0			0	4	

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	64.4	93.5	86.6	46.5	59.9	209.8	207.6	60.0	74.8	118.8	115.0	130.0
Average Queue (m)	22.5	57.0	45.7	7.1	34.8	180.7	180.8	57.2	49.6	47.5	114.7	129.8
95th Queue (m)	51.1	83.7	74.4	27.3	71.0	236.1	239.1	71.4	78.4	96.9	115.4	130.1
Link Distance (m)		250.1	250.1			193.4	193.4			131.9		
Upstream Blk Time (%)						22	37			1		
Queuing Penalty (veh)						0	0			0		
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)	3	24	11		2	54	52	18	20	5	63	96
Queuing Penalty (veh)	13	26	9		12	54	228	117	48	17	179	272

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB	B21
Directions Served	T	R	T
Maximum Queue (m)	439.3	32.9	311.2
Average Queue (m)	428.0	7.7	292.8
95th Queue (m)	445.7	21.1	388.9
Link Distance (m)	406.0		305.2
Upstream Blk Time (%)	91		32
Queuing Penalty (veh)	833		294
Storage Bay Dist (m)		35.0	
Storage Blk Time (%)	3	0	
Queuing Penalty (veh)	22	0	

Queuing and Blocking Report
Total Traffic Phase 5 PM

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB	B30	B30
Directions Served	L	R	L	T	TR	T	
Maximum Queue (m)	80.0	292.9	59.4	102.7	137.6	261.7	256.8
Average Queue (m)	74.9	189.3	36.7	35.7	125.9	226.6	137.2
95th Queue (m)	95.7	330.7	59.2	71.9	138.1	344.4	331.1
Link Distance (m)		293.0		305.2	103.9	252.0	252.0
Upstream Blk Time (%)		6			91	53	13
Queuing Penalty (veh)		33			636	185	46
Storage Bay Dist (m)	50.0		30.0				
Storage Blk Time (%)	26	74	14	6			
Queuing Penalty (veh)	92	242	58	23			

Intersection: 11: Block 1 Access B & South Service Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	1.3	26.4	20.6
Average Queue (m)	0.0	1.8	8.6
95th Queue (m)	0.9	13.8	16.4
Link Distance (m)	1018.8	173.6	70.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 12: South Service Rd & Road B

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	24.0	2.6	48.3
Average Queue (m)	3.8	0.1	19.5
95th Queue (m)	14.9	1.3	35.4
Link Distance (m)	173.6	281.0	68.6
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Queuing and Blocking Report
Total Traffic Phase 5 PM

Total Traffic Phase 5 PM
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	103.5	34.0	16.7
Average Queue (m)	16.5	4.6	4.1
95th Queue (m)	84.7	20.5	14.4
Link Distance (m)	281.0	293.0	70.1
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 4881

Timings

1: Waterdown Rd & North Service Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

							
Lane Group	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations							
Volume (vph)	39	105	54	320	217	25	113
Turn Type	pm+pt	NA	Perm	Prot	NA	pm+pt	NA
Protected Phases	4	8		5	2	1	6
Permitted Phases	8		8			6	
Detector Phase	4	8	8	5	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	7.0	8.0	7.0	8.0
Minimum Split (s)	27.0	25.0	25.0	13.0	30.0	11.0	30.0
Total Split (s)	27.0	27.0	27.0	13.0	32.0	11.0	30.0
Total Split (%)	38.6%	38.6%	38.6%	18.6%	45.7%	15.7%	42.9%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag				Lead	Lag	Lead	Lag
Lead-Lag Optimize?							
Recall Mode	None	Max	Max	Max	C-Max	None	C-Max
Act Effct Green (s)	23.0	23.0	23.0	9.0	35.0	32.0	26.0
Actuated g/C Ratio	0.33	0.33	0.33	0.13	0.50	0.46	0.37
v/c Ratio	0.07	0.17	0.09	0.73	0.14	0.04	0.10
Control Delay	16.6	17.7	1.9	33.8	5.8	7.6	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.6	17.7	1.9	33.8	5.8	7.6	11.8
LOS	B	B	A	C	A	A	B
Approach Delay		13.2			21.4		11.1
Approach LOS		B			C		B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 21 (30%), Referenced to phase 2:NBT and 6:SBTL, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.73

Intersection Signal Delay: 17.8

Intersection LOS: B

Intersection Capacity Utilization 32.5%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 1: Waterdown Rd & North Service Rd

↰	↱	↰	↱
11 s	32 s	27 s	27 s
↰	↱	↰	↱
13 s	30 s	27 s	27 s

HCM Signalized Intersection Capacity Analysis

1: Waterdown Rd & North Service Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

	↰	→	↰	↰	←	↰	↰	↑	↰	↰	↓	↰
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↰	↱	↰	↰	↱		↰	↱	
Volume (vph)	0	0	0	39	105	54	320	217	38	25	113	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00	1.00	0.97	*1.00		1.00	*1.00	
Frt				1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected				0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1770	1863	1583	3433	3642		1770	3615	
Flt Permitted				0.95	1.00	1.00	0.95	1.00		0.60	1.00	
Satd. Flow (perm)				1770	1863	1583	3433	3642		1120	3615	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	39	105	54	320	217	38	25	113	28
RTOR Reduction (vph)	0	0	0	0	0	36	0	19	0	0	18	0
Lane Group Flow (vph)	0	0	0	39	105	18	320	236	0	25	123	0
Turn Type				pm+pt	NA	Perm	Prot	NA		pm+pt	NA	
Protected Phases				4	8		5	2		1	6	
Permitted Phases				8		8				6		
Actuated Green, G (s)				20.0	20.0	20.0	7.0	31.2		26.8	24.0	
Effective Green, g (s)				23.0	23.0	23.0	9.0	33.2		24.8	26.0	
Actuated g/C Ratio				0.33	0.33	0.33	0.13	0.47		0.35	0.37	
Clearance Time (s)				7.0	7.0	7.0	6.0	6.0		3.0	6.0	
Vehicle Extension (s)				3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)				581	612	520	441	1727		413	1342	
v/s Ratio Prot				0.02	c0.06		c0.09	c0.06		0.00	0.03	
v/s Ratio Perm						0.01				0.02		
v/c Ratio				0.07	0.17	0.03	0.73	0.14		0.06	0.09	
Uniform Delay, d1				16.1	16.7	16.0	29.3	10.3		14.8	14.3	
Progression Factor				1.00	1.00	1.00	0.78	0.61		1.00	1.00	
Incremental Delay, d2				0.0	0.6	0.1	9.9	0.2		0.1	0.1	
Delay (s)				16.2	17.3	16.1	32.7	6.5		14.9	14.5	
Level of Service				B	B	B	C	A		B	B	
Approach Delay (s)		0.0			16.8			21.0			14.5	
Approach LOS		A			B			C			B	

Intersection Summary

HCM 2000 Control Delay

HCM 2000 Level of Service

B

HCM 2000 Volume to Capacity ratio

0.25

Actuated Cycle Length (s)

70.0

Sum of lost time (s)

12.0

Intersection Capacity Utilization

32.5%

ICU Level of Service

A

Analysis Period (min)

15

c Critical Lane Group

Timings

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBT
Lane Configurations	1	0	114	0	510	150
Volume (vph)	1	0	114	0	510	150
Turn Type	Perm	NA	custom	NA	NA	NA
Protected Phases	4	4	3	7	2	6
Permitted Phases	4	4	3	7	2	6
Detector Phase	4	4	3	7	2	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	11.0	11.0	16.0	16.0	31.0	31.0
Total Split (s)	13.0	13.0	18.0	31.0	39.0	39.0
Total Split (%)	18.6%	18.6%	25.7%	44.3%	55.7%	55.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead			
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	C-Max	C-Max
Act Effct Green (s)	8.6	10.6	13.2	52.1	52.1	52.1
Actuated g/C Ratio	0.12	0.15	0.19	0.74	0.74	0.74
v/c Ratio	0.00	0.21	0.12	0.18	0.05	0.05
Control Delay	27.0	26.5	0.5	2.9	6.0	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	26.5	0.5	2.9	6.0	6.0
LOS	C	C	A	A	A	A
Approach Delay	27.0		17.2	2.9	6.0	
Approach LOS	C		B	A	A	

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 69 (99%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.21
 Intersection Signal Delay: 6.5
 Intersection LOS: A
 Intersection Capacity Utilization 24.7%
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

39 s	18 s	13 s
39 s	31 s	

HCM Signalized Intersection Capacity Analysis

2: Waterdown Rd & Hwy 403 WB Off-Ramp

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	0	0	114	0	64	0	510	0	0	150	2
Volume (vph)	1	0	0	114	0	64	0	510	0	0	150	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1770	3539	1583	3725	3718	3718	3718	3718	3718	3718	3718	3718
Flt Permitted	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1774	3539	1583	3725	3718	3718	3718	3718	3718	3718	3718	3718
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	1	0	0	114	0	64	0	510	0	0	150	2
RTOR Reduction (vph)	0	0	0	0	48	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	1	0	114	16	0	0	510	0	0	151	0
Turn Type	Perm	NA	custom	NA	NA	NA	NA	NA	NA	NA	NA	NA
Protected Phases	4	4	3	7	2	6	2	6	2	6	2	6
Permitted Phases	4	4	3	7	2	6	2	6	2	6	2	6
Actuated Green, G (s)	1.2	6.5	14.7	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3	42.3
Effective Green, g (s)	4.2	9.5	17.7	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3	44.3
Actuated g/C Ratio	0.06	0.14	0.25	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Clearance Time (s)	7.0	7.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	106	480	400	2357	2352	2352	2352	2352	2352	2352	2352	2352
v/s Ratio Prot		c0.03	c0.01	c0.14	0.04							
v/s Ratio Perm	0.00											
v/c Ratio	0.01	0.24	0.04	0.22	0.06							
Uniform Delay, d1	30.9	27.0	19.7	5.5	4.9							
Progression Factor	1.00	1.00	1.00	0.61	1.31							
Incremental Delay, d2	0.0	0.3	0.0	0.2	0.1							
Delay (s)	31.0	27.3	19.8	3.5	6.5							
Level of Service	C	C	B	A	A							
Approach Delay (s)	31.0		24.6	3.5	6.5							
Approach LOS	C		C	A	A							

Intersection Summary

HCM 2000 Control Delay 8.5
 HCM 2000 Volume to Capacity ratio 0.21
 Actuated Cycle Length (s) 70.0
 Intersection Capacity Utilization 24.7%
 Analysis Period (min) 15
 c Critical Lane Group

Timings

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

	EBL	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	46	79	45	74	332	132	81	136	128
Volume (vph)	46	79	45	74	332	132	81	136	128
Turn Type	Perm	NA	Perm	Prot	pm+ov	NA	Perm	Prot	NA
Protected Phases		4		3	1	2		1	6
Permitted Phases	4		4		3		2		
Detector Phase	4	4	4	3	1	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	4.0	4.0	4.0	4.0	4.0	8.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0	24.0	24.0	10.0	29.0
Total Split (s)	22.0	22.0	22.0	10.0	14.0	24.0	24.0	14.0	38.0
Total Split (%)	31.4%	31.4%	31.4%	14.3%	20.0%	34.3%	34.3%	20.0%	54.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	2.0	0.0	2.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-2.0	1.0	-2.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	C-Max	C-Max	None	Max
Act Effct Green (s)	12.0	12.0	12.0	6.0	19.1	26.7	26.7	14.3	45.8
Actuated g/C Ratio	0.17	0.17	0.17	0.09	0.27	0.38	0.38	0.20	0.65
v/c Ratio	0.15	0.25	0.17	0.24	0.77	0.09	0.11	0.19	0.05
Control Delay	25.4	26.7	25.8	32.1	30.3	17.6	0.3	18.9	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.4	26.7	25.8	32.1	30.3	17.6	0.3	18.9	5.2
LOS	C	C	C	C	C	B	A	B	A
Approach Delay		26.1				11.0			12.3
Approach LOS		C				B			B

Intersection Summary

Cycle Length: 70

Actuated Cycle Length: 70

Offset: 60 (86%), Referenced to phase 2:NBT, Start of Green

Natural Cycle: 70

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.77

Intersection Signal Delay: 21.3

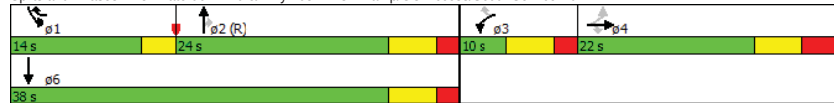
Intersection LOS: C

Intersection Capacity Utilization 40.9%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd



HCM Signalized Intersection Capacity Analysis

3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	46	79	45	74	0	332	0	132	81	136	128	0
Volume (vph)	46	79	45	74	0	332	0	132	81	136	128	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	*1.00		1.00		*1.00	1.00	0.97	*1.00	
Flpb, ped/bikes	1.00	1.00	0.98	1.00		1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00		1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1558	3539		1583		3725	1583	3433	3725	
Flt Permitted	0.95	1.00	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1863	1558	3539		1583		3725	1583	3433	3725	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	46	79	45	74	0	332	0	132	81	136	128	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	53	0	0	0
Lane Group Flow (vph)	46	79	45	74	0	332	0	132	28	136	128	0
Confl. Peds. (#/hr)			3	3								
Turn Type	Perm	NA	Perm	Prot		pm+ov		NA	Perm	Prot	NA	
Protected Phases		4		3		1		2		1	6	
Permitted Phases	4		4			3			2			
Actuated Green, G (s)	7.4	7.4	7.4	3.2		18.5		22.1	22.1	15.3	40.4	
Effective Green, g (s)	10.4	10.4	10.4	5.2		16.5		24.1	24.1	14.3	42.4	
Actuated g/C Ratio	0.15	0.15	0.15	0.07		0.24		0.34	0.34	0.20	0.61	
Clearance Time (s)	7.0	7.0	7.0	6.0		3.0		6.0	6.0	3.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	262	276	231	262		373		1282	545	701	2256	
v/s Ratio Prot		c0.04		0.02		c0.18		c0.04		0.04	0.03	
v/s Ratio Perm	0.03		0.03			0.03			0.02			
v/c Ratio	0.18	0.29	0.19	0.28		0.89		0.10	0.05	0.19	0.06	
Uniform Delay, d1	26.1	26.5	26.1	30.6		25.9		15.6	15.3	23.1	5.6	
Progression Factor	1.00	1.00	1.00	1.00		1.00		1.00	1.00	0.79	0.75	
Incremental Delay, d2	0.3	0.6	0.4	0.6		22.2		0.2	0.2	0.1	0.0	
Delay (s)	26.4	27.1	26.5	31.2		48.1		15.8	15.5	18.3	4.3	
Level of Service	C	C	C	C		D		B	B	B	A	
Approach Delay (s)		26.7			45.0			15.7			11.5	
Approach LOS		C			D			B			B	

Intersection Summary

HCM 2000 Control Delay	27.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Timings

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Configurations	5	0	16	0	102	40	204
Volume (vph)	5	0	16	0	102	40	204
Turn Type	Perm	NA	Perm	NA	NA	pm+pt	NA
Protected Phases	4	4	8	8	2	1	6
Permitted Phases	4	4	8	8	2	1	6
Detector Phase	4	4	8	8	2	1	6
Switch Phase							
Minimum Initial (s)	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Minimum Split (s)	26.0	26.0	26.0	26.0	36.0	12.0	36.0
Total Split (s)	29.0	29.0	29.0	29.0	37.0	14.0	51.0
Total Split (%)	36.3%	36.3%	36.3%	36.3%	46.3%	17.5%	63.8%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	3.0	4.0
All-Red Time (s)	3.0	3.0	3.0	3.0	2.0	0.0	2.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0	-3.0	-2.0	1.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag					Lag	Lead	
Lead-Lag Optimize?							
Recall Mode	None	None	None	None	None	None	None
Act Effct Green (s)	12.2	12.2	12.2	11.1	11.7	12.6	
Actuated g/C Ratio	0.46	0.46	0.46	0.42	0.44	0.47	
v/c Ratio	0.01	0.02	0.08	0.07	0.06	0.12	
Control Delay	0.0	8.8	0.1	8.1	5.6	5.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	0.0	8.8	0.1	8.1	5.6	5.3	
LOS	A	A	A	A	A	A	
Approach Delay	0.0		1.3	8.1		5.3	
Approach LOS	A		A	A		A	

Intersection Summary

Cycle Length: 80

Actuated Cycle Length: 26.6

Natural Cycle: 75

Control Type: Actuated-Uncoordinated

Maximum v/c Ratio: 0.12

Intersection Signal Delay: 4.9

Intersection LOS: A

Intersection Capacity Utilization 22.2%

ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 4: Waterdown Rd & Masonry Crt/Railway Rd



HCM Signalized Intersection Capacity Analysis

4: Waterdown Rd & Masonry Crt/Railway Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	5	0	2	16	0	100	0	102	6	40	204	3
Volume (vph)	5	0	2	16	0	100	0	102	6	40	204	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
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	0.96	1.00	0.85	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1729	1770	1583	3694	1770	3717	3694	1770	3717	3694	1770	3717
Flt Permitted	0.73	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1299	1403	1583	3694	1403	3717	3694	1403	3717	3694	1403	3717
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	5	0	2	16	0	100	0	102	6	40	204	3
RTOR Reduction (vph)	0	5	0	0	75	0	0	4	0	0	2	0
Lane Group Flow (vph)	0	2	0	16	25	0	0	104	0	40	205	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	pm+pt	NA	NA	NA
Protected Phases	4	4	8	8	2	2	2	2	1	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	1	6	6	6
Actuated Green, G (s)	4.0	4.0	4.0	4.0	6.5	6.5	6.5	6.5	10.6	10.6	10.6	10.6
Effective Green, g (s)	7.0	7.0	7.0	7.0	8.5	8.5	8.5	8.5	9.6	9.6	9.6	9.6
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.31	0.31	0.31	0.31	0.35	0.35	0.35	0.35
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	6.0	6.0	6.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	329	355	401	1137	1137	276	1696	1137	276	1696	1137	276
v/s Ratio Prot	0.00	0.01	0.01	0.02	0.03	0.00	0.06	0.03	0.00	0.06	0.03	0.06
v/s Ratio Perm	0.01	0.05	0.06	0.06	0.09	0.14	0.12	0.09	0.14	0.12	0.09	0.12
v/c Ratio	0.01	0.02	0.08	0.07	0.06	0.12		0.06	0.12		0.12	
Uniform Delay, d1	7.7	7.8	7.8	6.8	8.4	4.3		6.8	8.4	4.3		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		
Incremental Delay, d2	0.0	0.1	0.1	0.0	0.2	0.0		0.0	0.2	0.0		
Delay (s)	7.7	7.8	7.9	6.8	8.6	4.3		6.8	8.6	4.3		
Level of Service	A	A	A	A	A	A		A	A	A		
Approach Delay (s)	7.7	7.9	6.8	5.0				6.8	5.0			
Approach LOS	A	A	A	A				A	A			

Intersection Summary

HCM 2000 Control Delay 6.2

HCM 2000 Level of Service

A

HCM 2000 Volume to Capacity ratio 0.13

Actuated Cycle Length (s) 27.6

Sum of lost time (s)

12.0

Intersection Capacity Utilization 22.2%

ICU Level of Service

A

Analysis Period (min) 15

c Critical Lane Group

Timings

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

Lane Group	EBT	WBT	NBL
Lane Configurations	↔↔	↔↔	↔
Volume (vph)	293	403	3
Turn Type	NA	NA	Prot
Protected Phases	2	6	8
Permitted Phases			
Detector Phase	2	6	8
Switch Phase			
Minimum Initial (s)	8.0	8.0	8.0
Minimum Split (s)	23.0	23.0	27.0
Total Split (s)	53.0	53.0	27.0
Total Split (%)	66.3%	66.3%	33.8%
Yellow Time (s)	4.0	4.0	4.0
All-Red Time (s)	3.0	3.0	3.0
Lost Time Adjust (s)	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	C-Max	C-Max	None
Act Effct Green (s)	76.2	76.2	11.0
Actuated g/C Ratio	0.95	0.95	0.14
v/c Ratio	0.08	0.11	0.01
Control Delay	0.8	0.8	30.0
Queue Delay	0.0	0.0	0.0
Total Delay	0.8	0.8	30.0
LOS	A	A	C
Approach Delay	0.8	0.8	30.0
Approach LOS	A	A	C

Intersection Summary

Cycle Length: 80
Actuated Cycle Length: 80
Offset: 59 (74%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.11
Intersection Signal Delay: 0.9
Intersection LOS: A
Intersection Capacity Utilization 24.5%
ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 5: GO Bus Driveway & South Service Rd



HCM Signalized Intersection Capacity Analysis

5: GO Bus Driveway & South Service Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔↔			↔↔	↔	
Volume (vph)	293	3	0	403	3	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0	
Lane Util. Factor	*1.00			*1.00	1.00	
Frt	1.00			1.00	1.00	
Flt Protected	1.00			1.00	0.95	
Satd. Flow (prot)	3720			3725	1770	
Flt Permitted	1.00			1.00	0.95	
Satd. Flow (perm)	3720			3725	1770	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	293	3	0	403	3	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	296	0	0	403	3	0
Turn Type	NA			NA	Prot	
Protected Phases	2			6	8	
Permitted Phases			6			
Actuated Green, G (s)	64.4			64.4	1.6	
Effective Green, g (s)	67.4			67.4	4.6	
Actuated g/C Ratio	0.84			0.84	0.06	
Clearance Time (s)	7.0			7.0	7.0	
Vehicle Extension (s)	3.0			3.0	3.0	
Lane Grp Cap (vph)	3134			3138	101	
v/s Ratio Prot	0.08			c0.11	c0.00	
v/s Ratio Perm						
v/c Ratio	0.09			0.13	0.03	
Uniform Delay, d1	1.1			1.1	35.6	
Progression Factor	1.00			0.91	1.00	
Incremental Delay, d2	0.1			0.1	0.1	
Delay (s)	1.1			1.1	35.7	
Level of Service	A			A	D	
Approach Delay (s)	1.1			1.1	35.7	
Approach LOS	A			A	D	

Intersection Summary

HCM 2000 Control Delay 1.3
HCM 2000 Volume to Capacity ratio 0.12
Actuated Cycle Length (s) 80.0
Intersection Capacity Utilization 24.5%
Analysis Period (min) 15
c Critical Lane Group

HCM 2000 Level of Service A
Sum of lost time (s) 8.0
ICU Level of Service A

HCM Unsignalized Intersection Capacity Analysis

6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Volume (veh/h)	267	26	0	378	25	2
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	267	26	0	378	25	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	111			111		
pX, platoon unblocked						
vC, conflicting volume			293		469	146
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			293		469	146
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		95	100
cM capacity (veh/h)			1265		523	874
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	178	115	126	252	27	
Volume Left	0	0	0	0	25	
Volume Right	0	26	0	0	2	
cSH	1700	1700	1265	1700	539	
Volume to Capacity	0.10	0.07	0.00	0.15	0.05	
Queue Length 95th (m)	0.0	0.0	0.0	0.0	1.3	
Control Delay (s)	0.0	0.0	0.0	0.0	12.0	
Lane LOS					B	
Approach Delay (s)	0.0		0.0		12.0	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			20.4%		ICU Level of Service	A
Analysis Period (min)			15			

Timings

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

Lane Group	EBL	EBT	WBT	WBR	NBT
Lane Configurations	↔	↔	↔	↔	↔
Volume (vph)	97	170	344	416	7
Turn Type	Perm	NA	NA	Perm	NA
Protected Phases		2	6		8
Permitted Phases	2			6	
Detector Phase	2	2	6	6	8
Switch Phase					
Minimum Initial (s)	8.0	8.0	4.0	4.0	8.0
Minimum Split (s)	29.0	29.0	24.0	24.0	15.0
Total Split (s)	59.0	59.0	59.0	59.0	21.0
Total Split (%)	73.8%	73.8%	73.8%	73.8%	26.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	Max	Max	None
Act Effct Green (s)	67.2	67.2	67.2	67.2	12.4
Actuated g/C Ratio	0.84	0.84	0.84	0.84	0.16
v/c Ratio	0.11	0.11	0.22	0.30	0.15
Control Delay	2.2	1.9	3.1	1.0	30.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	2.2	1.9	3.1	1.0	30.0
LOS	A	A	A	A	C
Approach Delay		2.0	1.9		30.0
Approach LOS		A	A		C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Offset: 69 (86%), Referenced to phase 2:EBTL, Start of Green					
Natural Cycle: 45					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.30					
Intersection Signal Delay: 3.0					Intersection LOS: A
Intersection Capacity Utilization 49.1%					ICU Level of Service A
Analysis Period (min) 15					

Splits and Phases: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd



HCM Signalized Intersection Capacity Analysis

7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service Rd

Total Traffic Phase 5 Arena

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	97	170	2	0	344	416	34	7	0	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0				
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Flpb, ped/bikes	1.00	1.00			1.00	1.00		1.00				
Frt	1.00	1.00			1.00	0.85		1.00				
Flt Protected	0.95	1.00			1.00	1.00		0.96				
Satd. Flow (prot)	1770	1859			1863	1583		1789				
Flt Permitted	0.55	1.00			1.00	1.00		0.96				
Satd. Flow (perm)	1031	1859			1863	1583		1789				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	97	170	2	0	344	416	34	7	0	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	89	0	0	0	0	0	0
Lane Group Flow (vph)	97	172	0	0	344	327	0	41	0	0	0	0
Confl. Peds. (#/hr)			2									
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA				
Protected Phases	2				6		8		8			
Permitted Phases	2		6		6		8					
Actuated Green, G (s)	60.8	60.8			60.8	60.8	6.2					
Effective Green, g (s)	62.8	62.8			62.8	62.8	9.2					
Actuated g/C Ratio	0.78	0.78			0.78	0.78	0.11					
Clearance Time (s)	6.0	6.0			6.0	6.0	7.0					
Vehicle Extension (s)	3.0	3.0			3.0	3.0	5.0					
Lane Grp Cap (vph)	809	1459			1462	1242	205					
v/s Ratio Prot	0.09				0.18		0.02		0.02			
v/s Ratio Perm	0.09				c0.21		0.02					
v/c Ratio	0.12	0.12			0.24	0.26	0.20					
Uniform Delay, d1	2.0	2.0			2.3	2.3	32.1					
Progression Factor	0.67	0.67			1.00	1.00	1.00					
Incremental Delay, d2	0.3	0.2			0.4	0.5	1.0					
Delay (s)	1.7	1.5			2.6	2.8	33.1					
Level of Service	A	A			A	A	C					
Approach Delay (s)	1.6				2.8		33.1				0.0	
Approach LOS	A				A		C				A	
Intersection Summary												
HCM 2000 Control Delay	3.6		HCM 2000 Level of Service		A							
HCM 2000 Volume to Capacity ratio	0.25											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0							
Intersection Capacity Utilization	49.1%		ICU Level of Service		A							
Analysis Period (min)	15											
c Critical Lane Group												

Timings

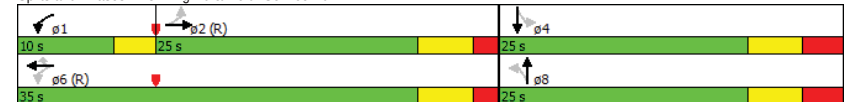
8: King Rd & North Service Rd

Total Traffic Phase 5 Arena

Mixed Use Development 1200 King Rd

									
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	2	65	106	124	17	49	17	4	7
Turn Type	Perm	NA	pm+pt	NA	Perm	Perm	NA	Perm	NA
Protected Phases		2	1	6			8		4
Permitted Phases		2	6		6	8		4	
Detector Phase	2	2	1	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	8.0	8.0	4.0	4.0	4.0	4.0	4.0	15.0	15.0
Minimum Split (s)	25.0	25.0	10.0	24.0	24.0	25.0	25.0	25.0	25.0
Total Split (s)	25.0	25.0	10.0	35.0	35.0	25.0	25.0	25.0	25.0
Total Split (%)	41.7%	41.7%	16.7%	58.3%	58.3%	41.7%	41.7%	41.7%	41.7%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag	Lead						
Lead-Lag Optimize?									
Recall Mode	C-Max	C-Max	None	C-Max	C-Max	None	None	None	None
Act Effct Green (s)	30.8	30.8	38.4	39.2	39.2	16.1	16.1	18.0	18.0
Actuated g/C Ratio	0.51	0.51	0.64	0.65	0.65	0.27	0.27	0.30	0.30
v/c Ratio	0.00	0.09	0.13	0.10	0.02	0.13	0.12	0.01	0.01
Control Delay	12.0	10.4	6.5	6.2	0.0	9.1	1.1	15.0	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	10.4	6.5	6.2	0.0	9.1	1.1	15.0	13.6
LOS	B	B	A	A	A	A	A	B	B
Approach Delay	10.5		5.9		3.5		14.0		
Approach LOS	B		A		A		B		
Intersection Summary									
Cycle Length: 60									
Actuated Cycle Length: 60									
Offset: 32 (53%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green									
Natural Cycle: 60									
Control Type: Actuated-Coordinated									
Maximum v/c Ratio: 0.13									
Intersection Signal Delay: 6.1					Intersection LOS: A				
Intersection Capacity Utilization 31.7%					ICU Level of Service A				
Analysis Period (min) 15									

Splits and Phases: 8: King Rd & North Service Rd



HCM Signalized Intersection Capacity Analysis 8: King Rd & North Service Rd

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Volume (vph)	2	65	17	106	124	17	49	17	93	4	7				2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0				
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95				
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.87		1.00	0.97				
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00				
Satd. Flow (prot)	1770	1805		1770	1863	1583	1770	3090		1770	3421				
Flt Permitted	0.68	1.00		0.61	1.00	1.00	0.75	1.00		0.68	1.00				
Satd. Flow (perm)	1262	1805		1130	1863	1583	1400	3090		1271	3421				
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00
Adj. Flow (vph)	2	65	17	106	124	17	49	17	93	4	7				2
RTOR Reduction (vph)	0	9	0	0	0	7	0	70	0	0	2	0			0
Lane Group Flow (vph)	2	73	0	106	124	10	49	40	0	4	8	0			0
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA				
Protected Phases		2		1	6			8			4				4
Permitted Phases	2			6		6	8			4					
Actuated Green, G (s)	26.0	26.0		35.0	35.0	35.0	12.0	12.0		12.0	12.0				
Effective Green, g (s)	28.0	28.0		34.0	37.0	37.0	15.0	15.0		15.0	15.0				
Actuated g/C Ratio	0.47	0.47		0.57	0.62	0.62	0.25	0.25		0.25	0.25				
Clearance Time (s)	6.0	6.0		3.0	6.0	6.0	7.0	7.0		7.0	7.0				
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0				
Lane Grp Cap (vph)	588	842		693	1148	976	350	772		317	855				
v/s Ratio Prot		0.04		c0.01	0.07			0.01			0.00				0.00
v/s Ratio Perm	0.00			c0.07		0.01	c0.04			0.00					
v/c Ratio	0.00	0.09		0.15	0.11	0.01	0.14	0.05		0.01	0.01				
Uniform Delay, d1	8.5	8.9		6.1	4.7	4.4	17.5	17.1		16.9	16.9				
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.53	0.15		1.00	1.00				
Incremental Delay, d2	0.0	0.2		0.1	0.2	0.0	0.2	0.0		0.0	0.0				
Delay (s)	8.6	9.1		6.2	4.9	4.5	9.5	2.6		16.9	16.9				
Level of Service	A	A		A	A	A	A	A		B	B				
Approach Delay (s)		9.1			5.5			4.7			16.9				
Approach LOS		A			A			A			B				
Intersection Summary															
HCM 2000 Control Delay			6.1		HCM 2000 Level of Service						A				
HCM 2000 Volume to Capacity ratio			0.15												
Actuated Cycle Length (s)			60.0		Sum of lost time (s)						12.0				
Intersection Capacity Utilization			31.7%		ICU Level of Service						A				
Analysis Period (min)			15												
c Critical Lane Group															

Timings 9: King Rd & Plains Rd E

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

											
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations		 			 				 		 
Volume (vph)	20	177	17	19	243	77	66	40	147	67	17
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Prot	NA	Perm
Protected Phases	5	2		1	6		7	4	3	8	
Permitted Phases	2		2	6		6	4				8
Detector Phase	5	2	2	1	6	6	7	4	3	8	8
Switch Phase											
Minimum Initial (s)	4.0	8.0	8.0	4.0	8.0	8.0	6.0	8.0	6.0	8.0	8.0
Minimum Split (s)	8.0	37.0	37.0	8.0	37.0	37.0	10.0	25.0	13.0	25.0	25.0
Total Split (s)	8.0	39.0	39.0	8.0	39.0	39.0	10.0	25.0	13.0	28.0	28.0
Total Split (%)	9.4%	45.9%	45.9%	9.4%	45.9%	45.9%	11.8%	29.4%	15.3%	32.9%	32.9%
Yellow Time (s)	3.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0	4.0	4.0
All-Red Time (s)	0.0	2.0	2.0	0.0	2.0	2.0	0.0	3.0	3.0	3.0	3.0
Lost Time Adjust (s)	1.0	-2.0	-2.0	1.0	-2.0	-2.0	1.0	-3.0	-3.0	-3.0	-3.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lag
Lead-Lag Optimize?											
Recall Mode	None	Max	Max	None	Max	Max	None	None	None	None	None
Act Effct Green (s)	39.1	38.4	38.4	39.1	38.4	38.4	12.5	11.5	10.0	13.2	13.2
Actuated g/C Ratio	0.59	0.57	0.57	0.59	0.57	0.57	0.19	0.17	0.15	0.20	0.20
v/c Ratio	0.03	0.08	0.02	0.03	0.11	0.08	0.20	0.17	0.29	0.18	0.04
Control Delay	7.8	8.6	0.1	7.8	8.6	1.0	18.4	21.9	28.6	24.4	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.8	8.6	0.1	7.8	8.6	1.0	18.4	21.9	28.6	24.4	0.2
LOS	A	A	A	A	A	A	B	C	C	C	A
Approach Delay		7.9			6.8			19.9		25.3	
Approach LOS		A			A			B		C	
Intersection Summary											
Cycle Length: 85											
Actuated Cycle Length: 66.8											
Natural Cycle: 85											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.29											
Intersection Signal Delay: 13.5						Intersection LOS: B					
Intersection Capacity Utilization 50.6%						ICU Level of Service A					
Analysis Period (min) 15											

Splits and Phases: 9: King Rd & Plains Rd E



HCM Signalized Intersection Capacity Analysis 9: King Rd & Plains Rd E

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

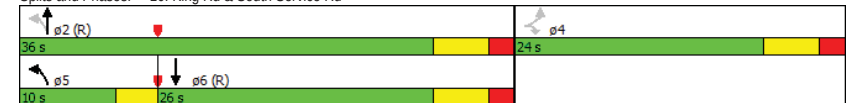
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 					 		
Volume (vph)	20	177	17	19	243	77	66	40	14	147	67	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	*1.00	1.00	1.00	*1.00	1.00	1.00	1.00		0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1754	3725	1540	1760	3725	1533	1762	1767		3433	1863	1557
Flt Permitted	0.61	1.00	1.00	0.65	1.00	1.00	1.00	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1123	3725	1540	1196	3725	1533	1855	1767		3433	1863	1557
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	20	177	17	19	243	77	66	40	14	147	67	17
RTOR Reduction (vph)	0	0	8	0	0	36	0	12	0	0	0	13
Lane Group Flow (vph)	20	177	9	19	243	41	66	42	0	147	67	4
Confl. Peds. (#/hr)	10		6	6		10	4		33	33		4
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA		Prot	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2	6		6	4					8
Actuated Green, G (s)	37.2	36.3	36.3	37.2	36.3	36.3	8.9	4.9		7.0	11.9	11.9
Effective Green, g (s)	35.3	38.3	38.3	35.3	38.3	38.3	6.9	7.9		10.0	14.9	14.9
Actuated g/C Ratio	0.49	0.53	0.53	0.49	0.53	0.53	0.10	0.11		0.14	0.21	0.21
Clearance Time (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	549	1978	818	585	1978	814	173	193		476	385	321
v/s Ratio Prot		0.05			c0.07		0.02	0.02		c0.04	c0.04	
v/s Ratio Perm	0.02		0.01	0.02		0.03	0.02					0.00
v/c Ratio	0.04	0.09	0.01	0.03	0.12	0.05	0.38	0.22		0.31	0.17	0.01
Uniform Delay, d1	9.6	8.3	8.0	9.5	8.5	8.1	30.6	29.3		27.9	23.5	22.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.1	0.0	0.0	0.1	0.1	1.4	0.6		0.4	0.2	0.0
Delay (s)	9.6	8.4	8.0	9.6	8.6	8.3	32.0	29.8		28.3	23.8	22.8
Level of Service	A	A	A	A	A	A	C	C		C	C	C
Approach Delay (s)		8.5			8.6		31.0			26.6		
Approach LOS		A			A		C			C		
Intersection Summary												
HCM 2000 Control Delay	16.1			HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio	0.17											
Actuated Cycle Length (s)	72.1			Sum of lost time (s)					16.0			
Intersection Capacity Utilization	50.6%			ICU Level of Service					A			
Analysis Period (min)	15											
c Critical Lane Group												

Timings 10: King Rd & South Service Rd

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Volume (vph)	83	121	75	75	106
Turn Type	Perm	Perm	pm+pt	NA	NA
Protected Phases			5	2	6
Permitted Phases	4	4	2		
Detector Phase	4	4	5	2	6
Switch Phase					
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	24.0	24.0	10.0	24.0	24.0
Total Split (s)	24.0	24.0	10.0	36.0	26.0
Total Split (%)	40.0%	40.0%	16.7%	60.0%	43.3%
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0
All-Red Time (s)	2.0	2.0	0.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	1.0	-2.0	-2.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0
Lead/Lag			Lead		Lag
Lead-Lag Optimize?					
Recall Mode	None	None	None	C-Max	C-Max
Act Effct Green (s)	10.2	10.2	44.1	44.9	39.0
Actuated g/C Ratio	0.17	0.17	0.74	0.75	0.65
v/c Ratio	0.28	0.33	0.09	0.05	0.11
Control Delay	23.3	7.4	3.7	3.5	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.3	7.4	3.7	3.5	2.2
LOS	C	A	A	A	A
Approach Delay	13.9			3.6	2.2
Approach LOS	B			A	A
Intersection Summary					
Cycle Length: 60					
Actuated Cycle Length: 60					
Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green					
Natural Cycle: 60					
Control Type: Actuated-Coordinated					
Maximum v/c Ratio: 0.33					
Intersection Signal Delay: 7.5			Intersection LOS: A		
Intersection Capacity Utilization 26.0%			ICU Level of Service A		
Analysis Period (min) 15					

Splits and Phases: 10: King Rd & South Service Rd



HCM Signalized Intersection Capacity Analysis
10: King Rd & South Service Rd

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	83	121	75	75	106	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1812	
Flt Permitted	0.95	1.00	0.60	1.00	1.00	
Satd. Flow (perm)	1770	1583	1116	1863	1812	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	83	121	75	75	106	27
RTOR Reduction (vph)	0	103	0	0	10	0
Lane Group Flow (vph)	83	18	75	75	123	0
Turn Type	Perm	Perm	pm+pt	NA	NA	
Protected Phases			5	2	6	
Permitted Phases	4	4	2			
Actuated Green, G (s)	7.1	7.1	40.9	40.9	33.8	
Effective Green, g (s)	9.1	9.1	39.9	42.9	35.8	
Actuated g/C Ratio	0.15	0.15	0.66	0.71	0.60	
Clearance Time (s)	6.0	6.0	3.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	268	240	775	1332	1081	
v/s Ratio Prot			c0.00	0.04	c0.07	
v/s Ratio Perm	c0.05	0.01	0.06			
v/c Ratio	0.31	0.08	0.10	0.06	0.11	
Uniform Delay, d1	22.7	21.8	3.7	2.5	5.2	
Progression Factor	1.00	1.00	1.00	1.00	0.32	
Incremental Delay, d2	0.7	0.1	0.1	0.1	0.2	
Delay (s)	23.3	22.0	3.7	2.6	1.9	
Level of Service	C	C	A	A	A	
Approach Delay (s)	22.5			3.2	1.9	
Approach LOS	C			A	A	
Intersection Summary						
HCM 2000 Control Delay			10.9		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.16			
Actuated Cycle Length (s)			60.0		Sum of lost time (s)	14.0
Intersection Capacity Utilization			26.0%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Block 1 Access B & South Service Rd

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	76	73	2	206	541	13
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	76	73	2	206	541	13
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWTL			TWTL		
Median storage (veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			149		322	112
vC1, stage 1 conf vol					112	
vC2, stage 2 conf vol					210	
vCu, unblocked vol			149		322	112
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			100		30	99
cM capacity (veh/h)			1432		775	940
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	149	208	554			
Volume Left	0	2	541			
Volume Right	73	0	13			
cSH	1700	1432	778			
Volume to Capacity	0.09	0.00	0.71			
Queue Length 95th (m)	0.0	0.0	48.8			
Control Delay (s)	0.0	0.1	20.2			
Lane LOS		A	C			
Approach Delay (s)	0.0	0.1	20.2			
Approach LOS		C				
Intersection Summary						
Average Delay			12.3			
Intersection Capacity Utilization		49.9%			ICU Level of Service	A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
12: South Service Rd & Road B

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↗	↖		↙	↘
Volume (veh/h)	8	79	191	7	29	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	8	79	191	7	29	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT	TWLT			
Median storage (veh)		2	2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	198				290	194
vC1, stage 1 conf vol					194	
vC2, stage 2 conf vol					95	
vCu, unblocked vol	198				290	194
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	99				96	98
cM capacity (veh/h)	1375				792	847
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	87	198	45			
Volume Left	8	0	29			
Volume Right	0	7	16			
cSH	1375	1700	811			
Volume to Capacity	0.01	0.12	0.06			
Queue Length 95th (m)	0.1	0.0	1.4			
Control Delay (s)	0.7	0.0	9.7			
Lane LOS	A		A			
Approach Delay (s)	0.7	0.0	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay		1.5				
Intersection Capacity Utilization		20.8%		ICU Level of Service	A	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
13: Block 1 Access A & South Service Rd

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖	↙	↘
Volume (veh/h)	114	13	9	97	95	73
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	114	13	9	97	95	73
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		TWLT		TWLT		
Median storage (veh)		2		2		
Upstream signal (m)				313		
pX, platoon unblocked						
vC, conflicting volume			127		236	120
vC1, stage 1 conf vol					120	
vC2, stage 2 conf vol					115	
vCu, unblocked vol			127		236	120
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			99		89	92
cM capacity (veh/h)			1459		832	931
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	127	106	168			
Volume Left	0	9	95			
Volume Right	13	0	73			
cSH	1700	1459	872			
Volume to Capacity	0.07	0.01	0.19			
Queue Length 95th (m)	0.0	0.1	5.7			
Control Delay (s)	0.0	0.7	10.1			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.7	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay		4.4				
Intersection Capacity Utilization		29.0%		ICU Level of Service	A	
Analysis Period (min)		15				

Queuing and Blocking Report
Total Traffic Phase 5 Arena

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Intersection: 1: Waterdown Rd & North Service Rd

Movement	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	T	TR	L	T	TR
Maximum Queue (m)	23.0	34.8	21.7	52.4	55.9	18.2	27.3	15.9	23.7	25.0
Average Queue (m)	7.8	15.6	7.3	20.5	27.9	6.8	16.3	5.0	8.0	9.8
95th Queue (m)	18.9	29.7	16.6	42.2	46.9	16.9	25.8	13.1	18.2	20.2
Link Distance (m)	341.1				135.0		135.0	130.8		
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	165.0		125.0		60.0		60.0		70.0	
Storage Blk Time (%)					0		0			
Queuing Penalty (veh)					0		0			

Intersection: 2: Waterdown Rd & Hwy 403 WB Off-Ramp

Movement	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	LTR	L	L	TR	LT	T	T	TR
Maximum Queue (m)	6.6	28.8	26.4	20.9	26.3	15.1	19.3	18.8
Average Queue (m)	0.4	11.5	11.7	8.5	8.0	3.4	5.0	4.6
95th Queue (m)	3.3	22.2	23.6	17.1	20.0	11.6	14.3	13.5
Link Distance (m)	60.7	437.7		168.8		168.8	135.0	135.0
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	140.0		100.0					
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Total Traffic Phase 5 Arena

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	L	R	T	T	R	L	L	T
Maximum Queue (m)	23.1	33.0	29.5	16.1	20.6	71.0	26.4	17.4	18.7	20.5	26.5	7.6
Average Queue (m)	9.2	15.5	9.6	5.8	11.0	39.3	10.7	4.9	6.6	7.5	11.8	1.1
95th Queue (m)	19.7	30.2	21.6	14.5	19.7	62.2	22.0	13.6	14.1	16.9	22.2	4.5
Link Distance (m)	326.8				195.9	195.9	115.0	115.0			168.8	168.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	125.0		250.0		65.0				30.0	35.0		
Storage Blk Time (%)											0	
Queuing Penalty (veh)											0	

Intersection: 3: Waterdown Rd & Hwy 403 EB Off-Ramp/GO Access/South Service Rd

Movement	SB
Directions Served	T
Maximum Queue (m)	6.8
Average Queue (m)	0.6
95th Queue (m)	3.4
Link Distance (m)	168.8
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: Waterdown Rd & Masonry Crt/Railway Rd

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	T	TR	L	T	TR
Maximum Queue (m)	8.6	10.4	20.4	15.8	18.2	16.7	14.3	19.1
Average Queue (m)	0.9	3.5	9.7	4.5	4.4	4.7	4.5	6.4
95th Queue (m)	5.0	10.6	17.4	12.7	12.9	12.2	11.4	15.5
Link Distance (m)	132.4		154.0	115.7	115.7		209.5	209.5
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	35.0				90.0			
Storage Blk Time (%)								
Queuing Penalty (veh)								

Queuing and Blocking Report
Total Traffic Phase 5 Arena

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Intersection: 5: GO Bus Driveway & South Service Rd

Movement	EB	EB	WB	WB	NB
Directions Served	T	TR	LT	T	LR
Maximum Queue (m)	5.2	8.7	5.4	20.6	7.6
Average Queue (m)	0.2	0.5	0.3	1.1	0.6
95th Queue (m)	2.2	4.8	2.9	8.5	3.9
Link Distance (m)	195.9	195.9	94.7	94.7	45.4
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: West GO Driveway & South Service Rd/GO Access/South Service Rd

Movement	NB
Directions Served	LR
Maximum Queue (m)	17.3
Average Queue (m)	5.9
95th Queue (m)	14.3
Link Distance (m)	52.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: East GO Driveway/Hwy 403 EB On-Ramp & GO Access/South Service Rd/South Service

Movement	EB	EB	WB	WB	NB
Directions Served	L	TR	T	R	LTR
Maximum Queue (m)	28.7	23.0	35.8	33.4	27.4
Average Queue (m)	11.1	4.8	12.5	11.7	9.8
95th Queue (m)	22.6	16.3	30.0	26.1	21.1
Link Distance (m)	95.2	95.2	1018.8		63.5
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				50.0	
Storage Blk Time (%)				0	
Queuing Penalty (veh)				0	

Queuing and Blocking Report
Total Traffic Phase 5 Arena

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Intersection: 8: King Rd & North Service Rd

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	T	R	L	T	TR	L	T	TR
Maximum Queue (m)	5.8	25.4	19.4	22.0	8.3	23.7	9.5	20.8	6.3	9.9	6.0
Average Queue (m)	0.3	6.0	6.8	6.0	0.6	7.4	1.9	7.8	1.0	1.3	0.4
95th Queue (m)	2.7	17.3	16.7	16.9	4.0	17.8	7.3	15.8	5.0	6.3	2.8
Link Distance (m)		1977.6		329.3			252.0	252.0		167.7	167.7
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	45.0		80.0		40.0	100.0			30.0		
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 9: King Rd & Plains Rd E

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	T	R	L	T	T	R	L	TR	L	L
Maximum Queue (m)	10.0	28.5	8.8	6.5	12.9	38.2	19.5	18.4	26.6	22.7	22.8	28.0
Average Queue (m)	2.9	10.6	1.6	1.3	2.8	18.2	4.8	6.9	9.9	8.5	8.5	15.8
95th Queue (m)	9.1	22.4	6.3	4.9	10.0	32.2	15.2	14.5	20.7	18.4	18.6	24.7
Link Distance (m)		250.1	250.1				193.4	193.4		131.9		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	35.0			35.0	30.0			30.0	45.0		100.0	100.0
Storage Blk Time (%)		0				1	0					
Queuing Penalty (veh)		0				0	0					

Intersection: 9: King Rd & Plains Rd E

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	28.7	8.8
Average Queue (m)	10.5	2.7
95th Queue (m)	22.5	7.8
Link Distance (m)	406.0	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		35.0
Storage Blk Time (%)	0	
Queuing Penalty (veh)	0	

Queuing and Blocking Report
Total Traffic Phase 5 Arena

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Intersection: 10: King Rd & South Service Rd

Movement	EB	EB	NB	NB	SB
Directions Served	L	R	L	T	TR
Maximum Queue (m)	34.0	25.7	19.1	15.9	23.0
Average Queue (m)	15.3	10.5	6.6	4.1	6.0
95th Queue (m)	28.2	18.5	16.5	13.0	17.0
Link Distance (m)	293.0		305.2		103.9
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	50.0	30.0			
Storage Blk Time (%)	0	0			
Queuing Penalty (veh)	0	0			

Intersection: 11: Block 1 Access B & South Service Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	6.7	77.3
Average Queue (m)	0.3	47.0
95th Queue (m)	3.2	78.7
Link Distance (m)	173.6	70.3
Upstream Blk Time (%)	7	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: South Service Rd & Road B

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	12.7	16.4
Average Queue (m)	0.8	7.6
95th Queue (m)	6.4	14.6
Link Distance (m)	173.6	68.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Queuing and Blocking Report
Total Traffic Phase 5 Arena

Total Traffic Phase 5 Arena
Mixed Use Development 1200 King Rd

Intersection: 13: Block 1 Access A & South Service Rd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	5.4	24.2
Average Queue (m)	0.4	11.9
95th Queue (m)	3.3	19.7
Link Distance (m)	293.0	70.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1