City of Mississauga

Class Environmental Assessment Study for Burnhamthorpe Road West Improvements

Transportation and Traffic Analysis Report

B000856

October 2018

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City of Mississauga

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1. Introduction

CIMA+ was retained by the City of Mississauga (the City) to conduct an Environmental Assessment (EA) for the improvement of Burnhamthorpe Road West from Loyalist Drive to the West City Limit. The project follows the process outlined in the Municipal Class EA, (October 2000, as amended in 2015) Schedule C.

A transportation and traffic analysis of the existing and projected traffic conditions is one of the components of this study. The purpose of this report is to present a review of existing transportation and traffic conditions throughout the study area, the results of the screenline analysis conducted for all horizon years as well as the expected impacts of projected traffic along the corridor and intersections under study. The findings of this report will assist the project team in addressing any necessary improvements in the design of the preferred alternative.

2. Study Area

2.1. Road Network

Burnhamthorpe Road is a major east-west arterial road traversing the City of Mississauga urban area. Within the EA study area, the 1.5-kilometre section of Burnhamthorpe Road West between Loyalist Drive and the West City Limit, consists of a rural 2-lane road cross-section. There are four (4) signalized intersections within the study area along Burnhamthorpe Road West, as illustrated in **Figure 1**. The study area intersections include:

- Burnhamthorpe Road W & Ninth Line;
- Burnhamthorpe Road W & Ridgeway Drive;
- Burnhamthorpe Road W & Colonial Drive; and
- Burnhamthorpe Road W & and Loyalist Drive.

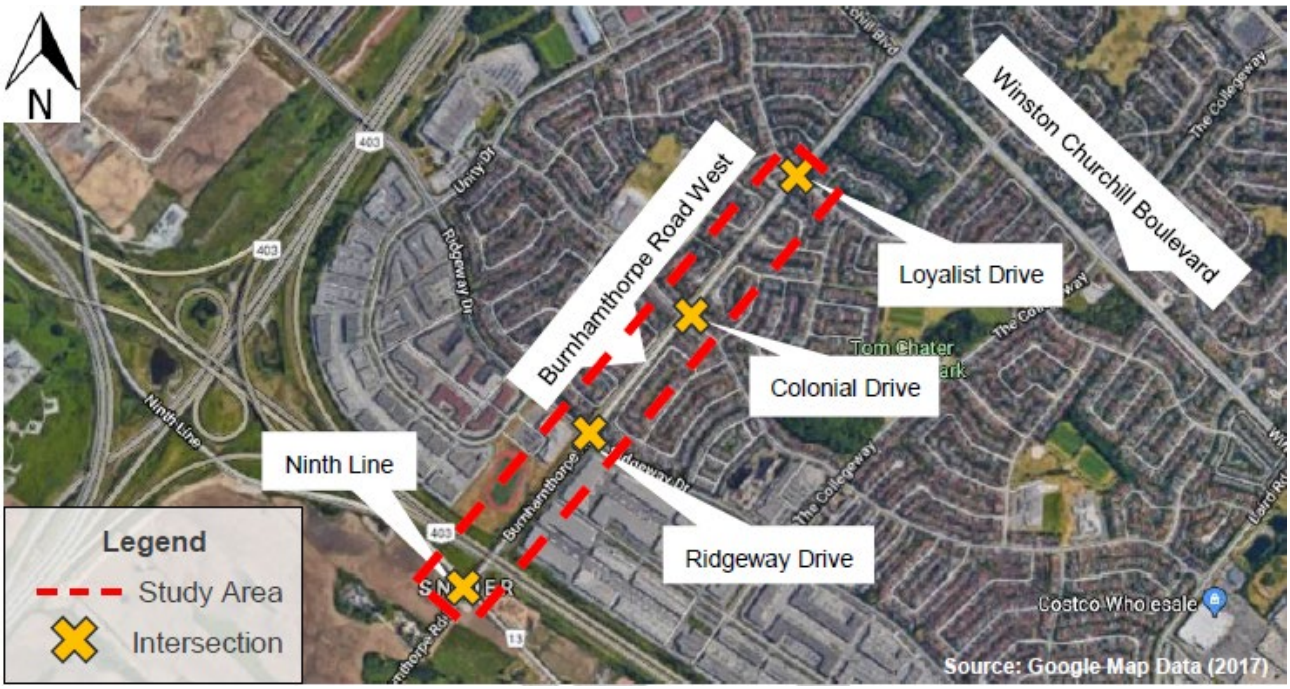


Figure 1: Burnhamthorpe Road West EA Study Area

It should be noted that to respond to the City's requirements, the intersection with Winston Churchill Boulevard was included as part of our review and analysis, to provide a better understanding of its effects on existing and projected traffic conditions along the corridor under study.

The land use surrounding the study area is predominantly residential, with the exception of the section between Ninth Line and Ridgeway Drive, with a Secondary School on the north side of Burnhamthorpe Road and some business employment on the south side. There is no direct access to Burnhamthorpe Road, with the exception of a church at the northwest corner of the intersection of Burnhamthorpe Road West and Loyalist Drive (entrance only).

The roads intersecting with Burnhamthorpe Road within the study area are collector roads with urban cross-sections (curb and gutter), with the exception of Ninth Line, which is a rural arterial road and Winston Churchill Boulevard – an urban arterial under City's jurisdiction. The current posted speed limit on Burnhamthorpe Road West within the study area is 60 km/h.

2.2. Cycling and Pedestrian Network

At the intersection of Burnhamthorpe Road & Ridgeway Drive, pedestrian volumes are higher due to its close proximity to Loyola Catholic Secondary School. The total number of crossings at this intersection along with the individual crossing with the highest number of crossings are summarized in **Table 1**.

A breakdown of the pedestrian volumes at each crossing at this intersection is summarized in **Figure 2**.

Table 1: Pedestrian Volumes along Burnhamthorpe Road at Ridgeway Drive Intersection

Peak Hour	Pedestrian Volumes	
	Total Number of Crossings	Individual Crossing with Highest Number of Crossings / Volume
AM Peak Hour (7:45 – 8:45)	421	North Crossing / 152
PM Peak Hour (16:30 – 17:30)	33	East Crossing / 12

Pedestrian volumes are fairly high, with the highest volume during the AM vehicular peak hour, with 421 crossings. The north crossing has the highest percentage of pedestrian crossings with 152 (36%) during the AM peak hour.

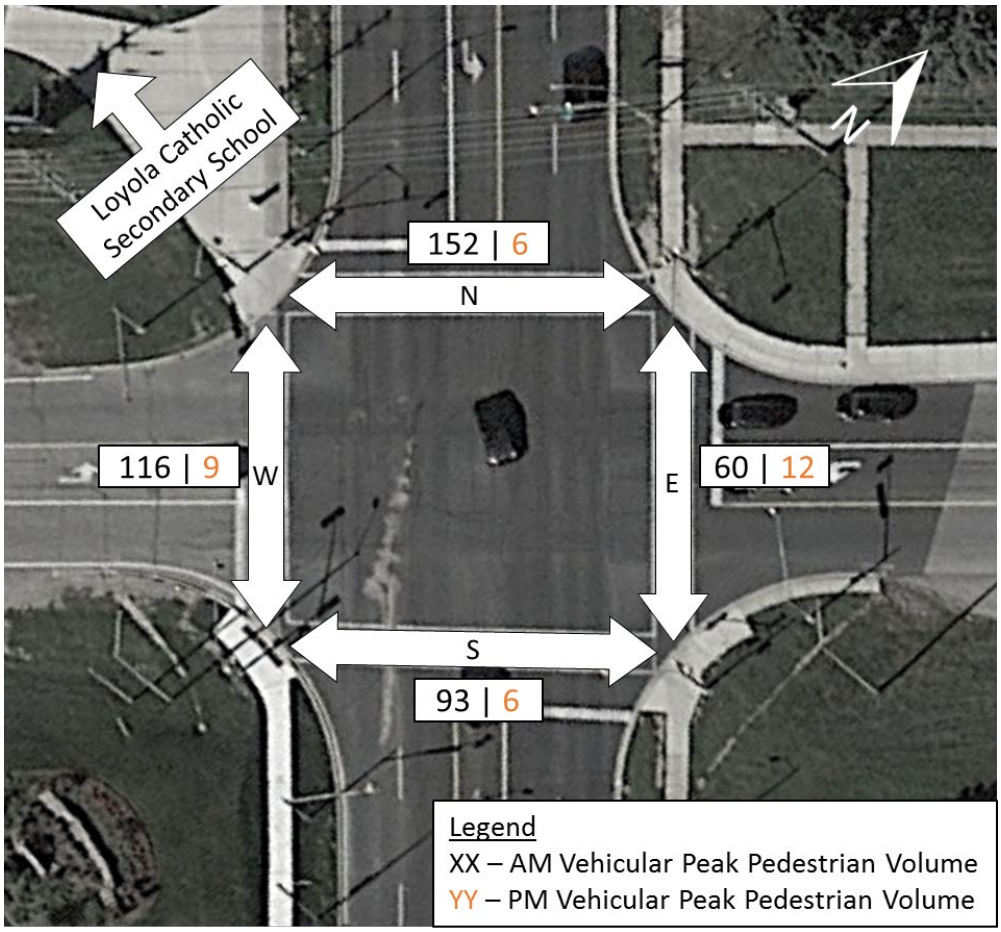


Figure 2: Pedestrian Volumes at Burnhamthorpe Drive & Ridgeway Drive

The total number of crossings at the intersections of Ninth Line, Colonial Drive, and Loyalist Drive along with the individual crossing with the highest number of pedestrians are summarized in **Table 2**.

Due to relatively low pedestrian volumes, the maximum pedestrian volumes between these three intersections was reported.

Table 2: Pedestrian Volumes along Burnhamthorpe Road at Intersections of Ninth Line, Colonial Drive, and Loyalist Drive

Peak Hour	Pedestrian Volumes	
	Total Number of Crossings	Individual Crossing with Highest Number of Crossings / Volume
AM Peak Hour (7:45 – 8:45)	39	South Crossing at Colonial Drive / 15
PM Peak Hour (16:30 – 17:30)	23	North Crossing at Colonial Drive / 10

Sidewalks are present, within the study area, on the north and south side of Burnhamthorpe Road West between Ridgeway Drive and Loyalist Drive. The sidewalks are located approximately 10 metres from the edge of the through lanes on either side of the road. The sidewalks are 1.5-metre wide, which conforms to AODA requirements[1], and were generally in good condition.

At some locations along Burnhamthorpe Road West, there are sidewalks perpendicular to Burnhamthorpe Road that connect the edge of the shoulder to residential areas and may encourage pedestrians to cross Burnhamthorpe Road outside of the designated crossing locations (**Figure 3**).

These sidewalks are located as follow:

- Approximately 200 metres east of Colonial Drive on the south side of Burnhamthorpe Road;
- Approximately 75 metres west of Colonial Drive on the north side of Burnhamthorpe Road; and
- Approximately 50 metres east of Ridgeway Drive on the south side of Burnhamthorpe Road

Figure 3: Pedestrian Pathway Between Colonial Drive and Loyalist Drive

Each intersection within the study area has crosswalks on all four approaches. They are standard crosswalks (i.e. marked with two parallel white lines) that range between 2.0 and 3.25 metres in width. According to OTM Book 11, the crosswalk must be at least 2.5 metres wide[2].

Pedestrian signal heads are provided at all intersections in the study area, with the north/south crossings requiring the use of a pushbutton in order to call the pedestrian phase. The pedestrian push buttons at each of the intersections within the study area do not comply with the requirements outlined in the Accessibility of Ontarians with Disabilities Act (AODA). An example of the existing pedestrian push buttons at intersection is shown in **Figure 4**.

[1] O.Reg. 191/11 – Integrated Accessibility Standards, Part IV.1 80.23
[2] OTM Book 11 Pavement Markings, page 80

Figure 4: Example of Non-AODA Compliant Pedestrian Push Button (there is no locator tone or audible and vibro-tactile walk indicators)

Further discussion regarding safety of the existing pedestrian network is provided in the Safety Report associated with this study.

The pedestrian performance along the corridor was evaluated using the following level-of-service (LOS) criteria from York Region's Transportation Mobility Plan Guidelines in **Table 3**.

Table 3: Pedestrian Level of Service Criteria

Level of Service	Segment	Intersection
A	≥ 2.0 m sidewalk with minimum 3.5 m buffer including planting and edge zone; or ≥ 3.0 m multi-use path	• ≥ 2.0 m sidewalk with minimum 3.5 m buffer including planting and edge zone; or ≥ 3.0 m multi-use path • Pedestrian signal head with sufficient pedestrian clearance time • Clearly delineated cross-walk
B	≥ 1.5 m sidewalk with minimum 1.0 m buffer including edge zone; or < 3.0 m multi-use path	• ≥ 1.5 m sidewalk with minimum 1.0 m buffer including edge zone; or < 3.0 m multi-use path • Pedestrian signal head with sufficient pedestrian clearance time • Clearly delineated cross-walk
C	≥ 1.5 m curb-faced sidewalk (no buffer)	• ≥ 1.5 m curb-faced sidewalk (no buffer) • Pedestrian signal head with sufficient pedestrian clearance time • Clearly delineated cross-walk
D	< 1.5 m sidewalk	• < 1.5 m sidewalk • Pedestrian signal head sufficient pedestrian clearance time • No clearly delineated cross-walk

Level of Service	Segment	Intersection
E	Paved shoulder or no sidewalk provision	• Paved shoulder or no sidewalk provision • No pedestrian signal head • No clearly delineated cross-walk
F	No sidewalk provision	• No sidewalk provision • No pedestrian signal head • No clearly delineated cross-walk

These guidelines provide a simplified method for evaluating pedestrian LOS compared to the methodology outlined in the Highway Capacity Manual (which require an extensive amount of data).

A target LOS C was assumed for both Segment and Intersection categories. Based on the existing characteristics described above, Error! Not a valid bookmark self-reference. summarizes the LOS throughout the study area.

Table 4: Pedestrian Level of Service in the Study Area

Location	Level of Service
Burnhamthorpe Road & Ninth Line	C
Burnhamthorpe Road between Ninth Line & Ridgeway Drive	F
Burnhamthorpe Road & Ridgeway Drive	B
Burnhamthorpe Road between Ridgeway Drive & Colonial Drive	B
Burnhamthorpe Road & Colonial Drive	B
Burnhamthorpe Road between Colonial Drive & Loyalist Drive	B
Burnhamthorpe Road & Loyalist Drive	B

The Burnhamthorpe Road West segment between Ninth Line & Ridgeway Drives does not meet the segment LOS target of C and operates at a LOS of F due to the lack of any sidewalk provision. However, the City of Mississasuga's Cycling Master Plan proposes the future development of primary boulevard multi-use trails along Burnhamthorpe Road West within the study area. The City could consider extending the existing boulevard trail that is currently east of Winston Churchill Boulevard along Burnhamthorpe Road to Ridgeway Drive. As a result, all locations will improve to a LOS of A.

No dedicated bicycle facilities are provided on Burnhamthorpe Road West within the study area, resulting in bicyclists having to use the unpaved shoulders, or to share the road with vehicular traffic. The existing AADT (Average Annual Daily Traffic) for Burnhamthorpe Road, provided by the City of Mississauga, ranges from 7,249 to 8,705 and the 85th percentile speed is 71-73 km/h, as measured from a speed study completed by CIMA^{+} (further details in the Safety Report).

Based on the OTM Book 18 – Cycling Facilities Pre-Selection Nomograph, illustrated in **Figure 5**, a separate facility such as separate bicycle lanes, buffered paved shoulders or in-boulevard active

transportation pathway would be appropriate for Burnhamthorpe Road West, especially considering future growth in traffic volumes.

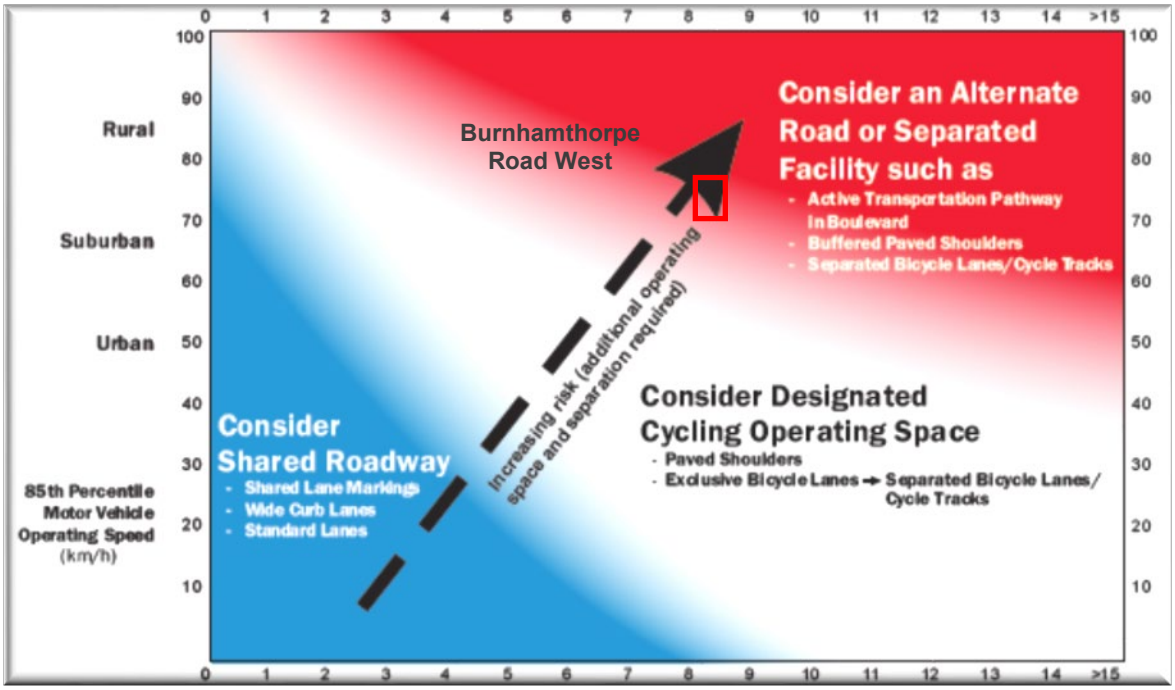


Figure 5: Desirable Cycling Facility Nomagraph[3]

The bicycle performance along the corridor was evaluated using the following LOS criteria from York Region's Transportation Mobility Plan Guidelines in **Table 5**. A target LOS is C was assumed for both Segment and Intersection categories. Based on the existing characteristics described above,

Table 6 summarizes the LOS throughout the study area.

Table 5: Bicycle Level of Service Criteria

Level of Service	Segment	Intersection
A	Separated cycling facilities (e.g. cycle tracks, multi-use path)	Separated cycling facilities Bicycle box or clearly delineated bicycle treatment or bicycle signal head
B	≥ 1.8 m dedicated cycling facilities (e.g. bicycle lanes with and without buffer)	> 1.8 m dedicated cycling facilities (e.g. bicycle lanes with and without buffer), Bicycle box, clearly delineated bicycle treatment or bicycle signal head

[3] OTM Book 18 Cycling Facilities, Figure 3.3 page 30

Level of Service	Segment	Intersection
C	< 1.8 m dedicated cycling facilities with no buffer	< 1.8 m dedicated cycling facilities with no buffer, Bicycle box, clearly delineated bicycle treatment or bicycle signal head
D	≤ 1.5 m bicycle lane with no buffer	≤ 1.5 m bicycle lane and no buffer Bicycle treatment
E	Shared facilities (e.g. signed routes, sharrows or paved shoulder with minimum 1.2 m in constrained area)	Shared facilities (e.g. signed routes, sharrows or paved shoulder with minimum 1.2 m in constrained area) No clearly delineated bicycle treatment
F	No bicycle provision	No bicycle provision

Table 6: Bicycle Level of Service in the Study Area

Location	Level of Service
Burnhamthorpe Road & Ninth Line	F
Burnhamthorpe Road between Ninth Line & Ridgeway Drive	F
Burnhamthorpe Road & Ridgeway Drive	F
Burnhamthorpe Road between Ridgeway Drive & Colonial Drive	F
Burnhamthorpe Road & Colonial Drive	F
Burnhamthorpe Road between Colonial Drive & Loyalist Drive	F
Burnhamthorpe Road & Loyalist Drive	F

The bicycle performance for the entire corridor and intersections within the study area operate at a LOS of F due to the lack of any bicycle provision. However, with the planned improvements of primary boulevard multi-use trails along Burnhamthorpe Road West within the study area, the segment LOS will improve to a LOS of A. In order to meet the intersection LOS target of C, the City should consider adding bicycle boxes, clearly delineated bicycle treatments, or bicycle signal heads to all intersections within the study area, which will improve the intersection LOS to a LOS of A.

2.3. Transit Service

Based on Mississauga Transit (MiWay) information, Route 36 is the only transit route through the Burnhamthorpe Road corridor within the study area.

There are also two east-west lines on Burnhamthorpe Road that travel between Winston Churchill Boulevard and Loyalist Drive, Route 347 and Route 368. Route 347 and Route 368 are school/summer school routes that are effective from July 3 to July 31, 2018 and from September to June 2018, respectively.

However, since these two routes are school/summer school routes, this section will only focus on the regular local route (Route 36), which is illustrated in **Figure 6** below:

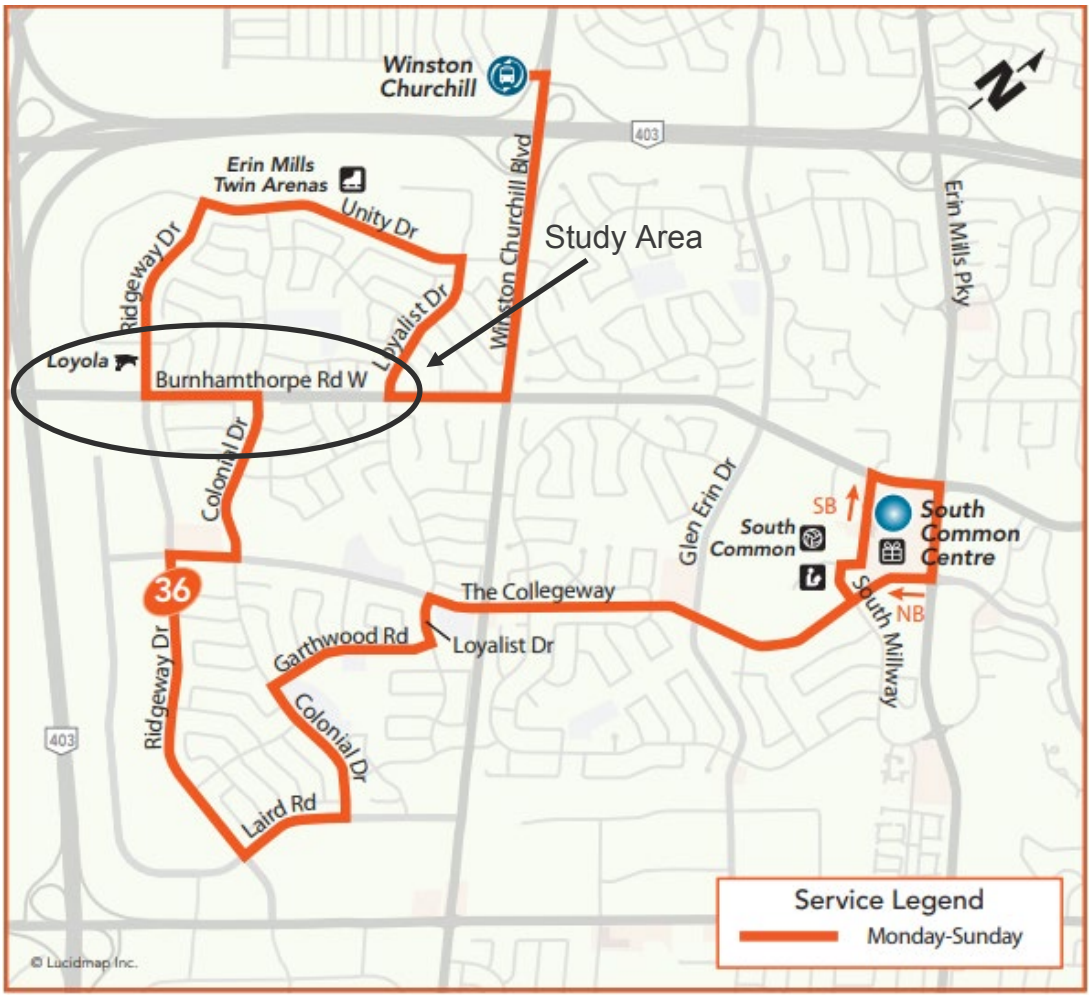


Figure 6: MiWay Route 36 Map

Route 36 operates north-south every 20 to 30 minutes on weekdays from 04:30 AM until after midnight, and every 40 to 50 minutes on weekends from 07:00 AM until midnight.

The locations of existing Route 36 bus stops along the Burnhamthorpe Road corridor within the study area are illustrated in **Figure 7**.

Figure 7: Existing Route 36 Bus Stops in the Study Area

The transit performance along the corridor was evaluated using the LOS criteria from York Region's Transportation Mobility Plan Guidelines in **Table 7**.

A target LOS of C or better was assumed for Access to Transit Stops and Transit Headways, and a LOS of D or better for Intersection Approach.

Table 7: Transit Level of Service Criteria

Level of Service	Access to Transit Stops	Transit Headways	Intersection Approach (transit or curb lanes)	
			Delay (seconds/veh)	v/c
A	90% within ≤ 200 m	≤ 5 minutes	≤ 10	0 to 0.60
B	90% within ≤ 500 m and 70% within ≤ 200	> 5-10 minutes	> 10-20	0.61 to 0.70
C	90% within ≤ 500 m and 50% within ≤ 200 m	> 10-15 minutes	> 20-35	0.71 to 0.80
D	100% within ≤ 600 m	> 15-20 minutes	> 35-55	0.81 to 0.90
E	100% within ≤ 800 m	> 20-30 minutes	> 55-80	0.91 to 1.00
F	100% > 800 m	> 30 minutes	> 80	> 1.00

The transit level of service was evaluated considering the access points to Burnhamthorpe Road from the surrounding neighbourhoods (i.e. each intersection and pedestrian access path as previously described and is summarized in **Table 8**.

The intersection of Burnhamthorpe Road & Ninth Line was not reviewed because there are no major points of origin/destination for transit users nearby.

Table 8: Transit Level of Service in the Study Area

Location	Direction	Access to Transit Stops	Transit Headways	Intersection Approach (transit or curb lanes)
		LOS	LOS	LOS
Burnhamthorpe Road & Ridgeway Drive	Northbound	A	E	B (D)
	Southbound	D		E (B)
Neighbourhood Pedestrian Access Path 1	Northbound	A		B (D)
	Southbound	D		A (A)
Neighbourhood Pedestrian Access Path 2	Northbound	A		B (D)
	Southbound	A		A (A)
Burnhamthorpe Road & Colonial Drive	Northbound	A		B (D)
	Southbound	A		A (A)
Neighbourhood Pedestrian Access Path 3	Northbound	D		A (A)
	Southbound	D		A (A)
Burnhamthorpe Road & Loyalist Drive	Northbound	A		A (A)
	Southbound	A		A (A)

Legend: AM (PM)

Based on the foregoing, some locations present a LOS worse than the target of C or better for Access to Transit Stops and Transit Headways, and a LOS of D or better for Intersection Approach. In order to improve transit service in the study area, consideration may be given to:

- Expanding transit service so that the entire length of Burnhamthorpe Road within the study area is served by transit routes;
- Ensuring that 90% of transit stops are located within ≤ 500 m and 50% within 200 m from each intersection/neighborhood pedestrian access path (if they remain – refer to Safety Report); and
- Reduce transit headway to 15 minutes.

It is recognized, however, that these potential changes need to take into account operational sustainability, including demand, fleet, revenue, among other considerations.

3. Existing Traffic Conditions

3.1. Existing Traffic Volumes

Turning Movement Counts (TMC) for both the AM and PM peak hours under existing conditions are summarized in a figure named Turning Movement Counts in **Appendix A**. The TMCs, which are provided in **Appendix B**, indicates that the AM Peak Hour occurs between 7:45 and 8:45, and the PM Peak Hour occurs between 16:30 and 17:30 (corridor peak hours).

To consider the variations between the different traffic counts, a review of the provided data was conducted to produce a balanced turning movement counts representing the 2017 existing conditions as presented in **Appendix C**. This information was used to represent existing conditions during all phases of the traffic analysis.

It should be noted that the most recent traffic signal timings provided by the City were used to represent existing conditions.

3.2. Existing Intersection Capacity Analysis

Intersection capacity analysis was undertaken using Synchro/SimTraffic software and following procedures described in the Highway Capacity Manual (HCM). The analysis primarily focuses on performance measures such as level-of-service (LOS), volume to capacity (v/c) ratio, and 95th percentile queues.

LOS is a qualitative measure of operational performance and is based on control delay. The LOS criteria for signalized intersections is shown in **Table 9**.

The v/c ratio is the ratio between traffic volumes and the capacity of an intersection movement. A v/c ratio greater than 1.0 indicates that the movement is operating over capacity.

The 95th Percentile Queue is the queue length that has only a 5 percent probability of being exceeded during the analysis period. It is industry practice and accepted methodology to use the 95th percentile queue length for design and operational analysis purposes.

Table 9: LOS Criteria for Signalized and Unsignalized Intersections

LOS	Control Delay (seconds/vehicle)	Traffic Flow Characteristics
A	0 – 10	Very Good
B	> 10 – 20	Good
C	> 20 – 35	Typically preferred planning objective
D	> 35 – 55	Typically acceptable
E	> 55 – 80	Undesirable; potentially unstable traffic flow
F	> 80	Failing movements may impede traffic flow

Existing intersection operations are summarized in **Table 10**. Detailed Synchro/SimTraffic Reports can be found in **Appendix D**.

Table 10: Existing Intersection Operations (2017)

Direction / Movement		Storage (m)	v/c	LOS	95th%^{ile} Queue (m)
Burnhamthorpe Road & Ninth Line					
EB	L	18	0.29 (0.52)	C (E)	110 (62)
	T/R	-	0.93 (0.86)	D (D)	816 (195)
WB	L	48	1.33 (1.26)	F (F)	173 (183)
	T	-	0.38 (1.10)	C (F)	697[4] (637)[4]
	R	46	0.07 (0.35)	C (B)	34 (200)
NB	L	29	0.41 (0.25)	D (B)	61 (94)
	T/R	-	0.87 (1.11)	D (F)	151 (721)
SB	L	27	0.68 (0.71)	C (D)	113 (46)
	T/R	-	0.89 (0.47)	D (B)	223 (79)
Overall		**-**	**1.08 (1.08)**	**D (E)**	**-**
Burnhamthorpe Road & Ridgeway Drive					
EB	L	47	0.74 (0.55)	C (B)	172 (57)
	T/R	-	1.00 (0.66)	D (C)	601[5] (133)
WB	L	58	1.08 (0.57)	F (C)	95 (157)
	T/R	-	0.70 (0.83)	B (C)	164 (452)[6]
NB	L	37	0.52 (0.92)	C (D)	26 (172)
	T/TR	-	0.49 (0.88)	C (D)	66 (448)
SB	L	56	0.67 (0.57)	D (C)	81 (38)
	T/TR	-	0.98 (0.64)	E (D)	173 (79)
Overall		**-**	**0.94 (0.84)**	**D (D)**	**-**
Burnhamthorpe Road & Colonial Drive					
EB	L	61	0.04 (0.08)	A (A)	9 (13)
	T/R	-	0.51 (0.47)	A (A)	77 (90)
WB	L	43	0.15 (0.28)	A (A)	43 (82)
	T/R	-	0.52 (0.54)	B (A)	123 (224)
NB	L	30	0.38 (0.20)	D (D)	33 (20)
	T/R	-	0.23 (0.44)	D (D)	46 (41)
SB	L	28	0.86 (0.45)	E (D)	50 (22)
	T/R	-	0.26 (0.30)	D (D)	46 (31)
Overall		**-**	**0.58 (0.52)**	**C (B)**	**-**

[4] Queue extends beyond the signal at Ridgeway Drive
[5] Queue extends beyond the signal at Ninth Line
[6] Queue extends beyond the signal at Colonial Drive

Direction / Movement		Storage (m)	v/c	LOS	95th%ile Queue (m)
Burnhamthorpe Road & Loyalist Drive					
EB	L	39	0.04 (0.15)	A (A)	9 (24)
	T/TR	30	0.39 (0.30)	A (A)	48 (52)
WB	L	35	0.07 (0.15)	A (A)	24 (46)
	T/TR	-	0.31 (0.40)	A (A)	101 (120)
NB	L	14	0.32 (0.09)	D (D)	23 (11)
	T/R	-	0.14 (0.18)	D (D)	25 (32)
SB	L	20	0.55 (0.54)	D (D)	29 (28)
	T/R	-	0.17 (0.14)	D (D)	28 (21)
Overall		**-**	**0.40 (0.41)**	**B (B)**	**-**
Burnhamthorpe Road & Winston Churchill Boulevard					
EB	L	30	0.81 (0.85)	D (E)	137 (70)
	T/TR	-	0.94 (0.42)	E (C)	220 (75)
WB	L	40	3.31 (0.56)	F (D)	142 (153)
	T/T	-	0.49 (0.91)	D (E)	925[7] (325)
	R	15	0.05 (0.16)	D (D)	25 (28)
NB	L	60	1.49 (1.28)	F (F)	188 (171)
	T/TR	-	1.04 (1.13)	F (F)	822[8] (828)[8]
SB	L	64	1.40 (0.81)	F (E)	104 (100)
	T/T	-	0.68 (0.71)	C (D)	616[9] (145)
	R	37	0.08 (0.13)	C (C)	90 (88)
Overall		**-**	**2.02 (1.03)**	**F (E)**	**-**

Legend: AM (PM)

The 95%ile queues at the intersections of Burnhamthorpe Road & Ridgeway Drive, Burnhamthorpe Road & Colonial Drive, and Burnhamthorpe Road & Loyalist Drive were reported with a 50% reduction of westbound left-turn volumes at Burnhamthorpe Road & Ninth Line.

This reduction was a sensitivity analysis used to calibrate and ensure queue spillover at the intersection of Burnhamthorpe Road & Ninth Line would not distort results at these intersections. Full queues at the intersections of Burnhamthorpe Road & Ninth Line and Burnhamthorpe Road & Winston Churchill Boulevard were reported.

Based on these results, the following movements operate at or above capacity:

- Burnhamthorpe Road & Ninth Line:
    - Westbound left-turn, with a v/c of 1.33 in the AM peak hour, and 1.26 in the PM peak hour;

[7] Queue extends beyond the signal at Tamarack Gate
[8] Queue reaches the signal at The Collegeway
[9] Queue extends beyond the signal at Unity Drive/Unity Gate

    - Westbound through, with a v/c of 1.10 in the PM peak hour; and
    - Northbound through/right-turn with a v/c of 1.11 in the PM peak hour.
- Burnhamthorpe Road & Ridgeway Drive:
    - Eastbound through/right-turn, with a v/c ratio of 1.00 in the AM peak hour; and
    - Westbound left-turn, with a v/c of 1.08 in the AM peak hour.
- Burnhamthorpe Road & Winston Churchill Boulevard;
    - Westbound left-turn, with a v/c of 3.31 in the AM peak hour;
    - Northbound left-turn, with a v/c of 1.49 in the AM peak hour, and 1.28 in the PM peak hour;
    - Northbound through/right-turn, with a v/c ratio of 1.04 in the AM peak hour, and 1.13 in the PM peak hour; and
    - Southbound left-turn, with a v/c of 1.40 in the AM peak hour.

The westbound left-turn at Burnhamthorpe Road and Winston Churchill Boulevard presents a very high v/c ratio in the AM peak hour of 3.31 because this left-turn does not have a protected phase. During CIMA+'s site visit completed on Wednesday, November 22, 2017, this left-turn was operating better than reported by Synchro/SimTraffic, presumably due to drivers being more aggressive when making this left turn than the modelled behaviour.

Additionally, several movements present 95th percentile queues that exceed available storage. However, based on the SimTraffic animation, only the following movements present excessive queuing that is sustained over multiple signal cycles:

- Burnhamthorpe Road & Ninth Line:
    - Westbound through/right-turn in the AM and PM peak hours.
- Burnhamthorpe Road & Ridgeway Drive:
    - Eastbound through/right-turn in the AM peak hour; and
    - Westbound through/right-turn in the PM peak hour.
- Burnhamthorpe Road & Winston Churchill Boulevard:
    - Westbound through in the AM peak hour;
    - Northbound through/right-turn in the AM and PM peak hours; and
    - Southbound through in the AM peak hour.

The westbound through/right-turn at Burnhamthorpe Road & Ninth Line presents long queues that are sustained over multiple cycles in the AM and PM peak hours. The westbound left-turn does not have a protected phase which causes left-turning vehicles to exceed the available storage and starve the through/right-turn lane. This through/right-turn was observed to operate better than reported by Synchro/SimTraffic, presumably due to drivers being more aggressive when making the westbound left turn than the modelled behaviour.

The eastbound through/right-turn at Burnhamthorpe Road & Ridgeway Drive presents long queues that extend west beyond Ninth Line during the AM peak hour. The westbound through/right-turn at Burnhamthorpe Road & Ridgeway Drive presents long queues that extend beyond Colonial Drive during the PM peak hour.

The westbound through movement at Burnhamthorpe Road & Winston Churchill Boulevard presents long queues that extend beyond the signal at Tamarack Gate approximately 450 m east during the AM peak hour. The length of this queue is due to the lack of protected phase for the westbound left-turn movement which operates at a v/c ratio of 3.31. This results in long westbound left-turn queues that exceed available storage and spill over to the westbound through movement. The northbound through/right-turn at Burnhamthorpe Road & Winston Churchill Boulevard

presents long queues that reach the signal at The Collegeway approximately 800 m south during the AM and PM peak hours due to capacity restrictions. The southbound through movement at Burnhamthorpe Road & Winston Churchill Boulevard presents long queues that extend beyond the signal at Unity Drive/Unity Gate approximately 550 m north during the AM peak hour. Even though the southbound left-turn has a protected phase, there is a high volume of left turning vehicles that starve the through lanes. This through movement was operating better than reported by Synchro/SimTraffic, presumably due to drivers being more aggressive when making the southbound left turn than the modelled behavior.

CIMA+ also completed queue/delay studies for the following movements, in order to ensure that the Synchro model represents real world operations:

- Burnhamthorpe Road & Loyalist Drive WBT, PM Peak Hour;
- Burnhamthorpe Road & Colonial Drive EBT, AM Peak Hour;
- Burnhamthorpe Road & Ridgeway Drive NBL, PM Peak Hour; and
- Burnhamthorpe Road & Ridgeway Drive EBT, AM Peak Hour.

Table 11 summarizes the results of the queue/delay studies compared to the Synchro/SimTraffic results.

Table 11: Queue/delay study comparison with Synchro/SimTraffic Results

Intersection	Movement	Peak Hour	Peak 1-hour Delay (s)	Synchro Delay (s)	Queue/Delay Study 95^{tho}%^{ile} Queue (m)	SimTraffic 95^{tho}%^{ile} Queue (m)
Burnhamthorpe Road & Colonial Drive	Eastbound Through	AM	12.0	7.7	78	77
Burnhamthorpe Road & Loyalist Drive	Westbound Through	PM	3.9	5.3	97	120
Burnhamthorpe Road & Ridgeway Drive	Northbound Left	PM	25.7	53.0	140	172

The average delays for the movements at the Colonial Drive and Loyalist Drive intersections surveyed resulted within 2 to 5 seconds from the delays reported by Synchro. While the calculated 95th percentile queues presented some differences, these differences correspond to only 5 vehicles, which is not unreasonable.

A queue/delay study was also conducted for the eastbound through movement at Ridgeway Drive, however this movement presented congestion during most of the AM peak hour, which distorted the results, therefore queue/delay calculations could not be completed. However, the SimTraffic animation was generally consistent with conditions observed in the field. The delay for the northbound left-turn movement at Ridgeway Drive was considerably lower than reported by

Synchro, presumably due to the permissive left-turns distorting the results because drivers in the field are more aggressive. However, the SimTraffic animation was consistent with conditions observed in the field, presenting frequent long queues which would occasionally dissipate.

Therefore, based on the queue/delay studies, the Synchro model can be considered an adequate representation of actual traffic conditions.

3.3. Existing Roadway Capacity Analysis

3.3.1. Screenline Analysis (Do-Nothing)

The purpose of a screenline analysis is to assess the total east-west traffic demand and total east-west road capacity available considering other parallel roads in the area, thereby, identifying the capacity deficiency.

For the purpose of the analysis, the Burnhamthorpe Road corridor was divided into five sections: east and west of Ninth Line, east of Colonial Drive, and east and west of Winston Churchill Boulevard.

Figure 8 illustrates how the study area was broken down for the preliminary assessment as well as the approximate location of the selected screenlines.

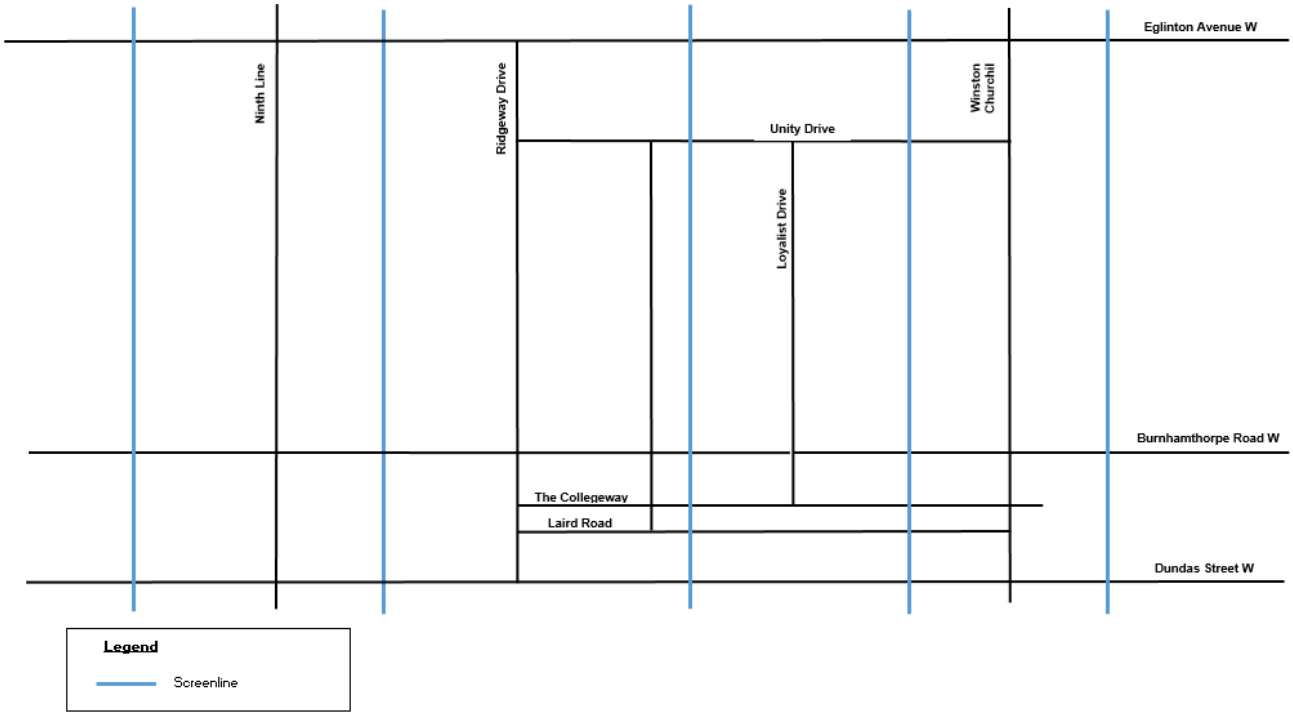


Figure 8: Screenline Locations

To conduct the screenline analysis of the existing and future Burnhamthorpe Road traffic operations and needs under the Do-Nothing scenario (meaning no improvements to the existing Burnhamthorpe Road including intersections within the project limits), the following information was utilized:

- The forecasted future volume for Burnhamthorpe Road and the surrounding roadway network for the 2011 (base), 2021, 2031 and 2041 horizon years (AM and PM)[10];
- The per hour per lane capacities for Arterial, Major Collector and Minor Collector roads under the jurisdiction of the City of Mississauga to estimate the capacity of each road segment; and
- The performance measure for each of the roadway segments in the screenline analysis was the v/c ratio.

The results of the screenline analysis for the base year of 2011 and the horizon years of 2021, 2031 and 2041 (based on EMME results) are shown in **Table 12** to **Table 15**, respectively.

The main findings of the screenline analysis under the Do-Nothing scenario can be summarized as follows:

- Under the base year of 2011, total traffic conditions at Screenline No. 1 (west of Ninth Line) are over capacity with a v/c ratio over 0.85.
- Under the 2021 scenario, total traffic conditions at Screenline No. 1 (west of Ninth Line) remains over capacity. Under this scenario total traffic conditions at Screenline No. 2 (west of Ridgeway Drive) are also over capacity.
- Under the 2031 and 2041 scenarios total traffic conditions at Screenline No. 1 and Screenline No. 2 remains over capacity.

3.3.2. Screenline Analysis (With Widening)

To conduct the screenline analysis of the existing and future Burnhamthorpe Road traffic operations and needs under the With Widening scenario (meaning proposed and/or approved improvements to the entire roadway network within the project limits), the following information was utilized:

- The forecasted future volume for Burnhamthorpe Road and the surrounding roadway network for the 2021, 2031 and 2041 horizon years (AM and PM)[11] under the with widening conditions;
- The per hour per lane capacities for Arterial, Major Collector and Minor Collector roads under the jurisdiction of the City of Mississauga to estimate the capacity of each road segment; and
- The performance measure for each of the roadway segments in the screenline analysis was the v/c ratio.

The results of the screenline analysis under the With Widening scenario for the horizon years of 2021, 2031 and 2041 (based on EMME results) are shown in **Table 16** to **Table 18** respectively.

The main findings of the screenline analysis can be summarized as follow:

- Under the 2021 scenario, total traffic conditions at Screenline No. 1 (west of Ninth Line) remains over capacity. Under this scenario total traffic conditions at Screenline No. 2 (west of Ridgeway Drive) are also over capacity during the PM peak hour (westbound)
- Under the 2031 and 2041 scenarios total traffic conditions at Screenline No. 1 and Screenline No. 2 remains over capacity along the main direction of traffic.

[10] From the City's current travel demand forecasting EMME model
[11] From the City's current travel demand forecasting EMME model

Table 12: Screenline Analysis – 2011 Without Widening

Screenline	Direction of Traffic	Traffic Volume - AM (V)	Traffic Volume - PM (V)	Total Capacity (C)	Volume to Capacity Ratio - AM (V/C)	Volume to Capacity Ratio - PM (V/C)
1	Westbound	1805	3844	3600	0.5	**1.07**
	Eastbound	3380	2438	3600	**0.94**	0.68
2	Westbound	1362	3646	4500	0.3	0.81
	Eastbound	3454	2288	4500	0.77	0.51
3	Westbound	1358	3290	5400	0.25	0.61
	Eastbound	3393	2189	5400	0.63	0.41
4	Westbound	1371	3504	6300	0.22	0.56
	Eastbound	3650	2170	6300	0.58	0.34
5	Westbound	1163	3619	6300	0.18	0.50
	Eastbound	3105	1853	6300	0.49	0.29

Table 13: Screenline Analysis – 2021 Without Widening

Screenline	Direction of Traffic	Traffic Volume - AM (V)	Traffic Volume - PM (V)	Total Capacity (C)	Volume to Capacity Ratio - AM (V/C)	Volume to Capacity Ratio - PM (V/C)
1	Westbound	2771	5834	3600	0.77	**1.62**
	Eastbound	4937	3891	3600	**1.37**	**1.08**
2	Westbound	1796	5147	4500	0.40	**1.14**
	Eastbound	4982	3655	4500	**1.11**	0.81
3	Westbound	1718	4173	5400	0.32	0.77
	Eastbound	3738	3155	5400	0.69	0.58
4	Westbound	1786	4380	6300	0.28	0.70
	Eastbound	3891	3242	6300	0.62	0.51
5	Westbound	1496	3667	6300	0.24	0.58
	Eastbound	3340	2524	6300	0.53	0.40

Table 14: Screenline Analysis – 2031 Without Widening

Screenline	Direction of Traffic	Traffic Volume - AM (V)	Traffic Volume - PM (V)	Total Capacity (C)	Volume to Capacity Ratio - AM (V/C)	Volume to Capacity Ratio - PM (V/C)
1	Westbound	2968	5767	3600	0.82	**1.60**
	Eastbound	5041	4229	3600	**1.4**	**1.17**
2	Westbound	2273	5592	4500	0.51	**1.24**
	Eastbound	5338	4085	4500	**1.19**	**0.91**
3	Westbound	2082	4392	5400	0.39	0.81
	Eastbound	4294	3460	5400	0.80	0.64
4	Westbound	2175	4627	6300	0.35	0.73
	Eastbound	4486	3585	6300	0.71	0.57
5	Westbound	1820	4057	6300	0.29	0.64
	Eastbound	3608	2953	6300	0.57	0.47

Table 15: Screenline Analysis – 2041 Without Widening

Screenline	Direction of Traffic	Traffic Volume - AM (V)	Traffic Volume - PM (V)	Total Capacity (C)	Volume to Capacity Ratio - AM (V/C)	Volume to Capacity Ratio - PM (V/C)
1	Westbound	2921	6188	3600	0.81	**1.72**
	Eastbound	5705	4679	3600	**1.58**	**1.3**
2	Westbound	2831	6420	4500	0.63	**1.43**
	Eastbound	5490	3941	4500	**1.22**	**0.88**
3	Westbound	1939	4386	5400	0.36	0.81
	Eastbound	4381	3593	5400	0.81	0.67
4	Westbound	2109	4684	6300	0.33	0.74
	Eastbound	4648	3795	6300	0.74	0.60
5	Westbound	1969	4889	6300	0.31	0.78
	Eastbound	4008	3559	6300	0.64	0.56

Table 16: Screenline Analysis – 2021 With Widening

Screenline	Direction of Traffic	Traffic Volume - AM (V)	Traffic Volume - PM (V)	Total Capacity (C)	Volume to Capacity Ratio - AM (V/C)	Volume to Capacity Ratio - PM (V/C)
1	Westbound	2762	5995	5400	0.51	**1.11**
	Eastbound	5079	3976	5400	**0.94**	0.74
2	Westbound	1919	5579	6300	0.30	**0.89**
	Eastbound	5245	3855	6300	0.83	0.61
3	Westbound	1933	4669	6300	0.31	0.74
	Eastbound	4439	3315	6300	0.70	0.53
4	Westbound	1945	4675	6300	0.31	0.74
	Eastbound	4513	3278	6300	0.72	0.52
5	Westbound	1447	3846	6300	0.23	0.61
	Eastbound	3714	2605	6300	0.5	0.41

Table 17: Screenline Analysis – 2031 With Widening

Screenline	Direction of Traffic	Traffic Volume - AM (V)	Traffic Volume - PM (V)	Total Capacity (C)	Volume to Capacity Ratio - AM (V/C)	Volume to Capacity Ratio - PM (V/C)
1	Westbound	2921	5929	5400	0.54	**1.10**
	Eastbound	5118	4213	5400	**0.95**	0.78
2	Westbound	2404	6127	6300	0.38	**0.97**
	Eastbound	3502	4366	6300	0.56	0.69
3	Westbound	2275	4850	6300	0.36	0.77
	Eastbound	4665	3814	6300	0.74	0.61
4	Westbound	2284	4794	6300	0.36	0.76
	Eastbound	4766	3762	6300	0.76	0.60
5	Westbound	1896	4400	6300	0.30	0.70
	Eastbound	3766	3096	6300	0.60	0.49

Table 18: Screenline Analysis – 2041 With Widening

Screenline	Direction of Traffic	Traffic Volume - AM (V)	Traffic Volume - PM (V)	Total Capacity (C)	Volume to Capacity Ratio - AM (V/C)	Volume to Capacity Ratio - PM (V/C)
1	Westbound	2900	6303	5400	0.54	**1.17**
	Eastbound	5474	4739	5400	**1.06**	**0.88**
2	Westbound	2904	6919	6300	0.46	**1.1**
	Eastbound	5779	4186	6300	**0.92**	0.66
3	Westbound	2012	4927	6300	0.32	0.78
	Eastbound	4748	3876	6300	0.75	0.62
4	Westbound	2067	4910	6300	0.33	0.78
	Eastbound	4881	3888	6300	0.77	0.62
5	Westbound	2001	4841	6300	0.32	0.77
	Eastbound	3994	3602	6300	0.63	0.57

3.3.3. Traffic Link Volume to Capacity Assessment

Link analysis was carried out to assess capacity needs (existing and future) considering only Burnhamthorpe Road capacity and corresponding traffic demand. With respect of the area under study, a comparison of the 2017 balanced traffic volume and EMME based interpolated traffic volume for 2017[12] revealed variations in traffic volumes along Burnhamthorpe Road as can be seen in **Table 19** for the AM and PM peak periods.

Since this variation can be considered as significant, in order to consider the observed variation on traffic volumes as part of the link v/c assessment as well as the projection of future scenarios, the following approach was adopted to adjust the traffic volumes for all horizon years:

1. The difference between the 2021 horizon year traffic (EMME Outputs) and the interpolated 2017 was added to the existing 2017 traffic (balanced) and used as the revised 2021 horizon year traffic.
2. An annualized growth percentage was calculated and used to estimate the traffic volumes following an iterative process to estimate the revised 2031 and 2041 horizon years.
3. The process was completed for the AM and PM peak hours for the “with widening” scenario.
4. The process was also completed for the “without widening” scenario for the 2021 horizon year only.

[12] Estimated using an annualized growth factor based on the projected growth between the base year 2011 and 2021 from EMME.

Table 19: Comparison between EMME Output and projected traffic volumes

Burnhamthorpe Road (without widening)		Traffic Volume 2017 Balanced (AM)	Traffic Volume 2017 Balanced (PM)	Traffic Volume 2017 Interpolated EMME (AM)	Traffic Volume 2017 Interpolated EMME (PM)	Variation between observed and EMME	Variation between observed and EMME
East of Ninth Line	Westbound	428	894	622	1427	1.45	1.59
	Eastbound	834	726	1318	954	1.58	1.31
East of Ridgeway Drive	Westbound	735	738	478	811	0.65	1.09
	Eastbound	655	434	767	651	1.17	1.5
East of Colonial Drive	Westbound	517	793	720	1001	1.39	1.26
	Eastbound	633	627	955	892	1.50	1.42
East of Loyalist Drive	Westbound	581	888	490	900	0.84	1.01
	Eastbound	1005	556	914	621	0.90	1.11

A summary of the iterative calculation process is presented in the following tables for the AM and PM peak hours for both the “with widening” scenario for all horizon years and the “without widening“ scenario for the 2021 horizon year.

Table 20: AM Peak Hour Traffic Projections (with widening)

		9TH LINE		RIDGEWAY DR	COLONIAL DR	LOYALIST DR	WINSTON C.
2011 EMME	**WB**	410	485	330	529	343	224
	EB	620	780	391	572	648	540
2021 EMME	**WB**	841	714	576	848	588	390
	EB	1414	1677	1017	1211	1091	598
ANNUALIZED GROWTH	**WB**	10.5%	4.7%	7.5%	6.0%	7.1%	7.4%
	EB	12.8%	11.5%	16.0%	11.2%	6.8%	1.1%
2017 (BALANCED)	**WB**	335	428	735	517	581	488
	EB	791	834	655	633	1005	968
2017 INTERPOLATED (EMME)	**WB**	669	622	478	720	490	324
	EB	1096	1318	767	955	914	575
2021 PROJECTED	**WB**	507	520	833	645	679	554
	EB	1,109	1,193	905	889	1,182	991
2031 PROJECTED	**WB**	600	691	949	715	768	712
	EB	1,105	1,297	869	875	1,167	1,174
2041 PROJECTED	**WB**	580	552	865	673	754	694
	EB	1218	1343	905	886	1245	1154

Table 21: AM Peak Hour Traffic Projections (without widening)

		9TH LINE		RIDGEWAY DR	COLONIAL DR	LOYALIST DR	WINSTON C.
2011 EMME	**WB**	410	485	330	529	343	224
	EB	620	780	391	572	648	540
2021 EMME	**WB**	844	556	434	603	502	316
	EB	1287	1169	722	730	875	509
ANNUALIZED	**WB**	10.6%	1.5%	3.2%	1.4%	4.6%	4.1%
GROWTH	**EB**	10.8%	5.0%	8.5%	2.8%	3.5%	-0.6%
2017 (BALANCED)	**WB**	335	428	735	517	581	488
	EB	791	834	655	633	1005	968
2017	**WB**	670	528	392	573	438	279
INTERPOLATED EMME	**EB**	1020	1013	590	667	784	521
2021 PROJECTED	WB	509	456	777	547	645	525
	EB	1,058	990	787	696	1,096	956

Table 22: PM Peak Hour Traffic Projections (with widening)

		9TH LINE		RIDGEWAY DR	COLONIAL DR	LOYALIST DR	WINSTON C.
2011 EMME	**WB**	726	860	412	601	626	532
	EB	500	596	330	548	311	236
2021 EMME	**WB**	841	1805	1077	1267	1083	777
	EB	1414	1192	865	1121	828	497
ANNUALIZED	**WB**	1.6%	11.0%	16.1%	11.1%	7.3%	4.6%
GROWTH	**EB**	18.3%	10.0%	16.2%	10.5%	16.6%	11.1%
2017 (BALANCED)	**WB**	647	894	738	793	888	884
	EB	471	726	434	627	702	487
2017 INTERPOLATED EMME	**WB**	795	1427	811	1001	900	679
	EB	1048	954	651	892	621	393
2021 PROJECTED	WB	693	1,272	1,004	1,059	1,071	982
	EB	837	964	648	856	909	591
2031 PROJECTED	**WB**	1,395	1,379	1,017	1,067	1,023	1,134
	EB	790	1,084	701	907	970	783
2041 PROJECTED	**WB**	1496	1411	1062	1078	1109	1191
	EB	819	1011	688	896	1022	850

Table 23: PM Peak Hour Traffic Projections (without widening)

		9TH LINE		RIDGEWAY DR	COLONIAL DR	LOYALIST DR	WINSTON C.
2011 EMME	**WB**	726	860	412	601	626	532
	EB	500	596	330	548	311	236
2021 EMME	**WB**	844	1290	661	711	868	316
	EB	1287	895	604	666	691	509
ANNUALIZED	**WB**	1.6%	5.0%	6.0%	1.8%	3.9%	-4.1%
GROWTH	**EB**	15.7%	5.0%	8.3%	2.2%	12.2%	11.6%
2017 (BALANCED)	**WB**	647	894	738	793	888	884
	EB	471	726	434	627	702	487
2017	**WB**	797	1118	561	667	771	402
INTERPOLATED EMME	**EB**	972	775	494	619	539	400
2021 PROJECTED	WB	694	1,066	838	837	985	798
	EB	786	846	544	674	854	596

4. Future Traffic Conditions

Projected traffic volumes for all horizon years along the corridor under study were used to estimate turning movements at intersections using the Fratar growth factor model. The results of the iterative calculation process for the horizon years of 2021, 2031 and 2041 are presented as part of **Appendix E**.

In a similar way that for the analysis of existing conditions, intersection capacity analysis was undertaken using procedures described in the Highway Capacity Manual (HCM). The analysis primarily focuses on performance measures such as level-of-service (LOS), volume to capacity (v/c) ratio, and 95th percentile queues. The results for each of the horizon years are described in the following sections.

4.1. Future Intersection Operations With Widening

This section provides the results of widening Burnhamthorpe Road to a 4-lane road cross section with no additional improvements to intersection operations for the horizon years 2021, 2031, and 2041, and based on the following considerations:

- Burnhamthorpe Road & Ninth Line will be converted to a 2-lane roundabout by 2021 (construction is scheduled to begin summer 2018). ARCADY results were reported for the intersection operations at Burnhamthorpe Road & Ninth Line for all future scenarios.
- Burnhamthorpe Road & Winston Churchill Boulevard has an existing 4-lane road cross section and the proposed widening is not expected to affect its existing intersection operations. However, Burnhamthorpe Road & Winston Churchill Boulevard is planned for widening to a 6-lane road cross section by 2041.

4.1.1. 2021 Future Intersection Operations

Signal cycle, phasing, and splits were optimized to accommodate the future volumes using a maximum cycle length of 160 seconds. The results of the traffic operational analysis conducted for the 2021 horizon year are presented in **Table 24**.

Detailed Synchro/SimTraffic Reports can be found in **Appendix F**. Main findings are summarized below:

- No turning movements at the intersections of Burnhamthorpe Road & Ninth Line, Burnhamthorpe Road & Ridgeway Drive, Burnhamthorpe Road & Colonial Drive and Burnhamthorpe Road & Loyalist Drive present operational issues, with all individual movements presenting a v/c ratio of 0.94 or lower and a LOS of E or better.
- The northbound through/right-turn at Burnhamthorpe Road & Winston Churchill Boulevard is expected to operate above capacity with a v/c of 1.03 in the PM peak hour.
- Several movements at Burnhamthorpe Road & Winston Churchill Boulevard are also expected to operate at LOS F.
- A SimTraffic simulation shows that, during the PM peak hour, westbound queues at Burnhamthorpe Road & Winston Churchill Boulevard may extend beyond the signal at Tamarack Gate.
- 95th percentile queues are expected to exceed available storage for multiple turning movements at all intersections.

Table 24: 2021 Intersection Operations (With Widening, No Additional Improvements)

Direction / Movement		Storage (m)	v/c	LOS	95^{tho}%^{ile} Queue (m)
Burnhamthorpe Road & Ninth Line					
EB	**T**	-	0.67 (0.53)	A (A)	15 (13)
WB	**T**	-	0.27 (0.82)	A (B)	7 (96)
NB	**T**	-	0.37 (0.63)	A (A)	7 (15)
SB	**T**	-	0.45 (0.46)	A (A)	7 (7)
Burnhamthorpe Road & Ridgeway Drive					
EB	**L**	47	0.84 (0.72)	E (C)	49 (110)
	T/TR	-	0.81 (0.47)	D (C)	109 (105)
WB	**L**	58	0.93 (0.64)	E (E)	92 (61)
	T/TR	-	0.41 (0.76)	C (D)	67 (136)
NB	**L**	37	0.57 (0.94)	C (E)	35 (130)
	T/TR	-	0.48 (0.73)	C (C)	59 (114)
SB	**L**	56	0.69 (0.44)	D (C)	60 (31)
	T/TR	-	0.91 (0.74)	D (D)	125 (86)
Overall		**-**	**0.82 (0.78)**	**D (D)**	**-**
Burnhamthorpe Road & Colonial Drive					
EB	**L**	61	0.11 (0.06)	B (A)	22 (11)
	T/TR	-	0.36 (0.24)	B (A)	98 (27)
WB	**L**	43	0.06 (0.26)	A (A)	12 (29)
	T/TR	-	0.26 (0.36)	B (A)	72 (47)
NB	**L**	30	0.84 (0.17)	E (D)	49 (19)
	T/R	-	0.14 (0.34)	D (D)	51 (39)
SB	**L**	28	0.30 (0.59)	D (D)	27 (24)
	T/R	-	0.34 (0.23)	D (D)	45 (27)
Overall		**-**	**0.45 (0.39)**	**C (A)**	**-**
Burnhamthorpe Road & Loyalist Drive					
EB	**L**	39	0.02 (0.21)	A (B)	7 (25)
	T/TR	30	0.40 (0.34)	B (A)	67 (70)
WB	**L**	35	0.11 (0.14)	A (A)	23 (16)
	T/TR	-	0.30 (0.43)	A (A)	56 (77)
NB	**L**	14	0.14 (0.14)	D (D)	19 (19)
	T/R	-	0.11 (0.19)	D (D)	30 (34)
SB	**L**	20	0.69 (0.48)	E (D)	36 (28)
	T/R	-	0.09 (0.15)	D (D)	31 (31)
Overall		**-**	**0.45 (0.43)**	**B (B)**	**-**

Direction / Movement		Storage (m)	v/c	LOS	95th%ile Queue (m)
Burnhamthorpe Road & Winston Churchill Boulevard					
EB	L	30	0.76 (0.98)	D (F)	114 (137)
	T/TR	-	0.94 (0.67)	E (D)	157 (228)
WB	L	40	0.73 (0.44)	E (D)	36 (187)
	T/T	-	0.59 (0.99)	E (F)	88 (515)[13]
	R	15	0.03 (0.08)	D (D)	26 (31)
NB	L	60	0.83 (0.92)	E (E)	117 (187)
	T/TR	-	0.93 (1.03)	E (E)	192 (483)
SB	L	64	0.91 (0.65)	F (D)	120 (78)
	T/T	-	0.83 (0.80)	D (D)	181 (148)
	R	37	0.10 (0.10)	C (C)	90 (91)
Overall		**-**	**0.91 (0.99)**	**E (E)**	**-**

Legend: AM (PM)

After widening and optimizing signal timing, the northbound through/right-turn movement at the intersection of Burnhamthorpe Road & Winston Churchill Boulevard is expected to operate above capacity in the PM peak hour and several movements are still expected to operate at LOS F in the AM and PM peak hours.

In order to address these issues, consideration may be given to accelerating the widening of Winston Churchill Boulevard to 2021, which will increase the capacity in the northbound and southbound directions.

Additionally, it is recommended to consider accelerating the inclusion of an additional eastbound left-turn lane at this intersection which is detailed further in Section 4.2.2. It is expected that this intersection will not present any operational issues afterwards but the major benefits from these two improvements will not be observed until horizon years 2031 and 2041.

4.1.2. 2031 Future Intersection Operations

Signal cycle, phasing, and splits were optimized to accommodate the future volumes using a maximum cycle length of 160 seconds. The results of the traffic operational analysis conducted for the 2031 horizon year are presented in **Table 25**.

Detailed Synchro/SimTraffic Reports can be found in **Appendix F**. Main findings are summarized below:

- No turning movements at the intersections of Burnhamthorpe Road & Colonial Drive and Burnhamthorpe Road & Loyalist Drive present operational issues, with all individual movements presenting a v/c ratio of 0.68 or lower and a LOS of E or better.

[13] Queue may extend beyond the signal at Tamarack Gate

- The following movements are expected to operate at or above capacity:
    - Burnhamthorpe Road & Ninth Line:
        - Westbound through, with a v/c ratio of 1.00 in the PM peak hour.
    - Burnhamthorpe Road & Winston Churchill Boulevard:
        - Eastbound left-turn, with a v/c ratio of 1.09 in the PM peak hour;
        - Eastbound through/right-turn with a v/c ratio of 1.02 in the AM peak hour;
        - Westbound through, with a v/c ratio of 1.08 in the PM peak hour;
        - Northbound through/right-turn with a v/c ratio of 1.05 in the AM peak hour, and 1.16 in the PM peak hour; and
        - Southbound left-turn with a v/c ratio of 1.00 in the AM peak hour.
- Several movements at Burnhamthorpe Road & Ninth Line, Burnhamthorpe Road & Ridgeway Drive and Burnhamthorpe Road & Winston Churchill Boulevard are also expected to operate at LOS F.
- During the PM peak hour, westbound queues at Burnhamthorpe Road & Ninth Line may extend beyond the signal at Ridgeway Drive.
- A SimTraffic simulation shows that, during the PM peak hour, westbound queues at Burnhamthorpe Road & Winston Churchill Boulevard may extend beyond the signal at Glen Erin Drive.
- 95th percentile queues are expected to exceed available storage for multiple turning movements at all intersections.

Table 25: 2031 Intersection Operations (With Widening, No Additional Improvements)

Direction / Movement		Storage (m)	v/c	LOS	95th%^{ile} Queue (m)
Burnhamthorpe Road & Ninth Line					
EB	**T**	-	0.75 (0.54)	A (A)	37 (13)
WB	**T**	-	0.38 (1.00)	A (F)	7 (691)[14]
NB	**T**	-	0.45 (0.83)	A (B)	7 (96)
SB	**T**	-	0.54 (0.76)	A (B)	7 (44)
Burnhamthorpe Road & Ridgeway Drive					
EB	**L**	47	0.74 (0.82)	C (D)	67 (91)
	T/TR	-	0.89 (0.59)	D (C)	140 (105)
WB	**L**	58	0.91 (0.95)	F (F)	80 (100)
	T/TR	-	0.63 (0.91)	C (E)	100 (203)
NB	**L**	37	0.90 (0.98)	E (E)	84 (164)
	T/TR	-	0.50 (0.67)	C (C)	73 (281)
SB	**L**	56	0.55 (0.41)	D (C)	49 (48)
	T/TR	-	0.89 (0.88)	D (D)	114 (125)
Overall		**-**	**0.87 (0.88)**	**D (D)**	**-**

[14] Queue may extend beyond the signal at Ridgeway Drive

Direction / Movement		Storage (m)	v/c	LOS	95th%^{ile} Queue (m)
Burnhamthorpe Road & Colonial Drive					
EB	L	61	0.12 (0.08)	A (A)	15 (10)
	T/TR	-	0.38 (0.28)	A (A)	52 (26)
WB	L	43	0.09 (0.34)	A (A)	12 (31)
	T/TR	-	0.32 (0.40)	A (A)	54 (62)
NB	L	30	0.68 (0.24)	D (D)	52 (32)
	T/R	-	0.12 (0.52)	D (D)	58 (60)
SB	L	28	0.38 (0.44)	D (D)	34 (29)
	T/R	-	0.53 (0.25)	D (D)	58 (36)
Overall		**-**	**0.47 (0.42)**	**B (B)**	**-**
Burnhamthorpe Road & Loyalist Drive					
EB	L	39	0.01 (0.23)	B (A)	6 (27)
	T/TR	30	0.41 (0.35)	B (A)	77 (53)
WB	L	35	0.14 (0.14)	A (A)	26 (24)
	T/TR	-	0.34 (0.40)	A (A)	79 (78)
NB	L	14	0.33 (0.23)	E (D)	22 (19)
	T/R	-	0.19 (0.31)	E (D)	40 (41)
SB	L	20	0.59 (0.61)	D (E)	36 (31)
	T/R	-	0.08 (0.20)	D (D)	29 (36)
Overall		**-**	**0.45 (0.42)**	**B (B)**	**-**
Burnhamthorpe Road & Winston Churchill Boulevard					
EB	L	30	0.86 (1.09)	E (F)	147 (145)
	T/TR	-	1.02 (0.85)	F (E)	313 (353)
WB	L	40	0.76 (0.72)	E (D)	79 (188)
	T/T	-	0.76 (1.08)	E (F)	118 (1399)[15]
	R	15	0.06 (0.31)	D (D)	31 (35)
NB	L	60	0.73 (0.79)	D (D)	181 (198)
	T/TR	-	1.05 (1.16)	F (F)	441 (787)
SB	L	64	1.00 (0.99)	F (F)	115 (111)
	T/T	-	0.85 (0.73)	D (D)	510 (304)
	R	37	0.10 (0.07)	C (C)	91 (96)
Overall		**-**	**1.00 (1.10)**	**E (F)**	**-**

Legend: AM (PM)

[15] Queue may extend beyond the signal at Glen Erin Drive

4.1.3. 2041 Future Intersection Operations

Signal cycle, phasing, and splits were optimized to accommodate the future volumes using a maximum cycle length of 160 seconds. The results of the traffic operational analysis conduced for the 2041 horizon year are presented in **Table 26**. Detailed Synchro/SimTraffic Reports can be found in **Appendix F**. Main findings are summarized below:

- No turning movements at the intersections of Burnhamthorpe Road & Colonial Drive and Burnhamthorpe Road & Loyalist Drive present operational issues, with all individual movements presenting a v/c ratio of 0.64 or lower and a LOS of E or better.
- The following movements are expected to operate at or above capacity:
    - Burnhamthorpe Road & Ninth Line:
        - Westbound through, with a v/c ratio of 1.19 in the PM peak hour.
    - Burnhamthorpe Road & Winston Churchill Boulevard:
        - Eastbound left-turn, with a v/c ratio of 1.01 in the PM peak hour;
        - Westbound through, with a v/c ratio of 1.02 in the PM peak hour; and
        - Northbound through/right-turn with a v/c ratio of 1.08 in the PM peak hour.
- Several movements at Burnhamthorpe Road & Ninth Line, Burnhamthorpe Road & Ridgeway Drive and Burnhamthorpe Road & Winston Churchill Boulevard are also expected to operate at LOS F.
- During the PM peak hour, westbound queues at Burnhamthorpe Road & Ninth Line may extend beyond the signal at Colonial Drive.
- A SimTraffic simulation shows that, during the PM peak hour, southbound queues at Burnhamthorpe Road & Ridgeway Drive may extend beyond the signal at Drummond Road/Sladeview Crescent.
- A SimTraffic simulation shows that, during the PM peak hour, westbound queues at Burnhamthorpe Road & Winston Churchill Boulevard may extend beyond the signal at South Common Mall Entrance.
- 95th percentile queues are expected to exceed available storage for multiple turning movements at all intersections.

Table 26: 2041 Intersection Operations (With Widening, No Additional Improvements)

Direction / Movement		Storage (m)	v/c	LOS	95^{tho}%^{ile} Queue (m)
Burnhamthorpe Road & Ninth Line					
EB	**T**	-	0.87 (0.63)	C (A)	154 (7)
WB	**T**	-	0.33 (1.19)	A (F)	7 (1411)[16]
NB	**T**	-	0.54 (0.96)	A (E)	13 (515)
SB	**T**	-	0.59 (0.93)	A (D)	7 (323)
Burnhamthorpe Road & Ridgeway Drive					
EB	**L**	47	0.63 (0.85)	C (E)	63 (150)
	T/TR	-	0.93 (0.81)	E (E)	157 (163)
WB	**L**	58	0.88 (0.72)	F (E)	79 (116)
	T/TR	-	0.50 (0.97)	C (E)	89 (190)
NB	**L**	37	0.88 (0.94)	F (E)	49 (159)
	T/TR	-	0.60 (0.66)	D (C)	86 (410)
SB	**L**	56	0.73 (0.47)	E (C)	67 (152)
	T/TR	-	0.91 (0.97)	E (E)	127 (357)[17]
Overall		**-**	**0.89 (0.93)**	**D (E)**	**-**
Burnhamthorpe Road & Colonial Drive					
EB	**L**	61	0.10 (0.09)	B (A)	16 (12)
	T/TR	-	0.41 (0.28)	B (A)	49 (26)
WB	**L**	43	0.14 (0.35)	B (A)	12 (29)
	T/TR	-	0.31 (0.40)	A (A)	62 (66)
NB	**L**	30	0.62 (0.27)	D (E)	56 (37)
	T/R	-	0.15 (0.64)	D (E)	71 (73)
SB	**L**	28	0.42 (0.40)	E (D)	41 (37)
	T/R	-	0.59 (0.34)	E (D)	75 (54)
Overall		**-**	**0.48 (0.44)**	**C (B)**	**-**

[16] Queue may extend beyond the signal at Colonial Drive
[17] Queue may extend beyond the signal at Drummond Road/Sladeview Crescent

Direction / Movement		Storage (m)	v/c	LOS	95th%^{ile} Queue (m)
Burnhamthorpe Road & Loyalist Drive					
EB	L	39	0.01 (0.25)	B (A)	4 (23)
	T/TR	30	0.40 (0.38)	B (A)	81 (58)
WB	L	35	0.17 (0.23)	A (A)	19 (28)
	T/TR	-	0.33 (0.47)	A (A)	70 (80)
NB	L	14	0.26 (0.20)	E (E)	20 (23)
	T/R	-	0.21 (0.49)	E (E)	48 (56)
SB	L	20	0.55 (0.50)	D (D)	41 (36)
	T/R	-	0.06 (0.15)	D (D)	37 (40)
Overall		**-**	**0.40 (0.47)**	**B (B)**	**-**
Burnhamthorpe Road & Winston Churchill Boulevard					
EB	L	30	0.94 (1.01)	E (F)	133 (137)
	T/TR	-	0.89 (0.69)	E (D)	177 (217)
WB	L	40	0.63 (0.54)	D (D)	57 (184)
	T/T	-	0.78 (1.02)	E (F)	133 (1546)[18]
	R	15	0.07 (0.37)	D (D)	32 (35)
NB	L	60	0.63 (0.76)	D (D)	50 (197)
	T//T/TR	-	0.88 (1.08)	E (F)	135 (451)
SB	L	64	0.95 (0.97)	F (F)	124 (130)
	T/T/T	-	0.72 (0.67)	D (D)	224 (294)
	R	37	0.14 (0.12)	C (C)	85 (70)
Overall		**-**	**0.90 (1.03)**	**D (E)**	**-**

Legend: AM (PM)

[18] Queue may extend beyond the signal at South Common Mall Entrance

4.2. Future Intersection Operations with Widening and Additional Improvements

The intersections of Burnhamthorpe Road & Colonial Drive and Burnhamthorpe Road & Loyalist Drive are expected to operate without major issues after widening (Section 4.1). Although there are operational issues at the intersection of Burnhamthorpe Road & Ninth Line, it is expected that Halton Region will conduct further studies to address capacity restrictions at this intersection's planned roundabout.

However, additional improvements were explored for the intersections of Burnhamthorpe Road & Ridgeway Drive and Burnhamthorpe Road & Winston Churchill Boulevard to address expected operational issues which were still reported after widening for horizon years 2031 and 2041.

4.2.1. Burnhamthorpe Road & Ridgeway Drive - 2031

The westbound left-turn at the intersection of Burnhamthorpe Road & Ridgeway Drive is expected to operate at LOS F in the AM and PM peak hours. Additionally, some queues are expected to exceed available storage. In order to address these issues, an additional left-turn lane was included in the northbound direction of this intersection (other alternatives were not able to address the operational issues). The resulting traffic operations are summarized in **Table 27**. Detailed Synchro/SimTraffic Reports can be found in **Appendix G**.

With the additional lane and signal timing adjustments, the westbound left-turn improves from LOS F to LOS E and LOS D in the AM and PM peak hours, respectively. However, some queues are still expected to exceed available storage. Recommended storage lengths are provided in Section 4.3.

Table 27: 2031 Intersection Operations (With Widening, Dual LT on NB Ridgeway Drive)

Direction / Movement		Storage (m)	v/c	LOS	95th%^{ile} Queue (m)
Burnhamthorpe Road & Ridgeway Drive					
EB	**L**	47	0.70 (0.67)	C (C)	61 (64)
	T/TR	-	0.85 (0.46)	D (C)	139 (93)
WB	**L**	58	0.89 (0.57)	E (D)	81 (45)
	T/TR	-	0.59 (0.65)	C (C)	94 (124)
NB	**L/L**	37	0.46 (0.85)	C (D)	16 (67)
	T/TR	-	0.53 (0.88)	C (D)	75 (143)
SB	**L**	56	0.62 (0.59)	D (D)	72 (46)
	T/TR	-	0.96 (0.88)	E (D)	133 (130)
Overall		**-**	**0.85 (0.75)**	**D (D)**	**-**

Legend: AM (PM)

4.2.2. Burnhamthorpe Road & Winston Churchill Boulevard - 2031

Several movements at the intersection of Burnhamthorpe Road & Winston Churchill Boulevard are expected to operate above capacity and at LOS F in the AM and PM peak hours. Additionally, some queues are expected to exceed available storage. In order to address these issues, an additional left-turn lane was included in the eastbound direction of this intersection. The resulting traffic operations are summarized in **Table 28**.

Detailed Synchro/SimTraffic Reports can be found in **Appendix G.** With the additional lane and signal timing improvements, the following movements are expected to operate below capacity and at a LOS of E or better:

- Eastbound left-turn v/c ratio improves from 1.09 to 0.90 and from LOS F to LOS E in the PM peak hour;
- Eastbound through/right-turn v/c ratio improves from 1.02 to 0.96 and from LOS F to LOS E in the AM peak hour;
- Westbound through v/c ratio v/c ratio improves from 1.08 to 0.84 and from LOS F to LOS E in the PM peak hour; and
- Southbound left-turn improves from LOS F to LOS E in the PM peak hour.

However, some queues are still expected to exceed available storage. Recommended storage lengths are provided in Section 4.3.

Table 28: 2031 Intersection Operations (With Widening, Dual LT on EB Winston Churchill Boulevard)

Direction / Movement		Storage (m)	v/c	LOS	95th%ile Queue (m)
Burnhamthorpe Road & Winston Churchill Boulevard					
EB	**L/L**	30	0.50 (0.90)	D (E)	47 (114)
	T/TR	-	0.96 (0.75)	E (D)	216 (108)
WB	**L**	40	0.92 (0.79)	F (E)	145 (54)
	T/T	-	0.63 (0.84)	D (E)	108 (164)
	R	15	0.06 (0.29)	D (D)	31 (32)
NB	**L**	60	0.73 (0.76)	D (D)	300[19] (405)[20]
	T/TR	-	1.03 (1.23)	F (F)	586 (742)
SB	**L**	64	1.04 (0.81)	F (E)	201 (111)
	T/T	-	0.85 (0.77)	D (D)	475 (161)
	R	37	0.10 (0.09)	C (C)	108 (70)
Overall		**-**	**0.98 (1.03)**	**E (F)**	**-**

Legend: AM (PM)

Even with the additional eastbound left-turn lane at the intersection of Burnhamthorpe Road & Winston Churchill Boulevard and optimizing signal timing, several movements are still expected to operate above capacity and at LOS F in the AM and PM peak hours. In order to address these issues, consideration may be given to accelerating the widening of Winston Churchill Boulevard to

[19] Queue is misrepresented due to northbound left-turn lane being starved by high volume of northbound through vehicles. SimTraffic animation shows a maximum number of 11 vehicles which is equivalent to a queue of 88 m which will be used for storage length recommendations provided in Section 4.3.
[20] Queue is misrepresented due to northbound left-turn lane being starved by high volume of northbound through vehicles. SimTraffic animation shows a maximum number of 10 vehicles which is equivalent to a queue of 80 m which will be used for storage length recommendations provided in Section 4.3.

2031, which will increase the capacity in the northbound and southbound directions. It is expected that this intersection will not present any operational issues afterwards.

4.2.3. Burnhamthorpe Road & Ridgeway Drive – 2041

Under the projected traffic conditions (2041) and the improvements from 2031, the intersection of Burnhamthorpe Road & Ridgeway Drive is not expected to present any operational issues. However, some queues are expected to exceed available storage. Recommended storage lengths are provided in Section 4.3. The resulting traffic operations are summarized in **Table 29**. Detailed Synchro/SimTraffic Reports can be found in **Appendix G**.

Table 29: 2041 Intersection Operations (With Widening, Dual LT on NB Ridgeway Drive)

Direction / Movement		Storage (m)	v/c	LOS	95th%^{ile} Queue (m)
Burnhamthorpe Road & Ridgeway Drive					
EB	L	47	0.62 (0.74)	C (D)	63 (94)
	T/TR	-	0.99 (0.63)	E (D)	184 (128)
WB	L	58	0.82 (0.53)	E (D)	85 (100)
	T/TR	-	0.53 (0.75)	C (D)	88 (232)
NB	L/L	37	0.46 (0.92)	D (E)	25 (72)
	T/TR	-	0.59 (0.81)	D (D)	92 (129)
SB	L	56	0.69 (0.59)	E (C)	57 (47)
	T/TR	-	0.87 (0.79)	E (D)	133 (130)
Overall		**-**	**0.88 (0.79)**	**D (D)**	**-**

Legend: AM (PM)

4.2.4. Burnhamthorpe Road & Winston Churchill Boulevard - 2041

Under the projected traffic conditions (2041), the improvements from 2031, and the scheduled widening of Winston Churchill Boulevard to a 6-lane road cross section, the intersection of Burnhamthorpe Road & Winston Churchill Boulevard is not expected to present any operational issues. However, some queues are expected to exceed available storage. The resulting traffic operations are summarized in **Table 30**. Detailed Synchro/SimTraffic Reports can be found in **Appendix G.**

With the additional lanes and signal timing improvements, the following movements are expected to operate below capacity and at a LOS of E or better:

- Eastbound left-turn v/c ratio improves from 1.01 to 0.93 and from LOS F to LOS E in the PM peak hour;
- Westbound through v/c ratio improves from 1.02 to 0.92 and from LOS F to LOS E in the PM peak hour;
- Northbound through/right-turn v/c ratio improves from 1.08 to 0.98 and from LOS F to LOS E in the PM peak hour; and
- Southbound left-turn improves from LOS F to LOS E in the PM peak hour.

However, some queues are still expected to exceed available storage. Recommended storage lengths are provided in Section 4.3.

Table 30: 2041 Intersection Operations (With Widening, Dual LT on EB Winston Churchill Boulevard)

Direction / Movement		Storage (m)	v/c	LOS	95th%ile Queue (m)
Burnhamthorpe Road & Winston Churchill Boulevard					
EB	**L/L**	30	0.66 (0.93)	D (E)	82 (117)
	T/TR	-	0.89 (0.80)	E (E)	138 (113)
WB	**L**	40	0.63 (0.66)	D (D)	43 (410)[21]
	T/T	-	0.47 (0.92)	D (E)	97 (780)[22]
	R	15	0.07 (0.41)	D (D)	31 (34)
NB	**L**	60	0.64 (0.75)	D (C)	45 (60)
	T/T/TR	-	0.90 (0.98)	E (E)	161 (202)
SB	**L**	64	0.92 (0.87)	E (E)	112 (111)
	T/T/T	-	0.72 (0.56)	D (C)	123 (104)
	R	37	0.12 (0.09)	C (C)	33 (26)
Overall		**-**	**0.86 (0.93)**	**D (D)**	**-**

Legend: AM (PM)

After implementing the additional improvements at the intersection of Burnhamthorpe Road & Winston Churchill Boulevard, the westbound through movement still presents long queues that extend beyond the signal at Tamarack Gate approximately 450 m east during the PM peak hour. These queues could not be addressed by adjusting signal timing without also increasing the v/c ratio of the northbound through movement above capacity. The westbound through queue at this intersection should be monitored in order to determine whether further signal timing adjustments are necessary based on future field observations.

[21] Queue is misrepresented due to westbound left-turn lane being starved by high volume of westbound through vehicles. SimTraffic animation shows a maximum number of 13 vehicles which is equivalent to a queue of 104 m which will be used for storage length recommendations provided in Section 4.3
[22] Queue may extend beyond the signal at Tamarack Gate

4.3. Recommended Intersection Configurations

This section provides recommended intersection configurations and storage lengths for the intersections of Burnhamthorpe Road & Ridgeway Drive, Colonial Drive, Loyalist Drive, and Winston Churchill Boulevard. No recommendations are provided for the intersection of Burnhamthorpe Road & Ninth Line. Although operational issues are expected at this intersection, it is expected that Halton Region will conduct further studies to address potential roundabout capacity restrictions in the long-term.

The recommended lane configurations for the other intersections in the study area by 2021 and 2031 are detailed in **Figure 9**. No additional improvements to intersection configurations are required by 2041 because no other operational issues are expected.

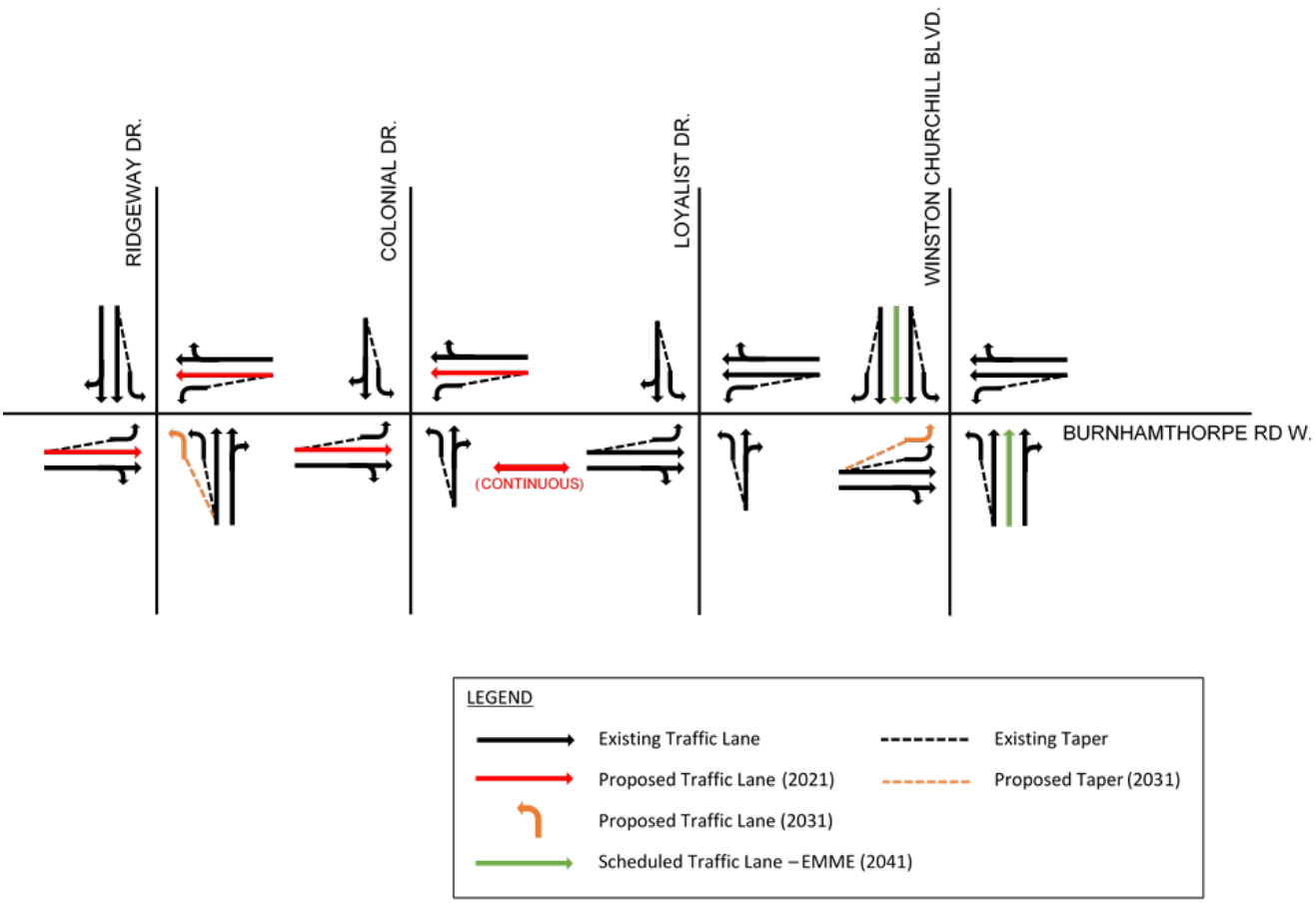


Figure 9: Recommended Intersection Configurations (2031)

As discussed in Section 4.2.2, several movements at the intersection of Burnhamthorpe Road & Winston Churchill Boulevard are still expected to operate above capacity and at LOS F in the AM and PM peak hours with the additional eastbound left-turn lane. As a result, consideration may be given to accelerating the widening of Winston Churchill Boulevard to 2031, which will increase the capacity in the northbound and southbound directions. It is expected that this intersection will not present any operational issues afterwards.

Table 31 summarizes the 95th percentile queues and recommended storage lengths for the exclusive left-turn lanes at the intersection of Burnhamthorpe Road & Ridgeway Drive.

Table 31: Recommended Storage Lengths for Ridgeway Drive Intersection (Left-turns)

Horizon Year	95th%ile Queue (m) (AM | PM)				
	EBL	WBL	NBL1	NBL2	SBL
2021	49 | 110	92 | 61	35 | 130	n/a	60 | 31
2031*	61 | 64	81 | 45	16 | 62	24 | 67	72 | 46
2041*	63 | 94	85 | 100	17 | 72	25 | 76	57 | 47
Recommended Storage Length (m)	**110**	**100**	**130 (2021)** 75 (2031)	**80**	**75**

**Dual left-turn lanes NB*

The additional northbound left-turn lane recommended by 2031 allowed the reassignment of green time which is expected to reduce the eastbound left-turn 95th percentile queue from 110 m in 2021 to 64 m in 2031.

Table 32 summarizes the 95th percentile queues and recommended storage lengths for the exclusive left-turn lanes at the intersection of Burnhamthorpe Road & Winston Churchill Boulevard.

Table 32: *Recommended Storage Lengths for Winston Churchill Boulevard Intersection (Left-turns)*

Horizon Year	95th%ile Queue (m) (AM | PM)				
	EBL1	EBL2	WBL	NBL	SBL
2021	114 | 137	n/a	36 | 187	117 | 187	120 | 78
2031*	40 | 111	47 | 114	145 | 54	88 | 80	201 | 111
2041*	80 | 112	82 | 117	43 | 104	45 | 60	112 | 111
Recommended Storage Length (m)	**140**	**120**	**190**	**190**	**205**

**Dual left-turn lanes EB*

Table 33 summarizes the 95th percentile queues and recommended storage lengths for the exclusive left-turn lanes at the intersections of Burnhamthorpe Road & Colonial Drive and Burnhamthorpe Road & Loyalist Drive.

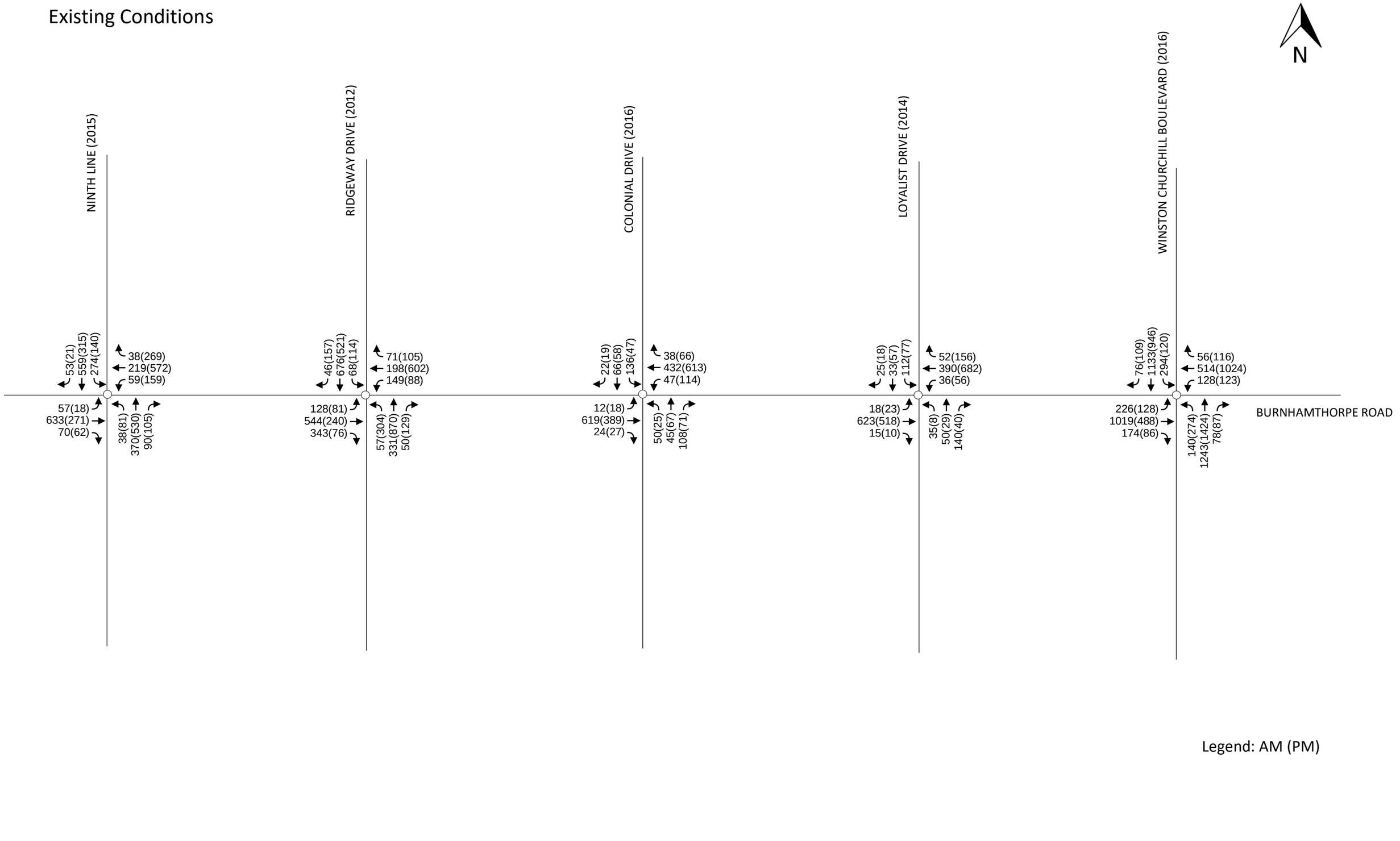
Table 33: Recommended Storage Lengths for Colonial Drive and Loyalist Drive Intersections

Intersection	Direction / Movement	Existing Storage (m)	2041 95^{tho}%^{ile} Queue (m)		Recommended Storage (m)
			AM	PM	
Burnhamthorpe & Colonial	EBL	61	16	12	20 m
	WBL	43	12	29	35 m[23]
	NBL	30	56	37	60 m
	SBL	28	41	37	45 m
Burnhamthorpe & Loyalist	EBL	39	4	23	30 m[24]
	WBL	35	19	28	30 m
	NBL	14	20	23	25 m
	SBL	20	41	36	45 m

[23] Recommended storage length is based on the 2031 PM peak hour queue of 31 m.
[24] Recommended storage length is based on the 2031 PM peak hour queue of 27 m.

APPENDIX A: EXISTING TURNING MOVEMENT COUNTS DIAGRAM

Existing Conditions



Legend: AM (PM)

APPENDIX B: TURNING MOVEMENT COUNTS

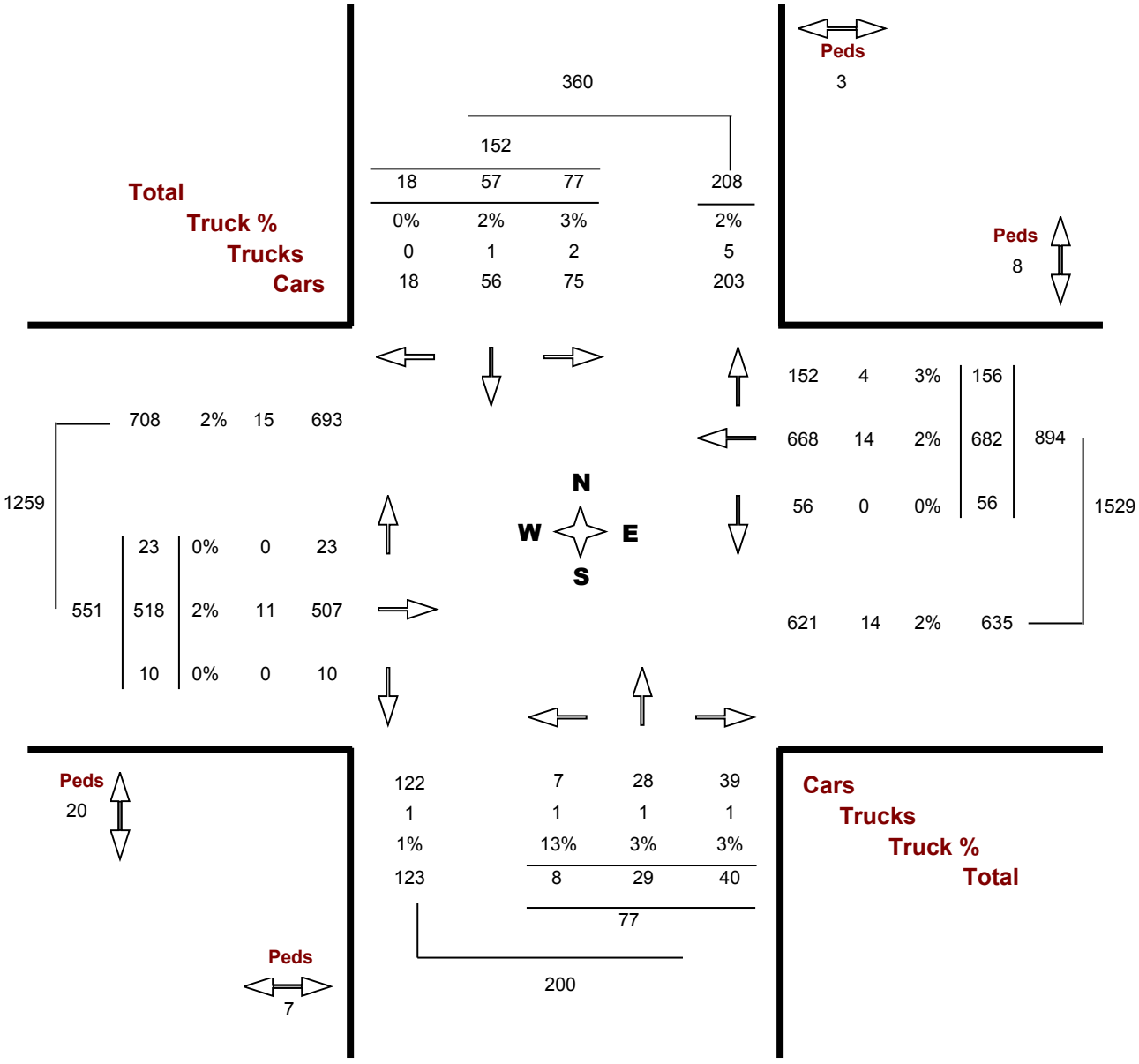
Turning Movements Report - PM Period

Location..... BURNHAMTHORPE RD W @ LOYALIST DR

Municipality..... Mississauga **GeoID.....** 345668

Count Date..... Tuesday, 22 April, 2014 **Peak Hour.....** 05:00 PM — 06:00 PM

Road 1 BURNHAMTHORPE RD W **Road 2** LOYALIST DR



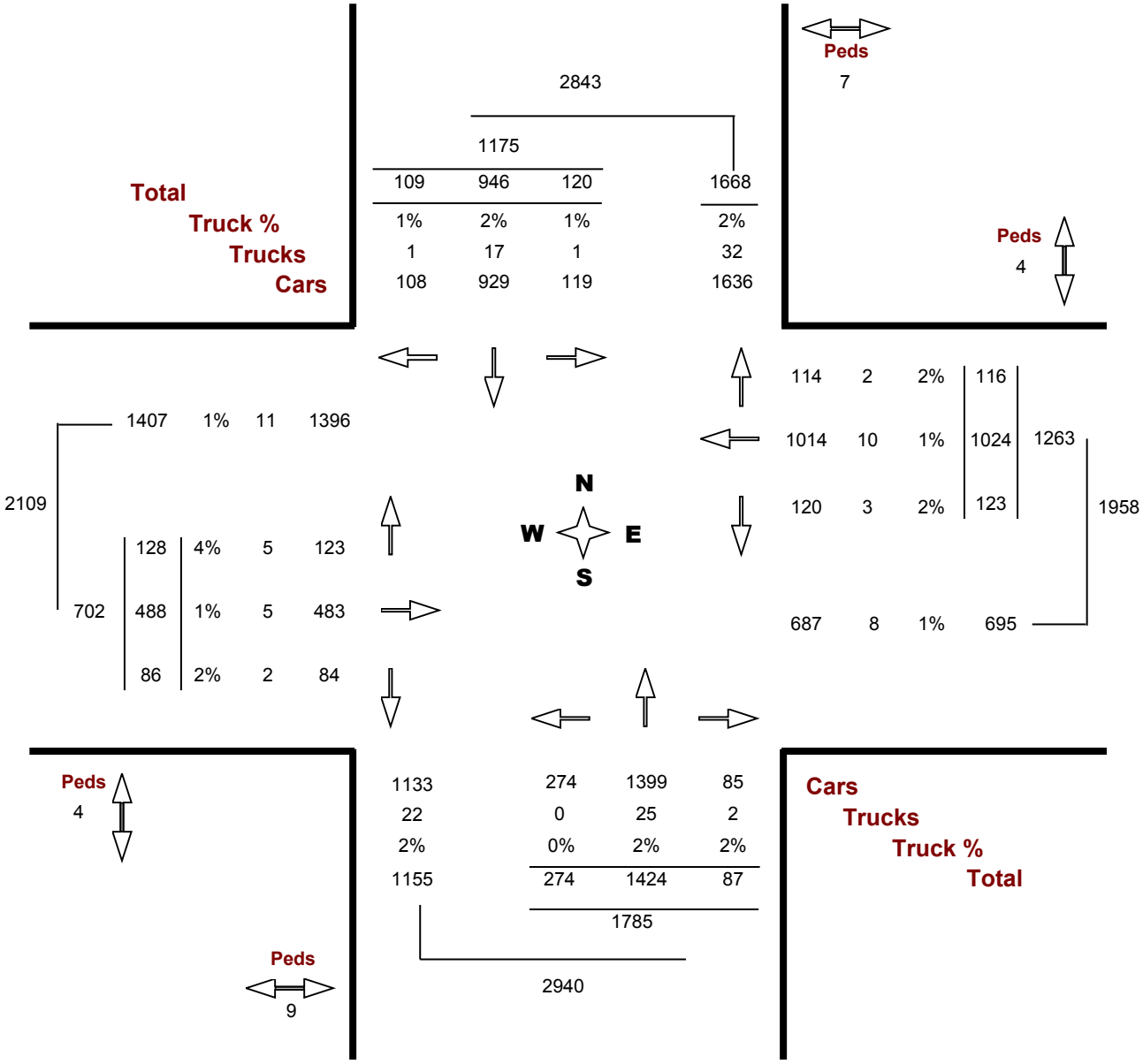
Turning Movements Report - PM Period

Location..... BURNHAMTHORPE RD W @ WINSTON CHURCHILL BLVD

Municipality..... Mississauga **GeoID.....** 345790

Count Date..... Wednesday, 30 March, 2016 **Peak Hour.....** 04:45 PM — 05:45 PM

Road 1 BURNHAMTHORPE RD W **Road 2** WINSTON CHURCHILL BLVD



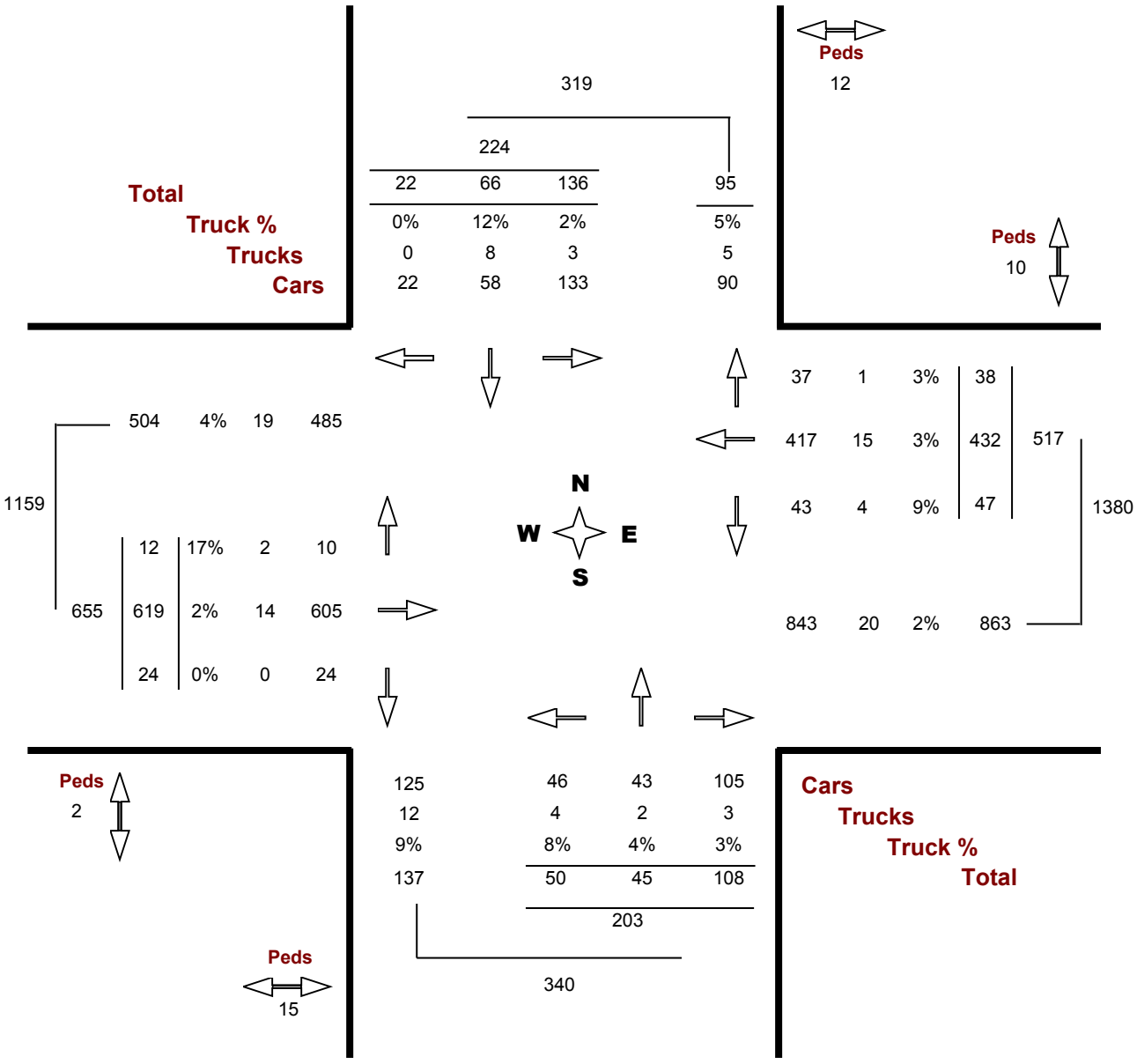
Turning Movements Report - AM Period

Location..... BURNHAMTHORPE RD W @ COLONIAL DR

Municipality..... Mississauga **GeoID.....** 345508

Count Date..... Wednesday, 09 March, 2016 **Peak Hour.....** 07:30 AM — 08:30 AM

Road 1 BURNHAMTHORPE RD W **Road 2** COLONIAL DR



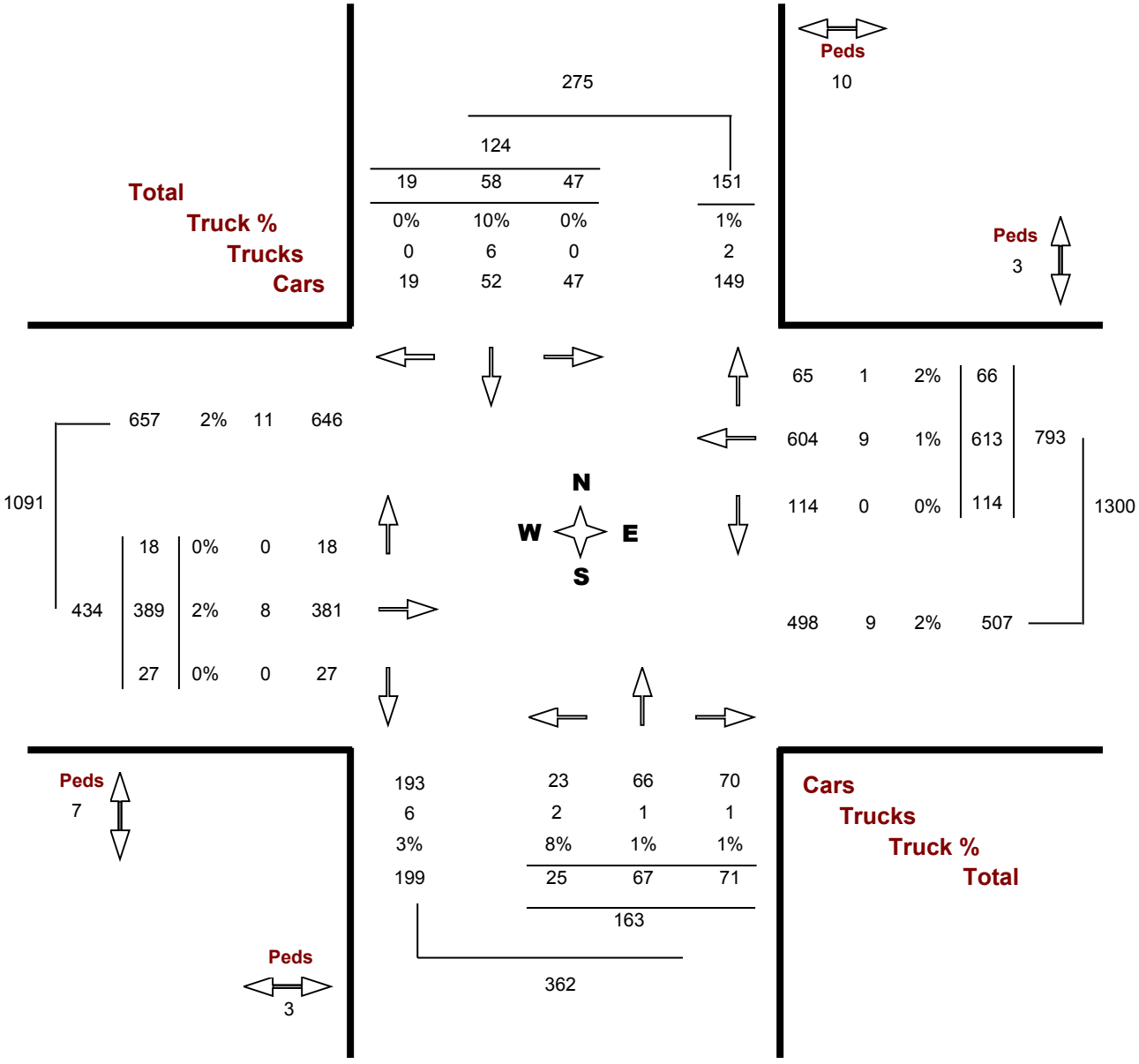
Turning Movements Report - PM Period

Location..... BURNHAMTHORPE RD W @ COLONIAL DR

Municipality..... Mississauga **GeoID.....** 345508

Count Date..... Wednesday, 09 March, 2016 **Peak Hour.....** 04:30 PM — 05:30 PM

Road 1 BURNHAMTHORPE RD W **Road 2** COLONIAL DR



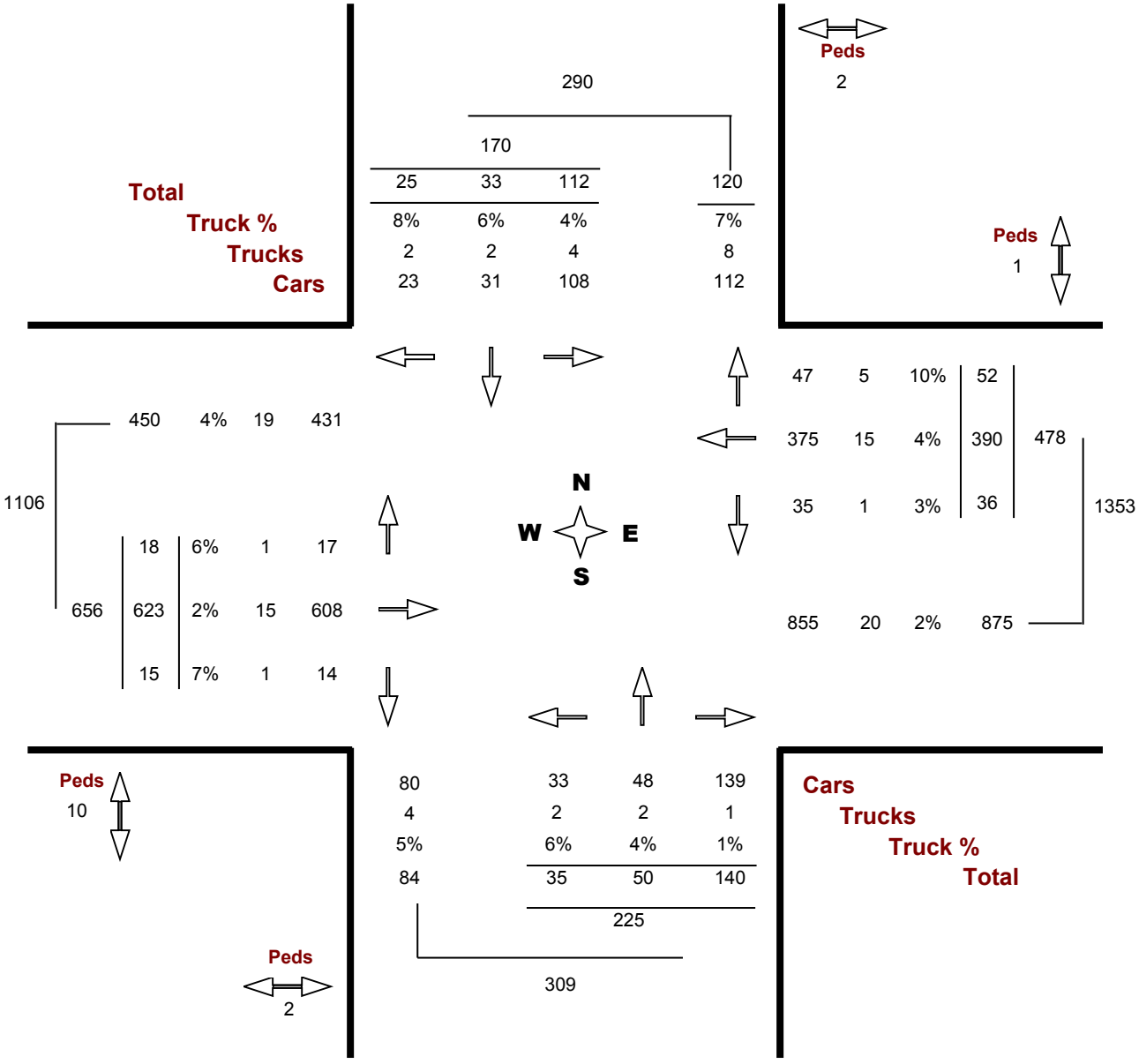
Turning Movements Report - AM Period

Location..... BURNHAMTHORPE RD W @ LOYALIST DR

Municipality..... Mississauga **GeoID.....** 345668

Count Date..... Tuesday, 22 April, 2014 **Peak Hour.....** 07:30 AM — 08:30 AM

Road 1 BURNHAMTHORPE RD W **Road 2** LOYALIST DR



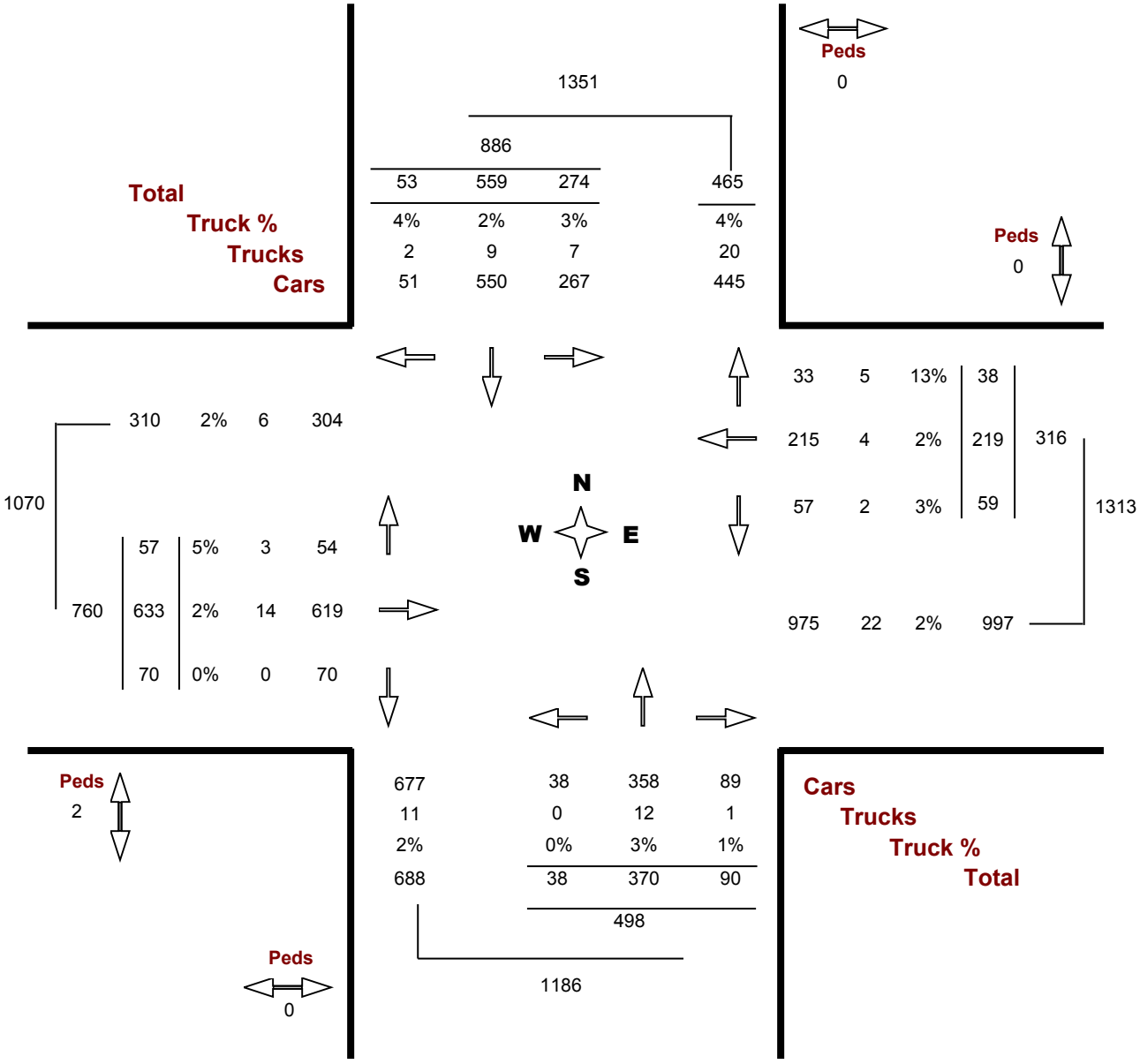
Turning Movements Report - AM Period

Location..... BURNHAMTHORPE RD W @ NINTH LINE

Municipality..... Mississauga **GeoID.....** 345175

Count Date..... Wednesday, 25 November, 2015 **Peak Hour.....** 07:45 AM — 08:45 AM

Road 1 BURNHAMTHORPE RD W **Road 2** NINTH LINE



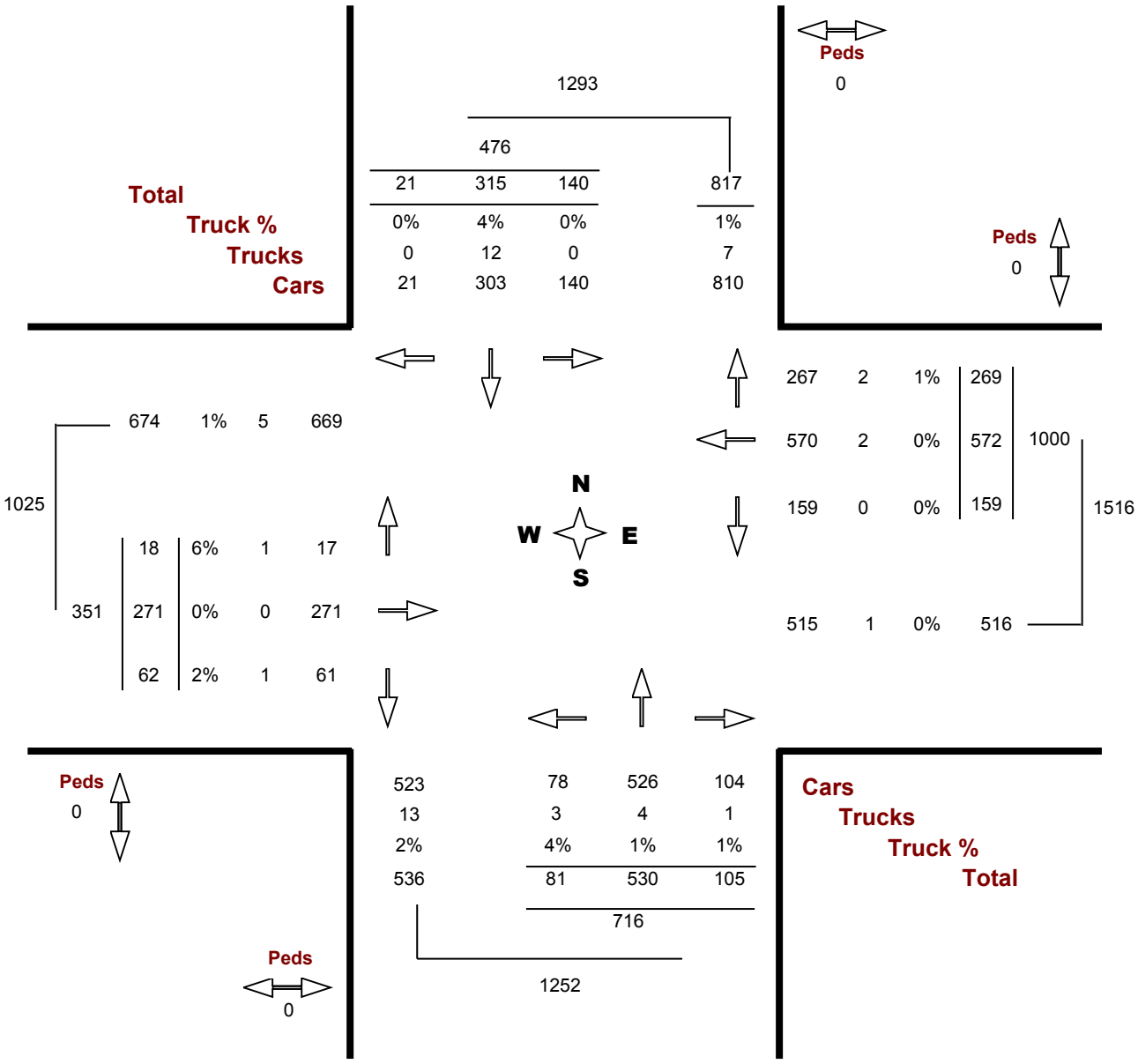
Turning Movements Report - PM Period

Location..... BURNHAMTHORPE RD W @ NINTH LINE

Municipality..... Mississauga **GeoID.....** 345175

Count Date..... Wednesday, 25 November, 2015 **Peak Hour.....** 04:30 PM — 05:30 PM

Road 1 BURNHAMTHORPE RD W **Road 2** NINTH LINE



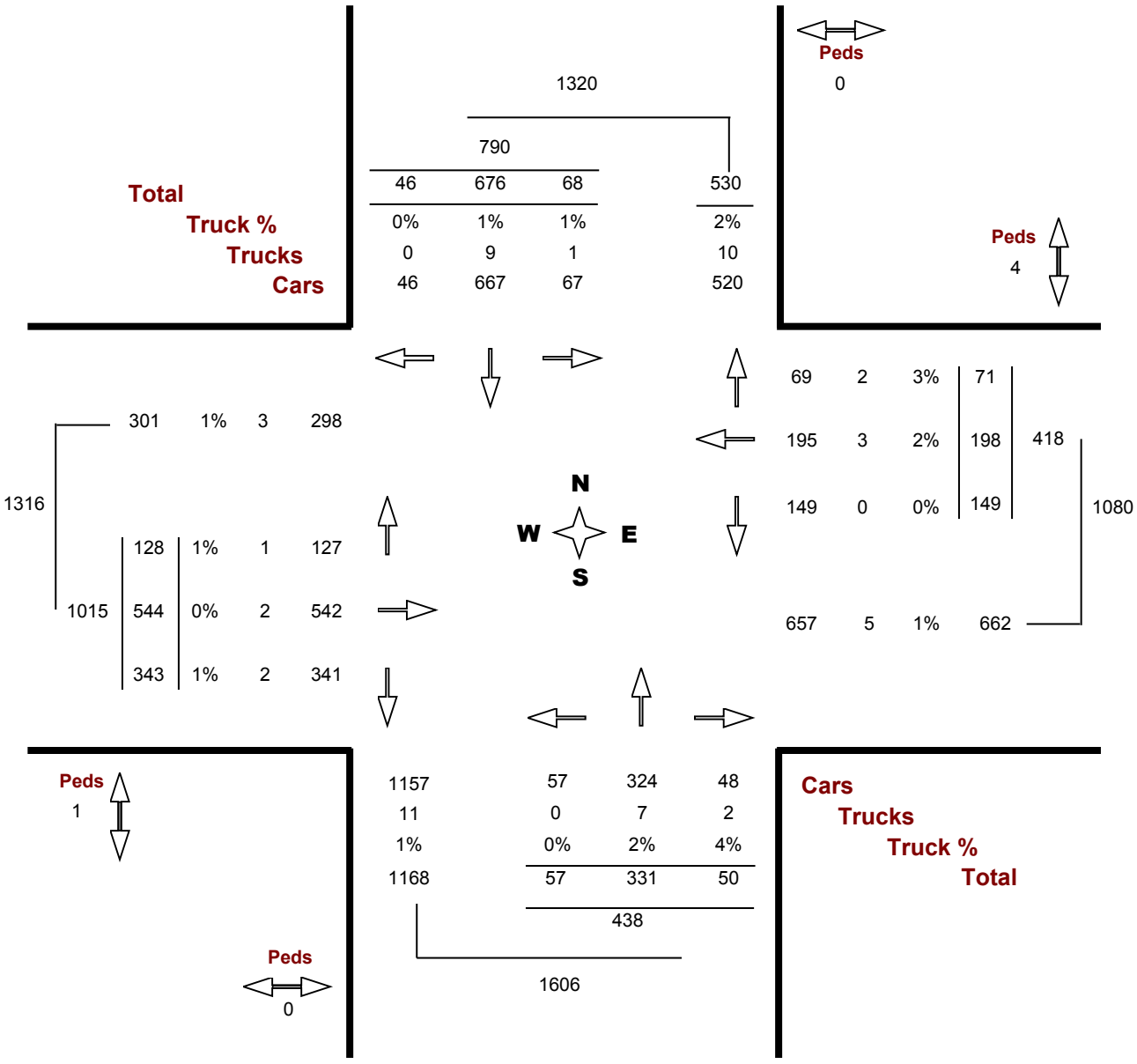
Turning Movements Report - AM Period

Location..... BURNHAMTHORPE RD W @ RIDGEWAY DR

Municipality..... Mississauga **GeoID.....** 345362

Count Date..... Tuesday, 01 May, 2012 **Peak Hour.....** 08:00 AM — 09:00 AM

Road 1 RIDGEWAY DR **Road 2** BURNHAMTHORPE RD W



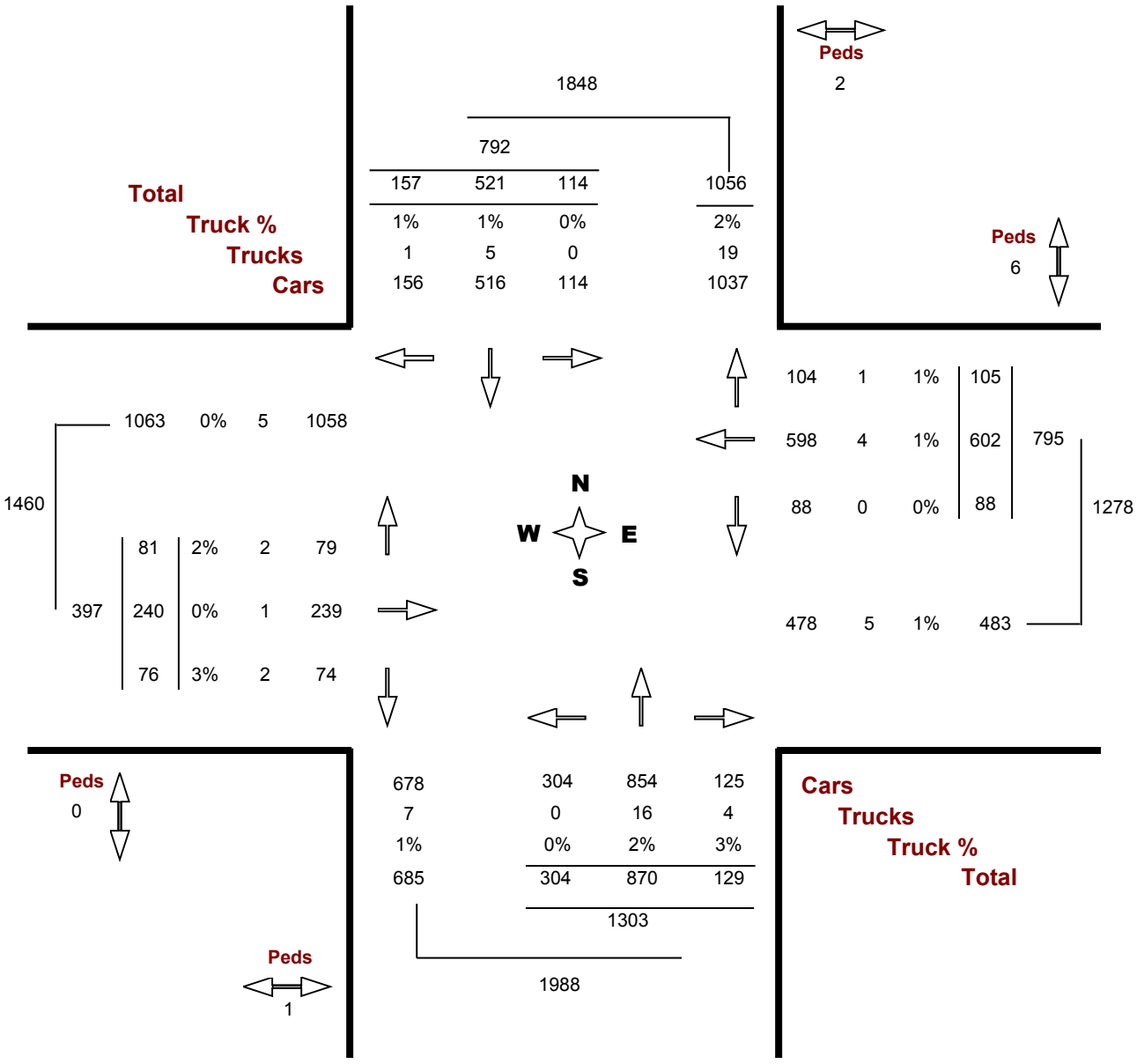
Turning Movements Report - PM Period

Location..... BURNHAMTHORPE RD W @ RIDGEWAY DR

Municipality..... Mississauga **GeoID.....** 345362

Count Date..... Tuesday, 01 May, 2012 **Peak Hour.....** 05:00 PM — 06:00 PM

Road 1 RIDGEWAY DR **Road 2** BURNHAMTHORPE RD W



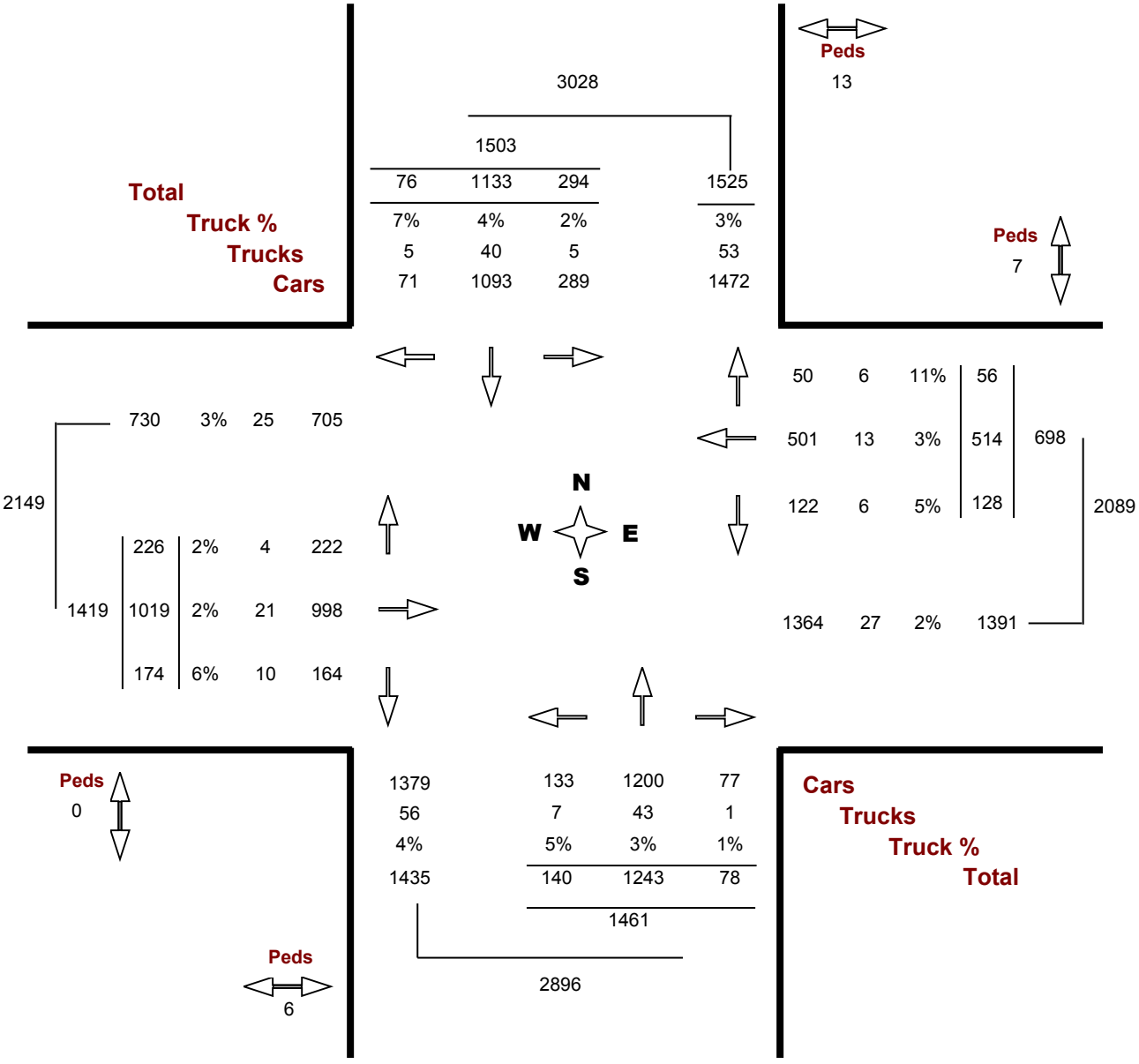
Turning Movements Report - AM Period

Location..... BURNHAMTHORPE RD W @ WINSTON CHURCHILL BLVD

Municipality..... Mississauga **GeoID.....** 345790

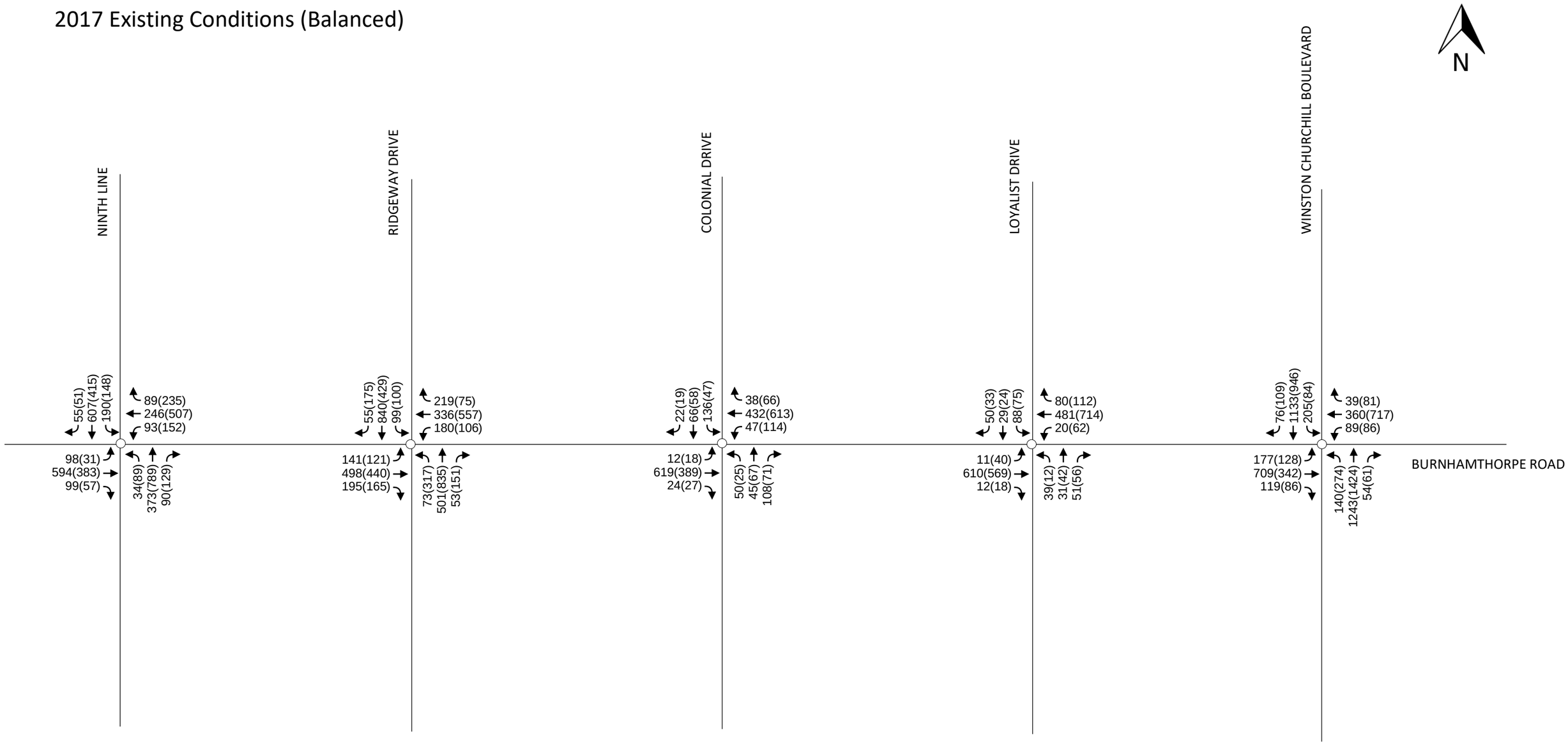
Count Date..... Wednesday, 30 March, 2016 **Peak Hour.....** 07:45 AM — 08:45 AM

Road 1 BURNHAMTHORPE RD W **Road 2** WINSTON CHURCHILL BLVD



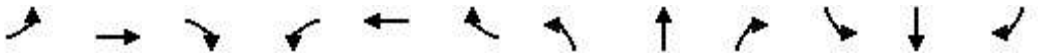
APPENDIX C: EXISTING TURNING MOVEMENT COUNTS: BALANCED

2017 Existing Conditions (Balanced)



Legend: AM (PM)

APPENDIX D: SYNCHRO/SIM TRAFFIC OUTPUTS: EXISTING CONDITIONS



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	1019	174	128	514	56	140	1243	78	294	1133	76
Future Volume (vph)	226	1019	174	128	514	56	140	1243	78	294	1133	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		7.0	5.0	7.0	7.0	5.0		1.0	5.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	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	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1648	3278		1604	3349	1341	1604	3434		1652	3510	1442
Flt Permitted	0.31	1.00		0.08	1.00	1.00	0.16	1.00		0.06	1.00	1.00
Satd. Flow (perm)	541	3278		127	3349	1341	264	3434		107	3510	1442
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)	246	1108	189	139	559	61	152	1351	85	320	1232	83
RTOR Reduction (vph)	0	9	0	0	0	41	0	3	0	0	0	24
Lane Group Flow (vph)	246	1288	0	139	559	20	152	1433	0	320	1232	59
Confl. Peds. (#/hr)	13		6	6		13			7	7		
Heavy Vehicles (%)	2%	2%	6%	5%	3%	11%	5%	3%	1%	2%	4%	7%
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm
Protected Phases	3	8			4			6		5	2	
Permitted Phases	8			4		4	6			2		2
Actuated Green, G (s)	65.0	65.0		53.0	53.0	53.0	62.0	62.0		81.0	81.0	81.0
Effective Green, g (s)	67.0	67.0		53.0	55.0	53.0	62.0	64.0		83.0	83.0	81.0
Actuated g/C Ratio	0.42	0.42		0.33	0.34	0.33	0.39	0.40		0.52	0.52	0.51
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	7.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	3.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	302	1372		42	1151	444	102	1373		229	1820	730
v/s Ratio Prot	0.06	c0.39			0.17			0.42		c0.16	0.35	
v/s Ratio Perm	0.28			c1.09		0.02	c0.58			0.57		0.04
v/c Ratio	0.81	0.94		3.31	0.49	0.05	1.49	1.04		1.40	0.68	0.08
Uniform Delay, d1	38.5	44.5		53.5	41.4	36.3	49.0	48.0		54.3	28.6	20.3
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	14.7	12.4		1097.4	0.3	0.0	265.2	36.5		203.2	2.0	0.2
Delay (s)	53.1	56.9		1150.9	41.7	36.4	314.2	84.5		257.4	30.6	20.6
Level of Service	D	E		F	D	D	F	F		F	C	C
Approach Delay (s)		56.3			244.4			106.5			74.5	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	102.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.02		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

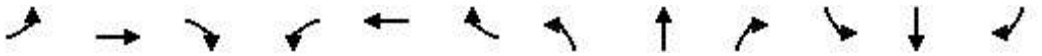
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	848	17	20	604	80	49	31	51	88	29	63
Future Volume (vph)	16	848	17	20	604	80	49	31	51	88	29	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.91		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1672	3246		1396	3208		1631	1916		1636	1556	
Flt Permitted	0.36	1.00		0.28	1.00		0.66	1.00		0.70	1.00	
Satd. Flow (perm)	627	3246		416	3208		1141	1916		1203	1556	
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)	17	922	18	22	657	87	53	34	55	96	32	68
RTOR Reduction (vph)	0	1	0	0	5	0	0	46	0	0	57	0
Lane Group Flow (vph)	17	939	0	22	739	0	53	43	0	96	43	0
Confl. Peds. (#/hr)	8		9	9		8	3					3
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	6%	0%	20%	6%	9%	3%	3%	0%	3%	3%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	84.8	84.8		84.8	84.8		16.7	16.7		16.7	16.7	
Effective Green, g (s)	84.8	86.3		84.8	86.3		16.7	18.7		16.7	18.7	
Actuated g/C Ratio	0.74	0.75		0.74	0.75		0.15	0.16		0.15	0.16	
Clearance Time (s)	6.5	6.5		6.5	6.5		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	
Lane Grp Cap (vph)	462	2435		306	2407		165	311		174	253	
v/s Ratio Prot		c0.29			0.23			0.02			0.03	
v/s Ratio Perm	0.03			0.05			0.05			c0.08		
v/c Ratio	0.04	0.39		0.07	0.31		0.32	0.14		0.55	0.17	
Uniform Delay, d1	4.1	5.0		4.2	4.7		44.1	41.2		45.7	41.5	
Progression Factor	1.05	1.11		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.4		0.5	0.3		1.1	0.2		3.7	0.3	
Delay (s)	4.4	6.0		4.6	5.0		45.2	41.5		49.4	41.8	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		6.0			5.0			42.8			45.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	11.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	12	637	25	47	631	38	73	45	108	136	66	31
Future Volume (vph)	12	637	25	47	631	38	73	45	108	136	66	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		7.5	5.0		7.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.97		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.89		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1498	2013		1532	1965		1610	1562		1684	1604	
Flt Permitted	0.30	1.00		0.31	1.00		0.67	1.00		0.52	1.00	
Satd. Flow (perm)	476	2013		493	1965		1129	1562		926	1604	
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)	13	692	27	51	686	41	79	49	117	148	72	34
RTOR Reduction (vph)	0	1	0	0	1	0	0	93	0	0	19	0
Lane Group Flow (vph)	13	718	0	51	726	0	79	73	0	148	87	0
Confl. Peds. (#/hr)	12		15	15		12	2		10	10		2
Heavy Vehicles (%)	17%	2%	0%	9%	3%	3%	8%	4%	3%	2%	12%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	80.1	80.1		80.1	80.1		21.4	21.4		21.4	21.4	
Effective Green, g (s)	80.1	81.1		80.1	81.1		21.4	23.9		21.4	23.9	
Actuated g/C Ratio	0.70	0.71		0.70	0.71		0.19	0.21		0.19	0.21	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	331	1419		343	1385		210	324		172	333	
v/s Ratio Prot		0.36			c0.37			0.05			0.05	
v/s Ratio Perm	0.03			0.10			0.07			c0.16		
v/c Ratio	0.04	0.51		0.15	0.52		0.38	0.23		0.86	0.26	
Uniform Delay, d1	5.4	7.8		5.9	7.9		41.0	37.9		45.4	38.2	
Progression Factor	1.17	0.92		1.11	1.40		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.9	1.4		1.1	0.4		32.9	0.4	
Delay (s)	6.5	7.7		7.5	12.5		42.1	38.2		78.2	38.6	
Level of Service	A	A		A	B		D	D		E	D	
Approach Delay (s)		7.7			12.1			39.5			61.7	
Approach LOS		A			B			D			E	

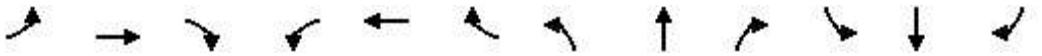
Intersection Summary			
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	522	204	180	336	219	73	501	53	99	840	55
Future Volume (vph)	148	522	204	180	336	219	73	501	53	99	840	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	6.5	5.0		1.0	5.0		1.0	5.0		6.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.93		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		0.95	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1671	1840		1665	1659		1685	3373		1483	3360	
Flt Permitted	0.30	1.00		0.08	1.00		0.11	1.00		0.37	1.00	
Satd. Flow (perm)	528	1840		133	1659		190	3373		574	3360	
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)	170	600	234	207	386	252	84	576	61	114	966	63
RTOR Reduction (vph)	0	12	0	0	21	0	0	7	0	0	4	0
Lane Group Flow (vph)	170	822	0	207	617	0	84	630	0	114	1025	0
Confl. Peds. (#/hr)	152		93	93		152	116		60	60		116
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	1%	1%	1%	6%	4%	5%	0%	2%	11%	8%	2%	9%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases		2		1	6		7	4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	49.9	49.9		59.9	59.9		42.1	42.1		34.3	34.3	
Effective Green, g (s)	49.9	51.4		61.9	61.4		44.1	43.6		34.3	35.8	
Actuated g/C Ratio	0.43	0.45		0.54	0.53		0.38	0.38		0.30	0.31	
Clearance Time (s)	6.5	6.5		3.0	6.5		3.0	6.5		6.5	6.5	
Vehicle Extension (s)	3.0	3.0		2.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	229	822		191	885		161	1278		171	1045	
v/s Ratio Prot		c0.45		c0.08	0.37		c0.03	0.19			c0.31	
v/s Ratio Perm	0.32			0.50			0.17			0.20		
v/c Ratio	0.74	1.00		1.08	0.70		0.52	0.49		0.67	0.98	
Uniform Delay, d1	27.2	31.8		34.0	19.9		27.3	27.3		35.3	39.3	
Progression Factor	0.72	0.81		1.66	0.67		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.3	24.3		86.1	4.1		1.4	0.3		9.4	23.1	
Delay (s)	31.9	49.9		142.4	17.5		28.7	27.6		44.8	62.4	
Level of Service	C	D		F	B		C	C		D	E	
Approach Delay (s)		46.8			48.1			27.7			60.6	
Approach LOS		D			D			C			E	

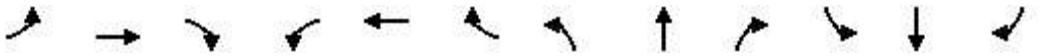
Intersection Summary			
HCM 2000 Control Delay	47.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



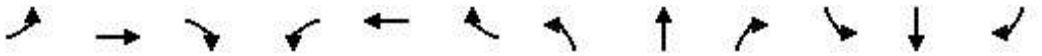
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	594	99	80	266	97	34	373	90	190	607	55
Future Volume (vph)	98	594	99	80	266	97	34	373	90	190	607	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.4	3.6	3.0	3.0	3.3	3.0	3.4	3.6	3.0	3.0	3.6
Total Lost time (s)	7.0	5.0		7.0	5.0	1.0	8.0	5.0		1.0	5.0	
Lane Util. Factor	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		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	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1546	1739		1668	1673	1501	1588	1741		1636	1711	
Flt Permitted	0.51	1.00		0.08	1.00	1.00	0.18	1.00		0.15	1.00	
Satd. Flow (perm)	823	1739		149	1673	1501	300	1741		263	1711	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	104	632	105	85	283	103	36	397	96	202	646	59
RTOR Reduction (vph)	0	5	0	0	0	43	0	7	0	0	3	0
Lane Group Flow (vph)	104	732	0	85	283	60	36	486	0	202	702	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	9%	5%	2%	1%	6%	4%	6%	4%	2%	3%	2%	4%
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		2			6	3		4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	49.8	49.8		49.8	49.8	62.9	34.1	34.1		50.2	50.2	
Effective Green, g (s)	49.8	51.8		49.8	51.8	66.9	34.1	37.1		52.2	53.2	
Actuated g/C Ratio	0.43	0.45		0.43	0.45	0.58	0.30	0.32		0.45	0.46	
Clearance Time (s)	7.0	7.0		7.0	7.0	3.0	8.0	8.0		3.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	2.0	4.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	356	783		64	753	873	88	561		299	791	
v/s Ratio Prot		0.42			0.17	0.01		0.28		0.09	c0.41	
v/s Ratio Perm	0.13			c0.57		0.03	0.12			0.22		
v/c Ratio	0.29	0.93		1.33	0.38	0.07	0.41	0.87		0.68	0.89	
Uniform Delay, d1	21.2	30.0		32.6	20.9	10.5	32.4	36.6		23.3	28.2	
Progression Factor	1.00	1.00		1.17	1.18	2.48	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	19.7		205.6	1.0	0.0	4.2	13.6		4.7	12.1	
Delay (s)	23.2	49.7		243.6	25.7	26.0	36.6	50.2		28.0	40.3	
Level of Service	C	D		F	C	C	D	D		C	D	
Approach Delay (s)		46.5			65.1			49.2			37.5	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	47.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	106.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	128	488	86	123	1024	116	274	1424	87	120	946	109
Future Volume (vph)	128	488	86	123	1024	116	274	1424	87	120	946	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		7.0	5.0	7.0	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	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	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1620	3320		1641	3415	1476	1685	3466		1668	3579	1500
Flt Permitted	0.07	1.00		0.40	1.00	1.00	0.12	1.00		0.06	1.00	1.00
Satd. Flow (perm)	117	3320		693	3415	1476	218	3466		108	3579	1500
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)	139	530	93	134	1113	126	298	1548	95	130	1028	118
RTOR Reduction (vph)	0	9	0	0	0	44	0	3	0	0	0	41
Lane Group Flow (vph)	139	614	0	134	1113	82	298	1640	0	130	1028	77
Confl. Peds. (#/hr)	7		9	9		7	4		4	4		4
Heavy Vehicles (%)	4%	1%	2%	2%	1%	2%	0%	2%	2%	1%	2%	1%
Turn Type	pm+pt	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	8			4		1	6		5	2	
Permitted Phases	8			4		4	6			2		2
Actuated Green, G (s)	68.5	68.5		55.5	55.5	55.5	76.7	65.2		72.3	63.0	63.0
Effective Green, g (s)	70.5	70.5		55.5	57.5	55.5	79.5	67.2		76.3	65.0	63.0
Actuated g/C Ratio	0.44	0.44		0.35	0.36	0.35	0.50	0.42		0.48	0.41	0.39
Clearance Time (s)	3.0	7.0		7.0	7.0	7.0	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		3.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	164	1462		240	1227	511	232	1455		161	1453	590
v/s Ratio Prot	c0.06	0.18			c0.33		c0.11	c0.47		0.06	0.29	
v/s Ratio Perm	0.31			0.19		0.06	0.53			0.33		0.05
v/c Ratio	0.85	0.42		0.56	0.91	0.16	1.28	1.13		0.81	0.71	0.13
Uniform Delay, d1	41.9	30.7		42.3	48.7	36.1	33.7	46.4		42.5	39.6	31.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	30.2	0.2		2.8	9.8	0.1	156.6	66.7		23.6	2.9	0.5
Delay (s)	72.0	30.9		45.1	58.5	36.3	190.3	113.1		66.1	42.5	31.4
Level of Service	E	C		D	E	D	F	F		E	D	C
Approach Delay (s)		38.4			55.1			124.9			43.9	
Approach LOS		D			E			F			D	

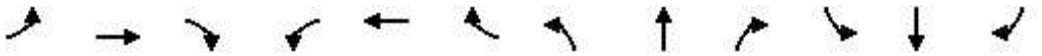
Intersection Summary			
HCM 2000 Control Delay	75.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	670	21	62	817	112	14	42	56	75	24	37
Future Volume (vph)	47	670	21	62	817	112	14	42	56	75	24	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.91		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1599	3305		1652	3297		1546	1932		1618	1522	
Flt Permitted	0.27	1.00		0.36	1.00		0.71	1.00		0.65	1.00	
Satd. Flow (perm)	447	3305		622	3297		1162	1932		1099	1522	
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)	51	720	23	67	878	120	15	45	60	81	26	40
RTOR Reduction (vph)	0	1	0	0	5	0	0	51	0	0	34	0
Lane Group Flow (vph)	51	742	0	67	993	0	15	54	0	81	32	0
Confl. Peds. (#/hr)	6					6	9		1	1		9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	5%	4%	0%	2%	3%	7%	8%	0%	2%	4%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	85.6	85.6		85.6	85.6		15.9	15.9		15.9	15.9	
Effective Green, g (s)	85.6	87.1		85.6	87.1		15.9	17.9		15.9	17.9	
Actuated g/C Ratio	0.74	0.76		0.74	0.76		0.14	0.16		0.14	0.16	
Clearance Time (s)	6.5	6.5		6.5	6.5		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	
Lane Grp Cap (vph)	332	2503		462	2497		160	300		151	236	
v/s Ratio Prot		0.22			c0.30			0.03			0.02	
v/s Ratio Perm	0.11			0.11			0.01			c0.07		
v/c Ratio	0.15	0.30		0.15	0.40		0.09	0.18		0.54	0.14	
Uniform Delay, d1	4.2	4.4		4.2	4.8		43.3	42.2		46.1	41.9	
Progression Factor	1.51	1.29		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.3		0.7	0.5		0.3	0.3		3.6	0.3	
Delay (s)	7.3	5.9		4.9	5.3		43.5	42.5		49.8	42.1	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		6.0			5.3			42.6			46.3	
Approach LOS		A			A			D			D	

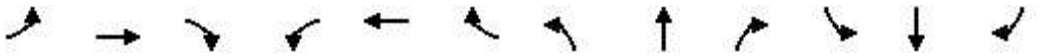
Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	61.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	620	43	114	688	66	28	67	71	47	58	22
Future Volume (vph)	28	620	43	114	688	66	28	67	71	47	58	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		7.5	5.0		7.5	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1756	2007		1681	1990		1594	1675		1736	1626	
Flt Permitted	0.28	1.00		0.33	1.00		0.70	1.00		0.49	1.00	
Satd. Flow (perm)	524	2007		587	1990		1176	1675		889	1626	
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)	30	674	47	124	748	72	30	73	77	51	63	24
RTOR Reduction (vph)	0	1	0	0	2	0	0	41	0	0	14	0
Lane Group Flow (vph)	30	720	0	124	818	0	30	109	0	51	73	0
Confl. Peds. (#/hr)	10		3	3		10	7		3	3		7
Heavy Vehicles (%)	0%	2%	0%	0%	1%	2%	8%	1%	1%	0%	10%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		2			6			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	86.8	86.8		86.8	86.8		14.7	14.7		14.7	14.7	
Effective Green, g (s)	86.8	87.8		86.8	87.8		14.7	17.2		14.7	17.2	
Actuated g/C Ratio	0.75	0.76		0.75	0.76		0.13	0.15		0.13	0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0		7.5	7.5		7.5	7.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	395	1532		443	1519		150	250		113	243	
v/s Ratio Prot		0.36			c0.41			c0.07			0.04	
v/s Ratio Perm	0.06			0.21			0.03			0.06		
v/c Ratio	0.08	0.47		0.28	0.54		0.20	0.44		0.45	0.30	
Uniform Delay, d1	3.7	5.0		4.4	5.5		44.9	44.5		46.4	43.5	
Progression Factor	1.42	1.19		0.49	0.79		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.8		1.5	1.3		0.7	1.2		2.8	0.7	
Delay (s)	5.5	6.8		3.6	5.6		45.5	45.7		49.3	44.2	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		6.7			5.3			45.7			46.1	
Approach LOS		A			A			D			D	

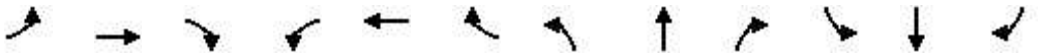
Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	121	440	165	106	557	75	317	835	151	100	429	175
Future Volume (vph)	121	440	165	106	557	75	317	835	151	100	429	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		6.5	5.0		1.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	1890		1677	1909		1650	3316		1589	3257	
Flt Permitted	0.12	1.00		0.27	1.00		0.24	1.00		0.12	1.00	
Satd. Flow (perm)	222	1890		484	1909		418	3316		205	3257	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	123	449	168	108	568	77	323	852	154	102	438	179
RTOR Reduction (vph)	0	11	0	0	4	0	0	13	0	0	39	0
Lane Group Flow (vph)	123	606	0	108	641	0	323	993	0	102	578	0
Confl. Peds. (#/hr)	6		6	6		6	9		12	12		9
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	1%	1%	2%	5%	1%	8%	2%	4%	7%	6%	3%	1%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	5	2			6		7	4		3	8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	54.4	54.4		44.9	44.9		47.6	37.8		37.4	30.6	
Effective Green, g (s)	56.4	55.9		44.9	46.4		49.6	39.3		41.4	32.1	
Actuated g/C Ratio	0.49	0.49		0.39	0.40		0.43	0.34		0.36	0.28	
Clearance Time (s)	3.0	6.5		6.5	6.5		3.0	6.5		3.0	6.5	
Vehicle Extension (s)	2.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	223	918		188	770		351	1133		179	909	
v/s Ratio Prot	0.04	c0.32			c0.34		c0.13	c0.30		0.04	0.18	
v/s Ratio Perm	0.23			0.22			0.27			0.16		
v/c Ratio	0.55	0.66		0.57	0.83		0.92	0.88		0.57	0.64	
Uniform Delay, d1	22.1	22.4		27.5	30.8		24.7	35.6		27.2	36.3	
Progression Factor	0.82	0.96		0.73	0.77		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.8		10.7	9.0		28.3	7.8		2.5	1.5	
Delay (s)	19.0	23.2		30.7	32.7		53.0	43.4		29.7	37.8	
Level of Service	B	C		C	C		D	D		C	D	
Approach Delay (s)		22.5			32.4			45.7			36.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	433	57	80	595	275	89	789	145	148	415	51
Future Volume (vph)	31	433	57	80	595	275	89	789	145	148	415	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.4	3.6	3.0	3.0	3.3	3.0	3.4	3.6	3.0	3.0	3.6
Total Lost time (s)	7.0	5.0		7.0	5.0	1.0	8.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	1826		1668	1756	1546	1574	1794		1620	1729	
Flt Permitted	0.11	1.00		0.12	1.00	1.00	0.49	1.00		0.07	1.00	
Satd. Flow (perm)	203	1826		219	1756	1546	806	1794		122	1729	
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)	32	451	59	83	620	286	93	822	151	154	432	53
RTOR Reduction (vph)	0	4	0	0	0	62	0	6	0	0	4	0
Lane Group Flow (vph)	32	506	0	83	620	224	93	967	0	154	481	0
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	7%	1%	2%	4%	1%	0%
Turn Type	Perm	NA		Perm	NA	pm+ov	Perm	NA		pm+pt	NA	
Protected Phases		2			6	3		4		3	8	
Permitted Phases	2			6		6	4			8		
Actuated Green, G (s)	35.0	35.0		35.0	35.0	44.3	52.7	52.7		65.0	65.0	
Effective Green, g (s)	35.0	37.0		35.0	37.0	48.3	52.7	55.7		67.0	68.0	
Actuated g/C Ratio	0.30	0.32		0.30	0.32	0.42	0.46	0.48		0.58	0.59	
Clearance Time (s)	7.0	7.0		7.0	7.0	3.0	8.0	8.0		3.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	2.0	4.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	61	587		66	564	649	369	868		218	1022	
v/s Ratio Prot		0.28			0.35	0.03		c0.54		c0.07	0.28	
v/s Ratio Perm	0.16			c0.38		0.11	0.12			0.34		
v/c Ratio	0.52	0.86		1.26	1.10	0.35	0.25	1.11		0.71	0.47	
Uniform Delay, d1	33.1	36.6		40.0	39.0	22.6	19.1	29.6		29.1	13.3	
Progression Factor	1.00	1.00		1.01	1.08	0.72	1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.7	15.3		167.1	59.4	0.1	0.5	67.0		8.2	0.5	
Delay (s)	61.8	51.9		207.6	101.6	16.3	19.6	96.7		37.3	13.8	
Level of Service	E	D		F	F	B	B	F		D	B	
Approach Delay (s)		52.5			85.8			89.9			19.5	
Approach LOS		D			F			F			B	

Intersection Summary			
HCM 2000 Control Delay	68.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	114.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8444	8634	8533	8547	8462	8526
Vehs Exited	7421	8148	7932	7596	8069	7834
Starting Vehs	613	609	674	705	648	652
Ending Vehs	1636	1095	1275	1656	1041	1340
Travel Distance (km)	15682	16957	16622	15908	16763	16386
Travel Time (hr)	1085.3	849.6	974.8	1252.0	886.7	1009.7
Total Delay (hr)	799.2	538.7	670.1	961.7	579.6	709.8
Total Stops	13778	15175	15372	16352	15715	15280
Fuel Used (l)	1768.1	1650.5	1734.4	1919.0	1662.4	1746.9

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8444	8634	8533	8547	8462	8526
Vehs Exited	7421	8148	7932	7596	8069	7834
Starting Vehs	613	609	674	705	648	652
Ending Vehs	1636	1095	1275	1656	1041	1340
Travel Distance (km)	15682	16957	16622	15908	16763	16386
Travel Time (hr)	1085.3	849.6	974.8	1252.0	886.7	1009.7
Total Delay (hr)	799.2	538.7	670.1	961.7	579.6	709.8
Total Stops	13778	15175	15372	16352	15715	15280
Fuel Used (l)	1768.1	1650.5	1734.4	1919.0	1662.4	1746.9

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (m)	117.9	208.6	212.6	139.9	950.3	910.1	25.0	150.0	715.8	716.0	104.0	545.5
Average Queue (m)	78.4	137.6	143.5	138.7	560.8	388.8	7.0	141.8	534.6	528.9	103.9	482.3
95th Queue (m)	137.1	218.3	219.5	142.0	924.6	925.2	24.5	187.7	822.3	814.8	104.1	615.5
Link Distance (m)		453.6	453.6		1637.8	1637.8			731.4	731.4		530.5
Upstream Blk Time (%)									22	19		50
Queuing Penalty (veh)									0	0		0
Storage Bay Dist (m)	30.0			40.0			15.0	60.0			64.0	
Storage Blk Time (%)	55	49		100	34	51	0	85	52		94	14
Queuing Penalty (veh)	281	110		257	43	28	0	526	73		529	41

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	544.1	80.0
Average Queue (m)	475.1	32.4
95th Queue (m)	614.0	89.5
Link Distance (m)	530.5	
Upstream Blk Time (%)	23	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		37.0
Storage Blk Time (%)	31	6
Queuing Penalty (veh)	24	33

Intersection: 6: Loyalist Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	13.6	60.1	60.3	60.4	302.2	296.1	31.1	112.2	41.9	128.6
Average Queue (m)	2.4	27.3	26.9	4.4	114.1	97.2	13.8	37.0	17.0	28.7
95th Queue (m)	9.3	52.1	49.6	26.7	368.3	362.2	32.2	134.0	35.1	112.1
Link Distance (m)		95.9			453.6	453.6		758.6		640.1
Upstream Blk Time (%)					10	10				
Queuing Penalty (veh)					37	37				
Storage Bay Dist (m)	39.0		30.0	35.0			14.0		20.0	
Storage Blk Time (%)		5	4	0	28		32	16	14	15
Queuing Penalty (veh)		22	19	0	6		26	8	13	13

Intersection: 9: Colonial Dr & Burnhamthorpe Rd

Movement	EB	EB	WB	WB	B18	B18	NB	NB	SB	SB
Directions Served	L	TR	L	TR	T		L	TR	L	TR
Maximum Queue (m)	13.1	93.0	111.1	332.2	69.3	64.7	47.0	181.6	52.8	110.4
Average Queue (m)	2.4	54.0	17.3	156.7	26.7	16.6	24.4	57.5	26.8	30.4
95th Queue (m)	9.5	83.3	76.8	422.8	101.5	77.7	51.1	190.1	50.8	98.6
Link Distance (m)		423.3		394.0	95.9	95.9		659.3		606.7
Upstream Blk Time (%)				25	21	10				
Queuing Penalty (veh)				177	75	34				
Storage Bay Dist (m)	61.0		43.0				30.0		28.0	
Storage Blk Time (%)		4		36			23	8	10	13
Queuing Penalty (veh)		1		17			35	6	10	18

Intersection: 12: Ridgeway Dr & Burnhamthorpe Rd

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	137.0	470.0	147.9	385.3	81.9	83.5	85.0	125.9	278.7	275.2
Average Queue (m)	86.5	325.4	49.3	200.7	32.0	39.2	41.0	48.2	139.0	142.3
95th Queue (m)	181.8	614.3	128.2	478.3	84.2	70.2	71.6	122.0	307.9	304.1
Link Distance (m)		556.1		423.3		722.3	722.3		771.8	771.8
Upstream Blk Time (%)		1		23						
Queuing Penalty (veh)		5		169						
Storage Bay Dist (m)	47.0		58.0		37.0			56.0		
Storage Blk Time (%)	3	59	2	50	29	8		1	42	
Queuing Penalty (veh)	24	88	13	90	72	6		5	41	

Intersection: 15: Ninth Line & Burnhamthorpe Rd

Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	87.9	757.0	148.0	561.8	54.3	82.8	154.4	98.0	237.0
Average Queue (m)	49.0	482.3	130.4	326.6	10.1	19.9	91.0	55.4	125.3
95th Queue (m)	109.6	815.7	172.5	697.0	33.5	61.0	151.4	113.0	223.4
Link Distance (m)		1594.2		556.1			708.2		748.6
Upstream Blk Time (%)				25					
Queuing Penalty (veh)				115					
Storage Bay Dist (m)	18.0		48.0		46.0	29.0		27.0	
Storage Blk Time (%)	19	58	100	5	0	4	53	20	46
Queuing Penalty (veh)	131	57	363	8	0	19	18	131	87

Network Summary

Network wide Queuing Penalty: 3942

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8578	8603	8432	8611	8497	8541
Vehs Exited	8364	8329	8258	8158	8374	8296
Starting Vehs	709	765	789	711	800	757
Ending Vehs	923	1039	963	1164	923	1000
Travel Distance (km)	17302	17141	17034	17054	17243	17155
Travel Time (hr)	1011.4	1138.3	1131.6	1085.2	1154.5	1104.2
Total Delay (hr)	693.4	823.6	819.0	771.7	837.5	789.1
Total Stops	14531	13942	16668	15392	15659	15241
Fuel Used (l)	1797.5	1897.7	1882.3	1844.5	1917.4	1867.9

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8578	8603	8432	8611	8497	8541
Vehs Exited	8364	8329	8258	8158	8374	8296
Starting Vehs	709	765	789	711	800	757
Ending Vehs	923	1039	963	1164	923	1000
Travel Distance (km)	17302	17141	17034	17054	17243	17155
Travel Time (hr)	1011.4	1138.3	1131.6	1085.2	1154.5	1104.2
Total Delay (hr)	693.4	823.6	819.0	771.7	837.5	789.1
Total Stops	14531	13942	16668	15392	15659	15241
Fuel Used (l)	1797.5	1897.7	1882.3	1844.5	1917.4	1867.9

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (m)	73.0	81.4	83.6	139.9	314.2	320.0	25.0	150.0	745.7	747.8	103.8	162.4
Average Queue (m)	36.7	42.5	47.9	65.7	192.0	194.8	9.1	147.8	709.0	705.7	49.5	98.6
95th Queue (m)	69.8	69.5	75.3	152.5	320.5	324.9	28.1	171.1	823.2	828.0	95.5	144.7
Link Distance (m)		453.6	453.6		1637.8	1637.8			731.4	731.4		530.5
Upstream Blk Time (%)									76	66		
Queuing Penalty (veh)									0	0		
Storage Bay Dist (m)	30.0			40.0			15.0	60.0			64.0	
Storage Blk Time (%)	31	17		13	59	61	0	95	46		2	23
Queuing Penalty (veh)	76	22		65	72	71	0	678	127		9	28

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	156.5	80.0
Average Queue (m)	96.6	33.9
95th Queue (m)	143.0	87.5
Link Distance (m)	530.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		37.0
Storage Blk Time (%)	37	0
Queuing Penalty (veh)	40	1

Intersection: 6: Loyalist Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	28.8	61.6	52.6	78.8	210.1	194.8	24.4	37.4	36.3	40.0
Average Queue (m)	10.6	28.1	27.8	12.8	71.4	45.3	3.8	15.4	15.4	9.6
95th Queue (m)	23.8	52.8	46.9	48.7	191.0	169.3	13.9	31.1	29.9	26.3
Link Distance (m)		95.7			453.6	453.6		758.6		640.1
Upstream Blk Time (%)					1	1				
Queuing Penalty (veh)					4	9				
Storage Bay Dist (m)	39.0		30.0	35.0			14.0		20.0	
Storage Blk Time (%)	0	5	7	0	18		2	17	13	2
Queuing Penalty (veh)	2	21	25	0	11		2	2	8	2

Intersection: 9: Colonial Dr & Burnhamthorpe Rd

Movement	EB	EB	WB	WB	B18	B18	NB	NB	SB	SB
Directions Served	L	TR	L	TR	T		L	TR	L	TR
Maximum Queue (m)	18.4	102.2	131.9	389.8	90.7	39.0	29.1	52.9	24.8	44.6
Average Queue (m)	5.0	55.4	40.7	142.7	14.2	1.9	7.3	22.5	10.3	14.5
95th Queue (m)	13.8	88.6	125.9	399.2	72.5	24.2	20.5	42.1	22.0	32.3
Link Distance (m)		423.3		394.2	95.7	95.7		659.3		606.7
Upstream Blk Time (%)				11	5	0				
Queuing Penalty (veh)				92	20	1				
Storage Bay Dist (m)	61.0		43.0				30.0		28.0	
Storage Blk Time (%)		6	0	32			0	5	0	2
Queuing Penalty (veh)		2	0	36			0	1	0	1

Intersection: 12: Ridgeway Dr & Burnhamthorpe Rd

Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	TR	L	T	TR
Maximum Queue (m)	63.2	115.5	147.9	428.9	137.0	567.4	559.3	47.3	95.6	114.5
Average Queue (m)	20.5	66.0	94.4	316.4	130.3	342.0	332.7	19.0	51.3	60.2
95th Queue (m)	44.1	102.0	201.2	537.7	166.8	648.5	636.3	37.6	79.7	92.5
Link Distance (m)		556.1		423.3		722.3	722.3		771.8	771.8
Upstream Blk Time (%)				16		6	3			
Queuing Penalty (veh)				115		0	0			
Storage Bay Dist (m)	47.0		58.0		37.0			56.0		
Storage Blk Time (%)	1	12	0	75	88	31		0	6	
Queuing Penalty (veh)	6	15	0	80	368	97		1	6	

Intersection: 15: Ninth Line & Burnhamthorpe Rd

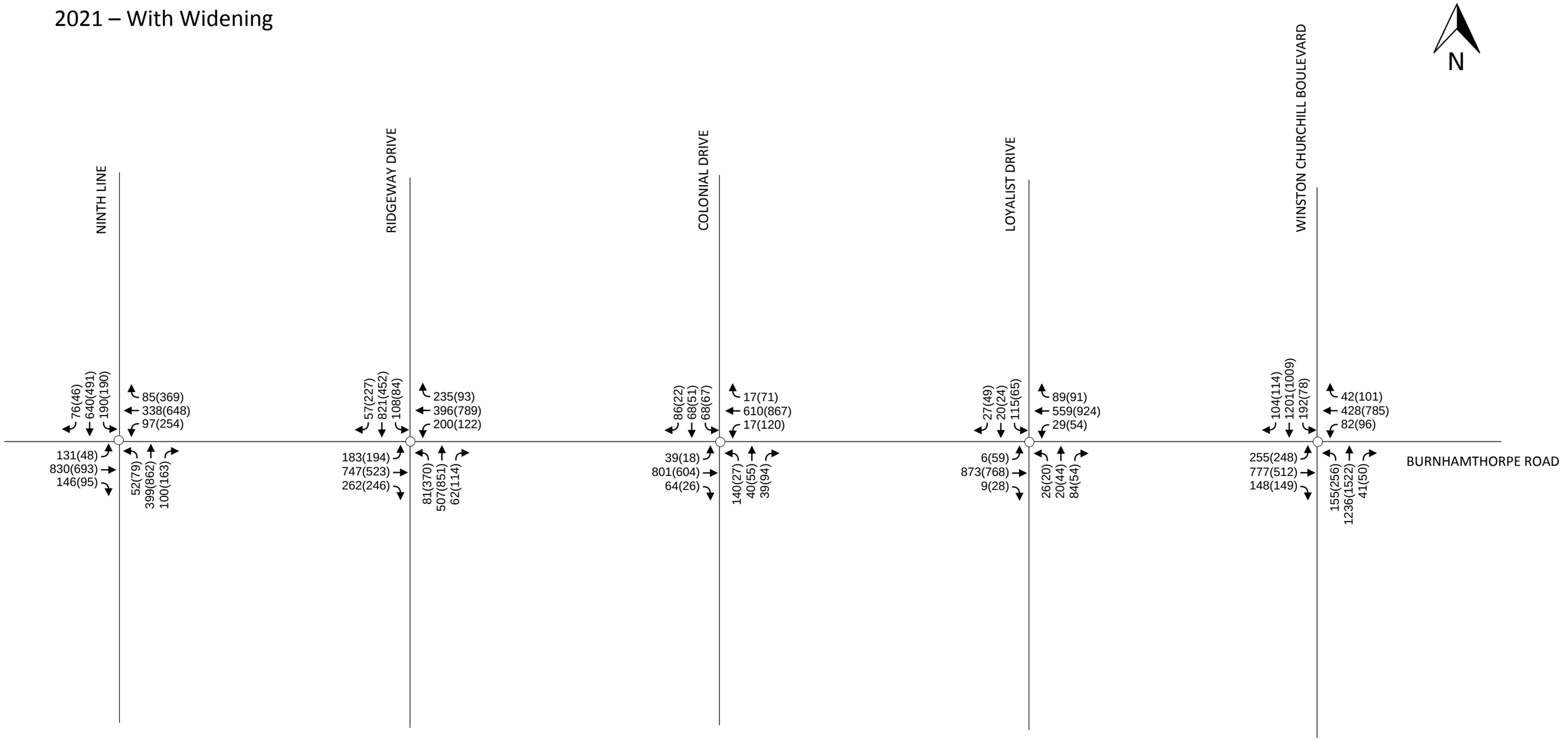
Movement	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	T	R	L	TR	L	TR
Maximum Queue (m)	87.8	203.7	148.0	562.0	146.0	82.9	723.8	58.8	92.5
Average Queue (m)	20.2	112.5	93.0	525.8	126.0	36.7	715.2	25.9	45.9
95th Queue (m)	62.2	195.2	183.0	636.6	200.4	93.6	721.2	46.1	78.5
Link Distance (m)		1594.2		556.1			708.2		748.6
Upstream Blk Time (%)				11			95		
Queuing Penalty (veh)				118			0		
Storage Bay Dist (m)	18.0		48.0		46.0	29.0		27.0	
Storage Blk Time (%)	13	63	53	68	6	3	55	16	19
Queuing Penalty (veh)	66	20	465	242	41	25	49	73	29

Network Summary

Network wide Queuing Penalty: 3245

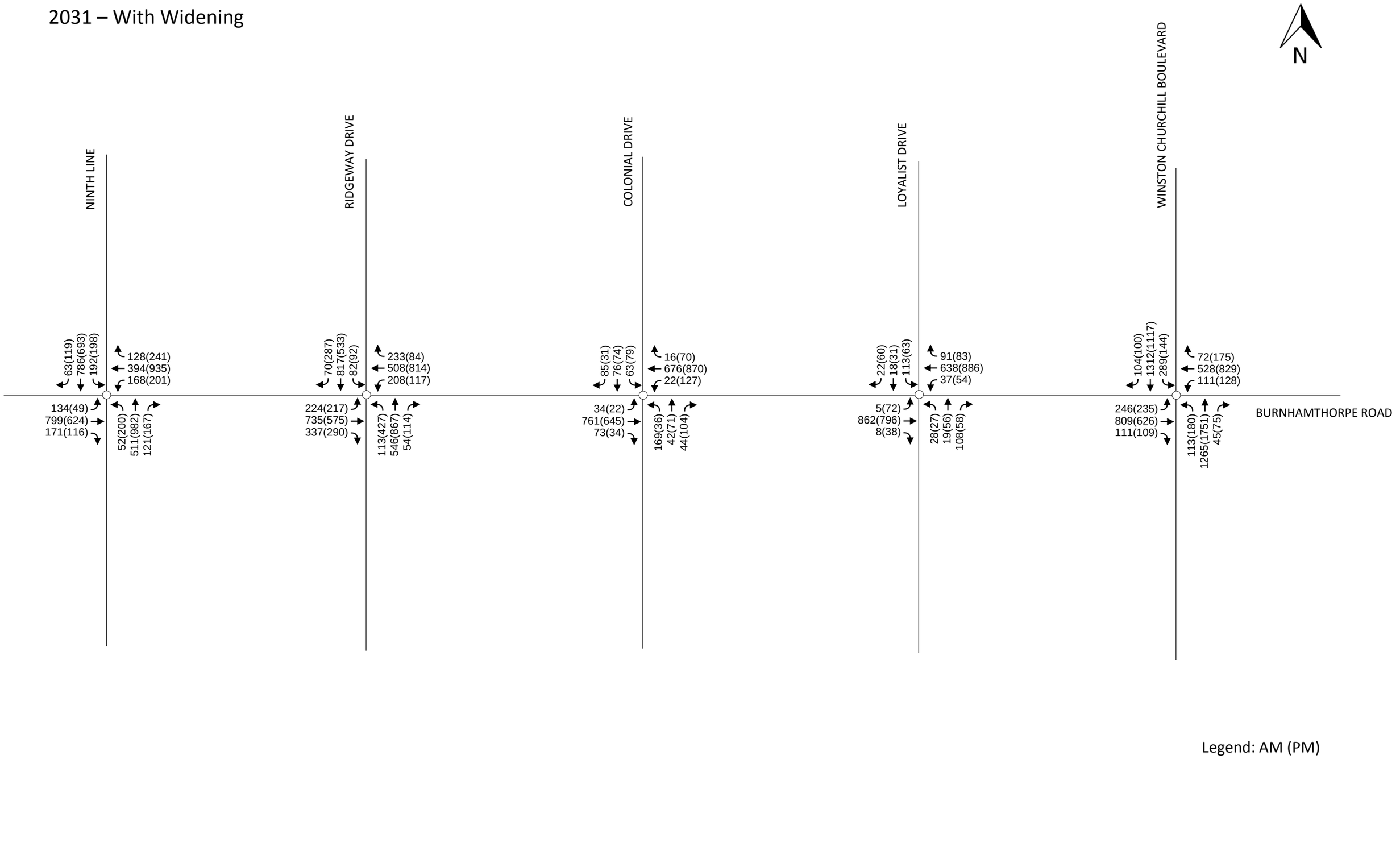
APPENDIX E: FUTURE TRAFFICS CONDITIONS TABLES AND DIAGRAMS: ALL HORIZON YEARS

2021 – With Widening



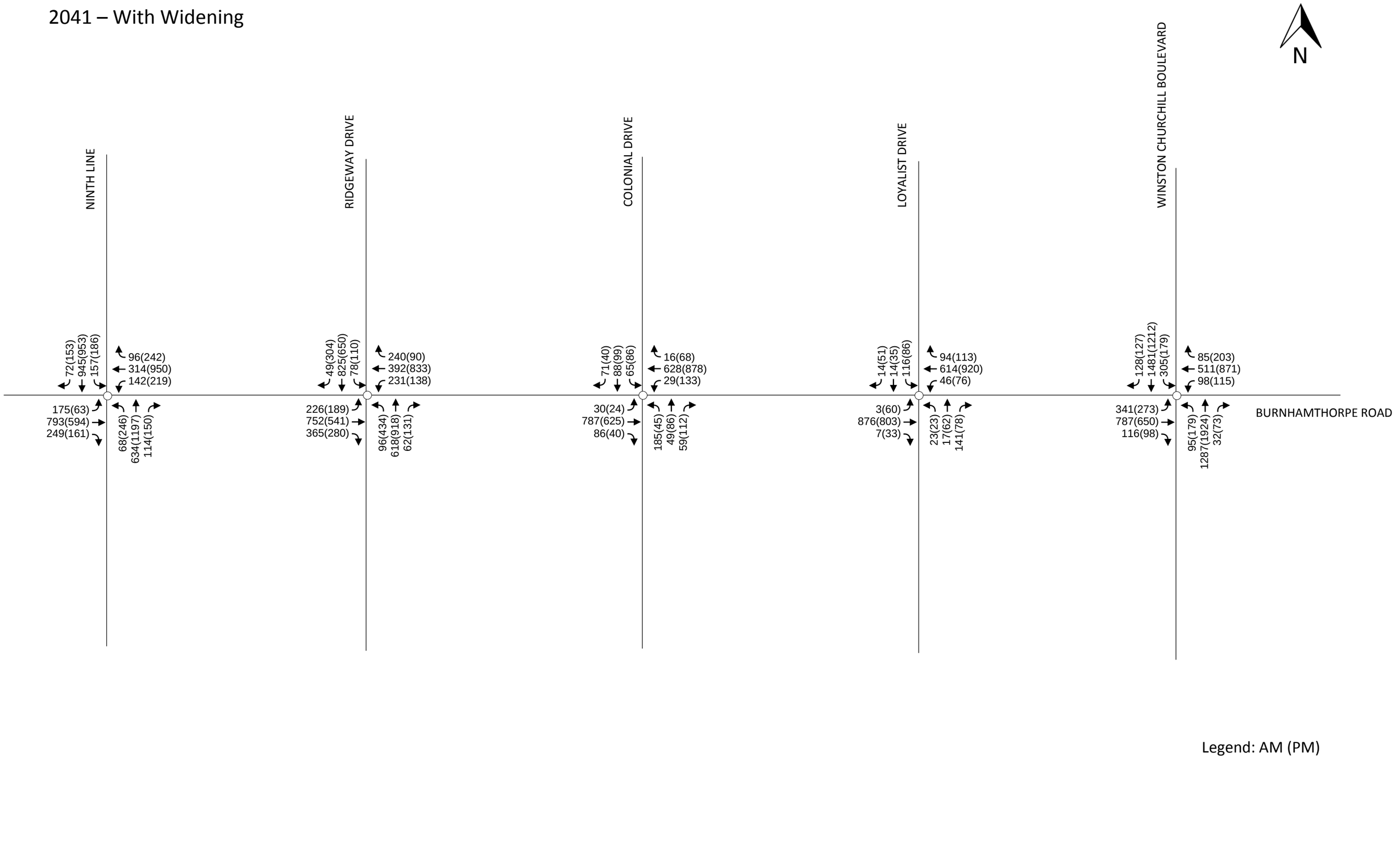
Legend: AM (PM)

2031 – With Widening



Legend: AM (PM)

2041 – With Widening



Legend: AM (PM)

origin\dest	9th Line N	Burnham E	9th Line S	Burnham W	0	total
9th Line N	0	190	640	76	0	906
Burnham E	85	0	97	338	0	520
9th Line S	399	100	0	52	0	551
Burnham W	131	830	146	0	1	1108
0	1	1	1	2	0	5
total	616	1121	884	468	1	3090 / 3090

2021 PM Peak

origin\dest	9th Line N	Burnham E	9th Line S	Burnham W		total
9th Line N	0	148	415	51	1	615
Burnham E	235	0	152	507	1	895
9th Line S	789	129	0	89	1	1008
Burnham W	31	383	57	0	1	472
	1	1	1	1	0	4
total	1056	661	625	648	4	2994

factor	0.859917	0.9944488	0.9148167	0.7000053	0.3375	
origin\dest	**9th Line N**	**Burnham E**	**9th Line S**	**Burnham W**	**0**	**total**
9th Line N	0	190	491	46	0	727
Burnham E	369	0	254	648	1	1272
9th Line S	862	163	0	79	0	1104
Burnham W	48	693	95	0	1	837
0	1	1	1	1	0	4
total	1280	1047	841	774	2	3944 / 3944
goal	1213	1013	804	728	3	
err	0.055235	0.0335637	0.0460199	0.0631868	0.333333	
NEW	0.815	0.962	0.875	0.658	0.506	

Warning: Goal sums off by 183, cannot converge!

Total of indi

2031 AM peak

origin\dest	9th Line N	Burnham E	9th Line S	Burnham W		total
9th Line N	0	190	607	55	1	853
Burnham E	89	0	93	246	1	429
9th Line S	373	90	0	34	1	498
Burnham W	98	594	99	0	1	792
	1	1	1	1	0	4
total	561	875	800	336	4	2576

factor	1.180136	1.1580695	1.4848318	1.313724	0.45	
origin\dest	**9th Line N**	**Burnham E**	**9th Line S**	**Burnham W**	**0**	**total**
9th Line N	0	192	786	63	0	1041
Burnham E	128	0	168	394	1	691
9th Line S	511	121	0	52	1	685
Burnham W	134	799	171	0	1	1105
0	1	1	1	1	0	4
total	774	1113	1126	510	3	3526 / 3526
goal	832	1202	1231	556	3	
err	0.069712	0.0740433	0.0852965	0.0827338	0	
NEW	1.269	1.251	1.623	1.432	0.450	

Warning: Goal sums off by 301, cannot converge!

Total of indi

2031 PM Peak

origin\dest	9th Line N	Burnham E	9th Line S	Burnham W		total
9th Line N	0	148	415	51	1	615
Burnham E	235	0	152	507	1	895
9th Line S	789	129	0	89	1	1008
Burnham W	31	383	57	0	1	472
	1	1	1	1	0	4
total	1056	661	625	648	4	2994

factor	0.98634	1.022645	1.2751264	1.7765062	0.578571	
origin\dest	**9th Line N**	**Burnham E**	**9th Line S**	**Burnham W**	**0**	**total**
9th Line N	0	198	693	119	1	1011
Burnham E	241	0	201	935	1	1378
9th Line S	982	167	0	200	1	1350
Burnham W	49	624	116	0	1	790
0	0	0	1	1	0	2
total	1272	989	1011	1255	4	4531 / 4531
goal	1336	1033	1065	1329	3	
err	0.047904	0.0425944	0.0507042	0.055681	0.333333	
NEW	1.036	1.068	1.343	1.881	0.434	

Warning: Goal sums off by 234, cannot converge!

Total of indi

2041 AM Peak

origin\dest	9th Line N	Burnham E	9th Line S	Burnham W		total
9th Line N	0	190	607	55	1	853
Burnham E	89	0	93	246	1	429
9th Line S	373	90	0	34	1	498
Burnham W	98	594	99	0	1	792
	1	1	1	1	0	4
total	561	875	800	336	4	2576

factor	1.578681	1.180615	2.2253447	1.8638616	0.84375	
origin\dest	**9th Line N**	**Burnham E**	**9th Line S**	**Burnham W**	**0**	**total**
9th Line N	0	157	945	72	1	1175
Burnham E	96	0	142	314	1	553
9th Line S	634	114	0	68	1	817
Burnham W	175	793	249	0	1	1218
0	1	0	1	1	0	3
total	906	1064	1337	455	4	3766 / 3766
goal	1019	1202	1526	519	3	
err	0.110893	0.1148087	0.1238532	0.1233141	0.333333	
NEW	1.776	1.334	2.540	2.126	0.633	

Warning: Goal sums off by 503, cannot converge!

Total of indi

2041 PM Peak

origin\dest	9th Line N	Burnham E	9th Line S	Burnham W	
9th Line N	0	148	415	51	1
Burnham E	235	0	152	507	1
9th Line S	789	129	0	89	4
Burnham W	31	383	57	0	1
	1	1	1	1	0
total	1056	661	625	648	7

factor	1.01657	0.7787254	1.4221906	1.8520132	0.25
origin\dest	**9th Line N**	**Burnham E**	**9th Line S**	**Burnham W**	**0**
9th Line N	0	186	953	153	0
Burnham E	242	0	219	950	0
9th Line S	1197	150	0	246	1
Burnham W	63	594	161	0	0
0	1	0	1	1	0
total	1503	930	1334	1350	1
goal	1574	965	1404	1428	3
err	0.045108	0.0362694	0.0498575	0.0546218	0.666667
NEW	1.065	0.808	1.497	1.959	0.750

Warning: Goal sums off by 254, cannot converge!

2021 AM peak

origin\dest	Colonial N	Burnham E	Colonial S	Burnham W		total
Colonial N	0	136	66	22	1	225
Burnham E	38	0	47	432	1	518
Colonial S	45	108	0	50	1	204
Burnham W	12	619	24	0	1	656
	1	1	1	1	0	4
total	96	864	138	505	4	1607

factor	0.925853	0.370298	0.7616384	2.8933064	0.450508	
origin\dest	**Colonial N**	**Burnham E**	**Colonial S**	**Burnham W**	**0**	**total**
Colonial N	0	68	68	86	1	223
Burnham E	17	0	17	610	0	644
Colonial S	40	39	0	140	0	219
Burnham W	39	801	64	0	2	906
0	1	0	0	2	0	3
total	97	908	149	838	3	1995 / 1995
goal	96	895	148	839	3	
err	0.010417	0.0145251	0.0067568	0.0011919	0	
NEW	0.916	0.365	0.757	2.897	0.451	

Warning: Goal sums off by 14, cannot converge!

Total of indi

2021 PM Peak

origin\dest	Colonial N	Burnham E	Colonial S	Burnham W		total
Colonial N	0	47	58	19	1	125
Burnham E	66	0	114	613	1	794
Colonial S	67	71	0	25	1	164
Burnham W	18	389	27	0	1	435
	1	1	1	1	0	4
total	152	508	200	658	4	1522

factor	0.96967	1.5457219	0.9451689	1.2715402	0.949219	
origin\dest	**Colonial N**	**Burnham E**	**Colonial S**	**Burnham W**	**0**	**total**
Colonial N	0	67	51	22	1	141
Burnham E	71	0	120	867	1	1059
Colonial S	55	94	0	27	1	177
Burnham W	18	604	26	0	1	649
0	1	1	1	1	0	4
total	145	766	198	917	4	2030 / 2030
goal	152	816	206	957	3	
err	0.046053	0.0612745	0.038835	0.0417973	0.333333	
NEW	1.016	1.647	0.983	1.327	0.712	

Warning: Goal sums off by 106, cannot converge!

Total of indiv

2031 AM peak

origin\dest	Colonial N	Burnham E	Colonial S	Burnham W	
Colonial N	0	136	66	22	1
Burnham E	38	0	47	432	1
Colonial S	45	108	0	50	1
Burnham W	12	619	24	0	1
	1	1	1	1	0
total	96	864	138	505	4

factor	0.923266	0.40446	1.0021312	3.3353611	0.400452
origin\dest	**Colonial N**	**Burnham E**	**Colonial S**	**Burnham W**	**0**
Colonial N	0	63	76	85	0
Burnham E	16	0	22	676	0
Colonial S	42	44	0	169	0
Burnham W	34	761	73	0	1
0	0	0	0	1	0
total	92	868	171	931	1
goal	94	869	172	943	3
err	0.021277	0.0011507	0.005814	0.0127253	0.666667
NEW	0.943	0.405	1.008	3.378	1.201

Warning: Goal sums off by 14, cannot converge!

2031 PM Peak

origin\dest	Colonial N	Burnham E	Colonial S	Burnham W		total
Colonial N	0	47	58	19	1	125
Burnham E	66	0	114	613	1	794
Colonial S	67	71	0	25	1	164
Burnham W	18	389	27	0	1	435
	1	1	1	1	0	4
total	152	508	200	658	4	1522

factor	0.89109	1.2292824	0.9365311	1.1928666	0.3375	
origin\dest	**Colonial N**	**Burnham E**	**Colonial S**	**Burnham W**	**0**	**total**
Colonial N	0	79	74	31	0	184
Burnham E	70	0	127	870	0	1067
Colonial S	71	104	0	36	0	211
Burnham W	22	645	34	0	0	701
0	0	1	0	1	0	2
total	163	829	235	938	0	2165 / 2165
goal	170	870	246	975	3	
err	0.041176	0.0471264	0.0447154	0.0379487	1	
NEW	0.929	1.290	0.980	1.240	#DIV/0!	

Warning: Goal sums off by 98, cannot converge!

Total of indi

2041 AM Peak

origin\dest	Colonial N	Burnham E	Colonial S	Burnham W		total
Colonial N	0	136	66	22	1	225
Burnham E	38	0	47	432	1	518
Colonial S	45	108	0	50	1	204
Burnham W	12	619	24	0	1	656
	1	1	1	1	0	4
total	96	864	138	505	4	1607

factor	0.691295	0.3464425	0.9765951	2.3383621	0.316406	
origin\dest	**Colonial N**	**Burnham E**	**Colonial S**	**Burnham W**	**0**	**total**
Colonial N	0	65	88	71	0	224
Burnham E	16	0	29	628	0	673
Colonial S	49	59	0	185	1	294
Burnham W	30	787	86	0	1	904
0	0	0	1	2	0	3
total	95	911	204	886	2	2098 / 2098
goal	96	897	201	876	3	
err	0.010417	0.0156076	0.0149254	0.0114155	0.333333	
NEW	0.699	0.341	0.962	2.312	0.475	

Warning: Goal sums off by 26, cannot converge!

Total of indi

2041 PM Peak

origin\dest	Colonial N	Burnham E	Colonial S	Burnham W	
Colonial N	0	47	58	19	1
Burnham E	66	0	114	613	1
Colonial S	67	71	0	25	4
Burnham W	18	389	27	0	1
	1	1	1	1	0
total	152	508	200	658	7

factor	0.96097	1.1790111	1.0936786	1.3409792	0.306818
origin\dest	**Colonial N**	**Burnham E**	**Colonial S**	**Burnham W**	**0**
Colonial N	0	86	99	40	0
Burnham E	68	0	133	878	0
Colonial S	86	112	0	45	2
Burnham W	24	625	40	0	0
0	1	1	1	2	0
total	179	824	273	965	2
goal	187	857	286	1015	3
err	0.042781	0.0385064	0.0454545	0.0492611	0.333333
NEW	1.004	1.226	1.146	1.410	0.460

Warning: Goal sums off by 108, cannot converge!

2021 AM peak

origin\dest	Loyalist N	Burnham E	Loyalist S	Burnham W		total
Loyalist N	0	88	29	50	1	168
Burnham E	80	0	20	481	1	582
Loyalist S	31	51	0	39	1	122
Burnham W	11	610	12	0	1	634
	1	1	1	1	0	4
total	123	750	62	571	4	1510

factor	0.79047	2.01447	1.0438271	0.8265635	0.949219	
origin\dest	**Loyalist N**	**Burnham E**	**Loyalist S**	**Burnham W**	**0**	**total**
Loyalist N	0	115	20	27	1	163
Burnham E	89	0	29	559	1	678
Loyalist S	20	84	0	26	1	131
Burnham W	6	873	9	0	1	889
0	0	1	0	0	0	1
total	115	1073	58	612	4	1862 / 1862
goal	117	1138	61	621	3	
err	0.017094	0.0571178	0.0491803	0.0144928	0.333333	
NEW	0.804	2.137	1.098	0.839	0.712	

Warning: Goal sums off by 75, cannot converge!

Total of indi

2021 PM Peak

origin\dest	Loyalist N	Burnham E	Loyalist S	Burnham W		total
Loyalist N	0	75	24	33	1	133
Burnham E	112	0	62	714	1	889
Loyalist S	42	56	0	12	1	111
Burnham W	40	569	18	0	1	628
	1	1	1	1	0	4
total	195	701	105	760	4	1765

factor	0.966857	0.888061	1.0394304	1.5332207	0.569531	
origin\dest	**Loyalist N**	**Burnham E**	**Loyalist S**	**Burnham W**	**0**	**total**
Loyalist N	0	65	24	49	1	139
Burnham E	91	0	54	924	0	1069
Loyalist S	44	54	0	20	1	119
Burnham W	59	768	28	0	1	856
0	1	1	1	1	0	4
total	195	888	107	994	3	2187 / 2187
goal	200	889	111	1036	3	
err	0.025	0.0011249	0.036036	0.0405405	0	
NEW	0.992	0.889	1.078	1.598	0.570	

Warning: Goal sums off by 51, cannot converge!

Total of indi

2031 AM peak

origin\dest	Loyalist N	Burnham E	Loyalist S	Burnham W	
Loyalist N	0	88	29	50	1
Burnham E	80	0	20	481	1
Loyalist S	31	51	0	39	1
Burnham W	11	610	12	0	1
	1	1	1	1	0
total	123	750	62	571	4

factor	0.647684	2.1750902	1.0371467	0.7522412	0.854297
origin\dest	**Loyalist N**	**Burnham E**	**Loyalist S**	**Burnham W**	**0**
Loyalist N	0	113	18	22	1
Burnham E	91	0	37	638	2
Loyalist S	19	108	0	28	1
Burnham W	5	862	8	0	1
0	0	1	1	0	0
total	115	1084	64	688	5
goal	117	1134	65	695	3
err	0.017094	0.0440917	0.0153846	0.0100719	0.666667
NEW	0.659	2.275	1.053	0.760	0.513

Warning: Goal sums off by 58, cannot converge!

2031 PM Peak

origin\dest	Loyalist N	Burnham E	Loyalist S	Burnham W		total
Loyalist N	0	75	24	33	1	133
Burnham E	112	0	62	714	1	889
Loyalist S	42	56	0	12	1	111
Burnham W	40	569	18	0	1	628
	1	1	1	1	0	4
total	195	701	105	760	4	1765

factor	1.151591	0.8933563	1.3517483	1.9270838	0.632813

origin\dest	Loyalist N	Burnham E	Loyalist S	Burnham W	0	total	
Loyalist N	0	63	31	60	1	155	
Burnham E	83	0	54	886	0	1023	
Loyalist S	56	58	0	27	1	142	
Burnham W	72	796	38	0	1	907	
0	1	0	1	1	0	3	
total	212	917	124	974	3	2230	/ 2230
goal	220	935	129	1029	3		
err	0.036364	0.0192513	0.0387597	0.05345	0		
NEW	1.195	0.911	1.406	2.036	0.633		

Warning: Goal sums off by 86, cannot converge!

Total of indi

2041 AM Peak

origin\dest	Loyalist N	Burnham E	Loyalist S	Burnham W		total
Loyalist N	0	88	29	50	1	168
Burnham E	80	0	20	481	1	582
Loyalist S	31	51	0	39	1	122
Burnham W	11	610	12	0	1	634
	1	1	1	1	0	4
total	123	750	62	571	4	1510

factor	0.536073	2.7593459	1.0452086	0.5852595	0.759375

origin\dest	Loyalist N	Burnham E	Loyalist S	Burnham W	0	total
Loyalist N	0	116	14	14	0	144
Burnham E	94	0	46	614	2	756
Loyalist S	17	141	0	23	1	182
Burnham W	3	876	7	0	0	886
0	0	2	1	0	0	3
total	114	1135	68	651	3	1971 / 1971
goal	114	1203	69	650	3	
err	0	0.0565254	0.0144928	0.0015385	0	
NEW	0.536	2.925	1.061	0.584	0.759	

Warning: Goal sums off by 71, cannot converge!

Total of indi

2041 PM Peak

origin\dest	Loyalist N	Burnham E	Loyalist S	Burnham W	
Loyalist N	0	75	24	33	1
Burnham E	112	0	62	714	1
Loyalist S	42	56	0	12	4
Burnham W	40	569	18	0	1
	1	1	1	1	0
total	195	701	105	760	7

factor	1.094948	1.0321672	1.3341159	1.3933882	0.321429
origin\dest	**Loyalist N**	**Burnham E**	**Loyalist S**	**Burnham W**	**0**
Loyalist N	0	86	35	51	0
Burnham E	113	0	76	920	0
Loyalist S	62	78	0	23	2
Burnham W	60	803	33	0	0
0	1	0	1	1	0
total	236	967	145	995	2
goal	244	988	151	1042	3
err	0.032787	0.0212551	0.0397351	0.0451056	0.333333
NEW	1.132	1.055	1.389	1.459	0.482

Warning: Goal sums off by 83, cannot converge!

2021 AM peak

origin\dest	Ridgeway N	Burnham E	Ridgeway S	Burnham W		total
Ridgeway N	0	99	840	55	1	995
Burnham E	219	0	180	336	1	736
Ridgeway S	501	53	0	73	1	628
Burnham W	141	498	195	0	1	835
	1	1	1	1	0	4
total	862	651	1216	465	4	3198

factor	0.918014	1.0635561	0.9530743	1.0100613	0.5625	
origin\dest	**Ridgeway N**	**Burnham E**	**Ridgeway S**	**Burnham W**	**0**	**total**
Ridgeway N	0	108	821	57	1	987
Burnham E	235	0	200	396	1	832
Ridgeway S	507	62	0	81	1	651
Burnham W	183	747	262	0	1	1193
0	0	0	0	0	0	0
total	925	917	1283	534	4	3663 / 3663
goal	911	915	1271	526	3	
err	0.015368	0.0021858	0.0094414	0.0152091	0.333333	
NEW	0.904	1.061	0.944	0.995	0.422	

Warning: Goal sums off by 42, cannot converge!

Total of indi

2021 PM Peak

origin\dest	Ridgeway N	Burnham E	Ridgeway S	Burnham W		total
Ridgeway N	0	100	429	175	1	705
Burnham E	75	0	106	557	1	739
Ridgeway S	835	151	0	317	1	1304
Burnham W	121	440	165	0	1	727
	1	1	1	1	0	4
total	1032	692	701	1050	4	3479

factor	0.893464	0.6636449	0.8307695	1.0226965	0.421875	
origin\dest	**Ridgeway N**	**Burnham E**	**Ridgeway S**	**Burnham W**	**0**	**total**
Ridgeway N	0	84	452	227	1	764
Burnham E	93	0	122	789	1	1005
Ridgeway S	851	114	0	370	0	1335
Burnham W	194	523	246	0	1	964
0	1	0	1	1	0	3
total	1139	721	821	1387	3	4071 / 4071
goal	1088	680	779	1335	3	
err	0.046875	0.0602941	0.0539153	0.0389513	0	
NEW	0.853	0.626	0.788	0.984	0.422	

Warning: Goal sums off by 184, cannot converge!

Total of indi

2031 AM peak

origin\dest	Ridgeway N	Burnham E	Ridgeway S	Burnham W	
Ridgeway N	0	99	840	55	1
Burnham E	219	0	180	336	1
Ridgeway S	501	53	0	73	1
Burnham W	141	498	195	0	1
	1	1	1	1	0
total	862	651	1216	465	4

factor	0.927323	0.8632783	1.008902	1.3181146	0.45
origin\dest	**Ridgeway N**	**Burnham E**	**Ridgeway S**	**Burnham W**	**0**
Ridgeway N	0	82	817	70	0
Burnham E	233	0	208	508	1
Ridgeway S	546	54	0	113	1
Burnham W	224	735	337	0	1
0	1	0	1	1	0
total	1004	871	1363	692	3
goal	1003	870	1360	692	3
err	0.000997	0.0011494	0.0022059	0	0
NEW	0.926	0.862	1.007	1.318	0.450

Warning: Goal sums off by 4, cannot converge!

2031 PM Peak

origin\dest	Ridgeway N	Burnham E	Ridgeway S	Burnham W		total
Ridgeway N	0	100	429	175	1	705
Burnham E	75	0	106	557	1	739
Ridgeway S	835	151	0	317	1	1304
Burnham W	121	440	165	0	1	727
	1	1	1	1	0	4
total	1032	692	701	1050	4	3479

factor	0.753883	0.5496356	0.7401564	0.9785749	0.474609

origin\dest	Ridgeway N	Burnham E	Ridgeway S	Burnham W	0	total	
Ridgeway N	0	92	533	287	1	913	
Burnham E	84	0	117	814	1	1016	
Ridgeway S	867	114	0	427	1	1409	
Burnham W	217	575	290	0	1	1083	
0	1	0	1	1	0	3	
total	1169	781	941	1529	4	4424 / 4424	
goal	1111	740	893	1456	3		
err	0.052205	0.0554054	0.0537514	0.0501374	0.333333		
NEW	0.716	0.521	0.702	0.932	0.356		

Warning: Goal sums off by 225, cannot converge!

Total of indi

2041 AM Peak

origin\dest	Ridgeway N	Burnham E	Ridgeway S	Burnham W		total
Ridgeway N	0	99	840	55	1	995
Burnham E	219	0	180	336	1	736
Ridgeway S	501	53	0	73	1	628
Burnham W	141	498	195	0	1	835
	1	1	1	1	0	4
total	862	651	1216	465	4	3198

factor	1.227117	1.1583589	1.4368365	1.303588	0.5625	
origin\dest	**Ridgeway N**	**Burnham E**	**Ridgeway S**	**Burnham W**	**0**	**total**
Ridgeway N	0	78	825	49	0	952
Burnham E	240	0	231	392	1	864
Ridgeway S	618	62	0	96	1	777
Burnham W	226	752	365	0	1	1344
0	1	0	1	1	0	3
total	1085	892	1422	538	3	3940 / 3940
goal	1091	896	1446	546	3	
err	0.0055	0.0044643	0.0165975	0.014652	0	
NEW	1.234	1.164	1.461	1.323	0.563	

Warning: Goal sums off by 42, cannot converge!

Total of indi

2041 PM Peak

origin\dest	Ridgeway N	Burnham E	Ridgeway S	Burnham W	
Ridgeway N	0	100	429	175	1
Burnham E	75	0	106	557	1
Ridgeway S	835	151	0	317	4
Burnham W	121	440	165	0	1
	1	1	1	1	0
total	1032	692	701	1050	7

factor	0.80549	0.6331883	0.872735	1.0019513	0.75
origin\dest	**Ridgeway N**	**Burnham E**	**Ridgeway S**	**Burnham W**	**0**
Ridgeway N	0	110	650	304	1
Burnham E	90	0	138	833	1
Ridgeway S	918	131	0	434	4
Burnham W	189	541	280	0	1
0	1	0	1	1	0
total	1198	782	1069	1572	7
goal	1132	731	1009	1498	3
err	0.058304	0.0697674	0.0594648	0.0493992	1.333333
NEW	0.761	0.592	0.824	0.955	0.321

Warning: Goal sums off by 255, cannot converge!

2021 AM peak

origin\dest	WCB N	Burham E	WCB S	Burham W		total
WCB N	0	205	1133	76	1	1415
Burham E	39	0	89	360	1	489
WCB S	1243	54	0	140	1	1438
Burham W	177	709	119	0	1	1006
	1	1	1	1	0	4
total	1460	969	1342	577	4	4352

factor	1.040456	0.7925697	0.8984681	1.1591045	0.569531	
origin\dest	**WCB N**	**Burham E**	**WCB S**	**Burham W**	**0**	**total**
WCB N	0	192	1201	104	1	1498
Burham E	42	0	82	428	1	553
WCB S	1236	41	0	155	1	1433
Burham W	255	777	148	0	1	1181
0	1	0	1	1	0	3
total	1534	1010	1432	688	4	4668 / 4668
goal	1527	1000	1416	685	3	
err	0.004584	0.01	0.0112994	0.0043796	0.333333	
NEW	1.036	0.785	0.888	1.154	0.427	

Warning: Goal sums off by 39, cannot converge!

Total of indi

2021 PM Peak

origin\dest	9th Line N	Burnham E	9th Line S	Burnham W		total
9th Line N	0	84	946	109	1	1140
Burnham E	81	0	86	717	1	885
9th Line S	1424	61	0	274	1	1760
Burnham W	128	342	86	0	1	557
	1	1	1	1	0	4
total	1634	488	1119	1101	4	4346

factor	0.945214	0.7305629	0.8433948	0.8278492	0.45	
origin\dest	**9th Line N**	**Burnham E**	**9th Line S**	**Burnham W**	**0**	**total**
9th Line N	0	78	1009	114	1	1202
Burnham E	101	0	96	785	1	983
9th Line S	1522	50	0	256	1	1829
Burnham W	248	512	149	0	1	910
0	1	1	1	1	0	4
total	1872	641	1255	1156	4	4928 / 4928
goal	1810	615	1200	1114	3	
err	0.034254	0.0422764	0.0458333	0.037702	0.333333	
NEW	0.914	0.701	0.806	0.798	0.338	

Warning: Goal sums off by 183, cannot converge!

Total of indiv

2031 AM peak

origin\dest	WCB N	Burham E	WCB S	Burham W	
WCB N	0	205	1133	76	1
Burham E	39	0	89	360	1
WCB S	1243	54	0	140	1
Burham W	177	709	119	0	1
	1	1	1	1	0
total	1460	969	1342	577	4

factor	1.314911	1.0788583	0.8850839	1.0448062	0.5625
origin\dest	**WCB N**	**Burham E**	**WCB S**	**Burham W**	**0**
WCB N	0	289	1312	104	1
Burham E	72	0	111	528	1
WCB S	1265	45	0	113	0
Burham W	246	809	111	0	1
0	1	1	1	1	0
total	1584	1144	1535	746	3
goal	1627	1157	1540	757	3
err	0.026429	0.011236	0.0032468	0.014531	0
NEW	1.351	1.091	0.888	1.060	0.563

Warning: Goal sums off by 73, cannot converge!

2031 PM Peak

origin\dest	WCB N	Burham E	WCB S	Burham W		total
WCB N	0	84	946	109	1	1140
Burham E	81	0	86	717	1	885
WCB S	1424	61	0	274	1	1760
Burham W	128	342	86	0	1	557
	1	1	1	1	0	4
total	1634	488	1119	1101	4	4346

factor	0.999204	0.9973431	0.6878479	0.5341559	0.379688	
origin\dest	**WCB N**	**Burham E**	**WCB S**	**Burham W**	**0**	**total**
WCB N	0	144	1117	100	1	1362
Burham E	175	0	128	829	1	1133
WCB S	1751	75	0	180	0	2006
Burham W	235	626	109	0	1	971
0	1	1	1	1	0	4
total	2162	846	1355	1110	3	5476 / 5476
goal	2090	815	1294	1065	3	
err	0.03445	0.0380368	0.0471406	0.0422535	0	
NEW	0.966	0.961	0.657	0.513	0.380	

Warning: Goal sums off by 206, cannot converge!

Total of indi

2041 AM Peak

origin\dest	WCB N	Burham E	WCB S	Burham W		total
WCB N	0	205	1133	76	1	1415
Burham E	39	0	89	360	1	489
WCB S	1243	54	0	140	1	1438
Burham W	177	709	119	0	1	1006
	1	1	1	1	0	4
total	1460	969	1342	577	4	4352

factor	1.626169	0.9373854	0.8240864	1.0629976	0.5625	
origin\dest	**WCB N**	**Burham E**	**WCB S**	**Burham W**	**0**	**total**
WCB N	0	305	1481	128	1	1915
Burham E	85	0	98	511	1	695
WCB S	1287	32	0	95	0	1414
Burham W	341	787	116	0	1	1245
0	1	1	0	1	0	3
total	1714	1125	1695	735	3	5272 / 5272
goal	1763	1138	1697	744	3	
err	0.027794	0.0114236	0.0011786	0.0120968	0	
NEW	1.673	0.948	0.825	1.076	0.563	

Warning: Goal sums off by 74, cannot converge!

Total of indi

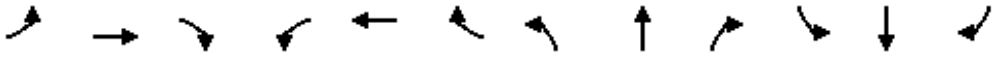
2041 PM Peak

origin\dest	WCB N	Burham E	WCB S	Burham W	
WCB N	0	84	946	109	1
Burham E	81	0	86	717	1
WCB S	1424	61	0	274	4
Burham W	128	342	86	0	1
	1	1	1	1	0
total	1634	488	1119	1101	7

factor	1.125146	1.0007847	0.6015052	0.5451208	0.3375
origin\dest	**WCB N**	**Burham E**	**WCB S**	**Burham W**	**0**
WCB N	0	179	1212	127	1
Burham E	203	0	115	871	1
WCB S	1924	73	0	179	2
Burham W	273	650	98	0	1
0	1	1	0	0	0
total	2401	903	1425	1177	5
goal	2346	876	1373	1143	3
err	0.023444	0.0308219	0.0378733	0.0297463	0.666667
NEW	1.099	0.971	0.580	0.529	0.203

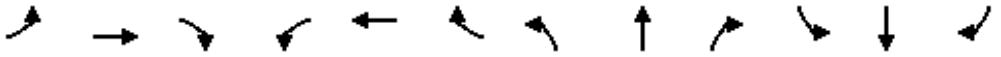
Warning: Goal sums off by 174, cannot converge!

APPENDIX F: SYNCHRO/SIM TRAFFIC OUTPUTS: FUTURE WITH WIDENING



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	255	777	148	82	428	42	155	1236	41	192	1201	104
Future Volume (vph)	255	777	148	82	428	42	155	1236	41	192	1201	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		2.0	5.0	7.0	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	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	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1648	3268		1604	3349	1341	1604	3449		1652	3510	1442
Flt Permitted	0.29	1.00		0.11	1.00	1.00	0.07	1.00		0.06	1.00	1.00
Satd. Flow (perm)	506	3268		186	3349	1341	115	3449		99	3510	1442
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)	277	845	161	89	465	46	168	1343	45	209	1305	113
RTOR Reduction (vph)	0	10	0	0	0	36	0	2	0	0	0	50
Lane Group Flow (vph)	277	996	0	89	465	10	168	1386	0	209	1305	63
Confl. Peds. (#/hr)	13		6	6		13			7	7		
Heavy Vehicles (%)	2%	2%	6%	5%	3%	11%	5%	3%	1%	2%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	60.0	50.0		42.4	35.4	35.4	80.2	66.9		85.8	69.7	69.7
Effective Green, g (s)	62.0	52.0		44.4	37.4	35.4	84.2	68.9		88.0	71.7	69.7
Actuated g/C Ratio	0.39	0.32		0.28	0.23	0.22	0.53	0.43		0.55	0.45	0.44
Clearance Time (s)	3.0	7.0		3.0	7.0	7.0	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	364	1062		122	782	296	202	1485		230	1572	628
v/s Ratio Prot	c0.11	c0.30		0.04	0.14		0.08	c0.40		c0.10	0.37	
v/s Ratio Perm	0.18			0.17		0.01	0.36			0.39		0.04
v/c Ratio	0.76	0.94		0.73	0.59	0.03	0.83	0.93		0.91	0.83	0.10
Uniform Delay, d1	37.2	52.4		46.6	54.6	48.9	43.3	43.4		52.1	38.8	26.6
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	8.2	14.8		16.8	1.2	0.0	23.4	12.1		34.6	5.2	0.3
Delay (s)	45.4	67.3		63.4	55.8	48.9	66.6	55.5		86.7	44.0	27.0
Level of Service	D	E		E	E	D	E	E		F	D	C
Approach Delay (s)		62.5			56.4			56.7			48.3	
Approach LOS		E			E			E			D	

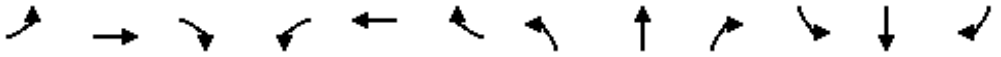
Intersection Summary			
HCM 2000 Control Delay	55.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	873	9	29	559	89	26	20	84	115	20	27
Future Volume (vph)	6	873	9	29	559	89	26	20	84	115	20	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.88		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1672	3250		1396	3193		1631	1862		1636	1590	
Flt Permitted	0.37	1.00		0.27	1.00		0.72	1.00		0.64	1.00	
Satd. Flow (perm)	650	3250		401	3193		1242	1862		1097	1590	
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)	7	949	10	32	608	97	28	22	91	125	22	29
RTOR Reduction (vph)	0	0	0	0	7	0	0	74	0	0	24	0
Lane Group Flow (vph)	7	959	0	32	698	0	28	39	0	125	27	0
Confl. Peds. (#/hr)	8		9	9		8	3					3
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	6%	0%	20%	6%	9%	3%	3%	0%	3%	3%	4%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	82.6	82.6		82.6	82.6		18.9	18.9		18.9	18.9	
Effective Green, g (s)	82.6	84.1		82.6	84.1		18.9	20.9		18.9	20.9	
Actuated g/C Ratio	0.72	0.73		0.72	0.73		0.16	0.18		0.16	0.18	
Clearance Time (s)	6.5	6.5		6.5	6.5		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	
Lane Grp Cap (vph)	466	2376		288	2335		204	338		180	288	
v/s Ratio Prot		c0.30			0.22			0.02			0.02	
v/s Ratio Perm	0.01			0.08			0.02			c0.11		
v/c Ratio	0.02	0.40		0.11	0.30		0.14	0.11		0.69	0.09	
Uniform Delay, d1	4.6	5.9		5.0	5.3		41.1	39.3		45.3	39.2	
Progression Factor	0.96	2.47		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		0.8	0.3		0.3	0.2		11.0	0.1	
Delay (s)	4.5	15.0		5.7	5.6		41.4	39.5		56.4	39.3	
Level of Service	A	B		A	A		D	D		E	D	
Approach Delay (s)		15.0			5.6			39.8			51.4	
Approach LOS		B			A			D			D	

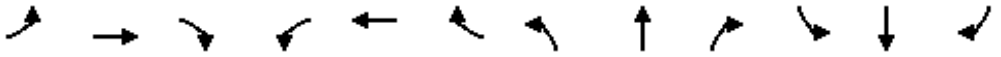
Intersection Summary			
HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	801	64	17	610	17	140	40	39	68	68	86
Future Volume (vph)	39	801	64	17	610	17	140	40	39	68	68	86
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		8.0	5.0		8.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1488	3797		1530	3757		1613	1644		1695	1586	
Flt Permitted	0.37	1.00		0.27	1.00		0.53	1.00		0.70	1.00	
Satd. Flow (perm)	584	3797		435	3757		908	1644		1252	1586	
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)	42	871	70	18	663	18	152	43	42	74	74	93
RTOR Reduction (vph)	0	4	0	0	1	0	0	33	0	0	46	0
Lane Group Flow (vph)	42	937	0	18	680	0	152	52	0	74	121	0
Confl. Peds. (#/hr)	12		15	15		12	2		10	10		2
Heavy Vehicles (%)	17%	2%	0%	9%	3%	3%	8%	4%	3%	2%	12%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	78.1	78.1		78.1	78.1		22.9	22.9		22.9	22.9	
Effective Green, g (s)	78.1	79.1		78.1	79.1		22.9	25.9		22.9	25.9	
Actuated g/C Ratio	0.68	0.69		0.68	0.69		0.20	0.23		0.20	0.23	
Clearance Time (s)	6.0	6.0		6.0	6.0		8.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	396	2611		295	2584		180	370		249	357	
v/s Ratio Prot		c0.25			0.18			0.03			0.08	
v/s Ratio Perm	0.07			0.04			c0.17			0.06		
v/c Ratio	0.11	0.36		0.06	0.26		0.84	0.14		0.30	0.34	
Uniform Delay, d1	6.4	7.4		6.2	6.8		44.3	35.7		39.2	37.4	
Progression Factor	1.89	2.38		1.44	1.65		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		0.4	0.2		28.7	0.2		0.7	0.6	
Delay (s)	12.4	18.0		9.3	11.6		73.0	35.8		39.9	37.9	
Level of Service	B	B		A	B		E	D		D	D	
Approach Delay (s)		17.7			11.5			59.7			38.5	
Approach LOS		B			B			E			D	

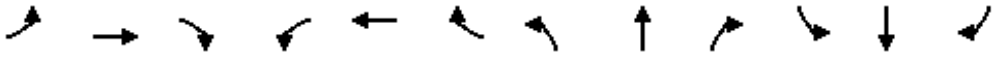
Intersection Summary			
HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	747	262	200	396	235	81	507	62	108	821	57
Future Volume (vph)	183	747	262	200	396	235	81	507	62	108	821	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	6.5	5.0		1.0	5.0		1.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.93		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.94	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.96		1.00	0.94		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1654	3516		1665	3178		1683	3384		1524	3383	
Flt Permitted	0.38	1.00		0.09	1.00		0.10	1.00		0.36	1.00	
Satd. Flow (perm)	655	3516		149	3178		184	3384		585	3383	
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)	210	859	301	230	455	270	93	583	71	124	944	66
RTOR Reduction (vph)	0	30	0	0	50	0	0	8	0	0	5	0
Lane Group Flow (vph)	210	1130	0	230	675	0	93	646	0	124	1005	0
Confl. Peds. (#/hr)	152		93	93		152	116		60	60		116
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	1%	1%	1%	6%	4%	5%	0%	2%	11%	8%	2%	9%
Turn Type	Perm	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	44.0	44.0		57.9	57.9		43.6	43.6		35.6	35.6	
Effective Green, g (s)	44.0	45.5		59.9	59.4		45.6	45.6		35.6	37.6	
Actuated g/C Ratio	0.38	0.40		0.52	0.52		0.40	0.40		0.31	0.33	
Clearance Time (s)	6.5	6.5		3.0	6.5		3.0	7.0		7.0	7.0	
Vehicle Extension (s)	3.0	3.0		2.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	1391		247	1641		164	1341		181	1106	
v/s Ratio Prot		c0.32		c0.10	0.21		c0.03	0.19			c0.30	
v/s Ratio Perm	0.32			0.38			0.19			0.21		
v/c Ratio	0.84	0.81		0.93	0.41		0.57	0.48		0.69	0.91	
Uniform Delay, d1	32.3	30.9		32.3	17.1		26.2	25.9		34.8	37.1	
Progression Factor	1.00	1.00		0.70	1.22		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.4	5.3		37.7	0.7		2.7	0.3		10.2	10.8	
Delay (s)	59.7	36.2		60.4	21.5		28.9	26.2		45.0	47.9	
Level of Service	E	D		E	C		C	C		D	D	
Approach Delay (s)		39.8			30.9			26.5			47.6	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	37.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



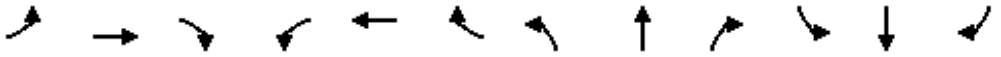
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	248	512	149	96	785	101	256	1522	50	78	1009	114
Future Volume (vph)	248	512	149	96	785	101	256	1522	50	78	1009	114
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.0	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.98	1.00	1.00		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
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1620	3272		1650	3415	1476	1685	3481		1668	3579	1500
Flt Permitted	0.10	1.00		0.25	1.00	1.00	0.08	1.00		0.07	1.00	1.00
Satd. Flow (perm)	165	3272		439	3415	1476	145	3481		115	3579	1500
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)	270	557	162	104	853	110	278	1654	54	85	1097	124
RTOR Reduction (vph)	0	16	0	0	0	83	0	2	0	0	0	69
Lane Group Flow (vph)	270	703	0	104	853	27	278	1706	0	85	1097	55
Confl. Peds. (#/hr)	7		9	9		7	4		4	4		4
Heavy Vehicles (%)	4%	1%	2%	2%	1%	2%	0%	2%	2%	1%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	62.4	49.0		48.8	38.4	38.4	83.6	74.3		65.5	59.2	59.2
Effective Green, g (s)	64.4	51.0		52.8	40.4	38.4	85.6	76.3		69.5	61.2	59.2
Actuated g/C Ratio	0.40	0.32		0.33	0.25	0.24	0.53	0.48		0.43	0.38	0.37
Clearance Time (s)	3.0	7.0		3.0	7.0	7.0	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	275	1042		238	862	354	302	1660		130	1368	555
v/s Ratio Prot	c0.14	0.21		0.03	c0.25		c0.13	c0.49		0.03	0.31	
v/s Ratio Perm	0.25			0.11		0.02	0.36			0.25		0.04
v/c Ratio	0.98	0.67		0.44	0.99	0.08	0.92	1.03		0.65	0.80	0.10
Uniform Delay, d1	50.9	47.3		39.0	59.6	47.1	47.9	41.9		37.7	44.0	33.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	48.9	1.7		0.5	27.7	0.1	31.4	29.6		8.7	5.0	0.4
Delay (s)	99.8	49.0		39.5	87.3	47.2	79.4	71.4		46.4	49.0	33.3
Level of Service	F	D		D	F	D	E	E		D	D	C
Approach Delay (s)		62.9			78.5			72.5			47.4	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	65.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	768	28	54	924	91	20	44	54	65	24	49
Future Volume (vph)	59	768	28	54	924	91	20	44	54	65	24	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	3304		1652	3320		1546	1939		1618	1512	
Flt Permitted	0.24	1.00		0.31	1.00		0.71	1.00		0.64	1.00	
Satd. Flow (perm)	400	3304		547	3320		1148	1939		1093	1512	
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)	63	826	30	58	994	98	22	47	58	70	26	53
RTOR Reduction (vph)	0	1	0	0	4	0	0	49	0	0	45	0
Lane Group Flow (vph)	63	855	0	58	1088	0	22	56	0	70	34	0
Confl. Peds. (#/hr)	6					6	9		1	1		9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	5%	4%	0%	2%	3%	7%	8%	0%	2%	4%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	86.2	86.2		86.2	86.2		15.3	15.3		15.3	15.3	
Effective Green, g (s)	86.2	87.7		86.2	87.7		15.3	17.3		15.3	17.3	
Actuated g/C Ratio	0.75	0.76		0.75	0.76		0.13	0.15		0.13	0.15	
Clearance Time (s)	6.5	6.5		6.5	6.5		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	
Lane Grp Cap (vph)	299	2519		410	2531		152	291		145	227	
v/s Ratio Prot		0.26			c0.33			0.03			0.02	
v/s Ratio Perm	0.16			0.11			0.02			c0.06		
v/c Ratio	0.21	0.34		0.14	0.43		0.14	0.19		0.48	0.15	
Uniform Delay, d1	4.3	4.4		4.0	4.8		44.1	42.7		46.2	42.5	
Progression Factor	2.00	1.82		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.4		0.7	0.5		0.4	0.3		2.5	0.3	
Delay (s)	10.1	8.3		4.8	5.4		44.5	43.1		48.7	42.8	
Level of Service	B	A		A	A		D	D		D	D	
Approach Delay (s)		8.5			5.3			43.3			45.6	
Approach LOS		A			A			D			D	

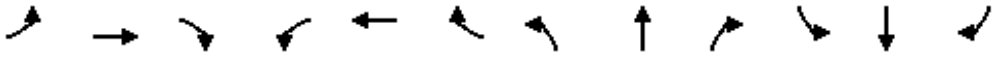
Intersection Summary			
HCM 2000 Control Delay	11.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	18	604	26	120	867	71	27	55	94	67	51	22
Future Volume (vph)	18	604	26	120	867	71	27	55	94	67	51	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		8.0	5.0		8.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1754	3829		1679	3791		1605	1650		1741	1629	
Flt Permitted	0.26	1.00		0.38	1.00		0.71	1.00		0.48	1.00	
Satd. Flow (perm)	474	3829		672	3791		1192	1650		871	1629	
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)	20	657	28	130	942	77	29	60	102	73	55	24
RTOR Reduction (vph)	0	2	0	0	3	0	0	68	0	0	17	0
Lane Group Flow (vph)	20	683	0	130	1016	0	29	94	0	73	62	0
Confl. Peds. (#/hr)	10		3	3		10	7		3	3		7
Heavy Vehicles (%)	0%	2%	0%	0%	1%	2%	8%	1%	1%	0%	10%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	84.7	84.7		84.7	84.7		16.3	16.3		16.3	16.3	
Effective Green, g (s)	84.7	85.7		84.7	85.7		16.3	19.3		16.3	19.3	
Actuated g/C Ratio	0.74	0.75		0.74	0.75		0.14	0.17		0.14	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0		8.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	349	2853		494	2825		168	276		123	273	
v/s Ratio Prot		0.18			c0.27			0.06			0.04	
v/s Ratio Perm	0.04			0.19			0.02			c0.08		
v/c Ratio	0.06	0.24		0.26	0.36		0.17	0.34		0.59	0.23	
Uniform Delay, d1	4.2	4.5		5.0	5.1		43.4	42.2		46.2	41.4	
Progression Factor	0.68	0.68		0.58	0.63		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		1.2	0.3		0.5	0.7		7.5	0.4	
Delay (s)	3.1	3.3		4.1	3.6		43.9	43.0		53.7	41.8	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		3.3			3.6			43.1			47.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	523	246	122	789	93	370	851	114	84	452	227
Future Volume (vph)	194	523	246	122	789	93	370	851	114	84	452	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		6.5	5.0		1.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.98		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3559		1677	3640		1651	3351		1589	3251	
Flt Permitted	0.12	1.00		0.35	1.00		0.17	1.00		0.22	1.00	
Satd. Flow (perm)	225	3559		625	3640		299	3351		364	3251	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	198	534	251	124	805	95	378	868	116	86	461	232
RTOR Reduction (vph)	0	44	0	0	7	0	0	10	0	0	59	0
Lane Group Flow (vph)	198	741	0	124	893	0	378	974	0	86	634	0
Confl. Peds. (#/hr)	6		6	6		6	9		12	12		9
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	1%	1%	2%	5%	1%	8%	2%	4%	7%	6%	3%	1%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	49.6	49.6		35.6	35.6		51.9	43.7		33.6	28.4	
Effective Green, g (s)	51.6	51.1		35.6	37.1		53.9	45.7		37.6	30.4	
Actuated g/C Ratio	0.45	0.44		0.31	0.32		0.47	0.40		0.33	0.26	
Clearance Time (s)	3.0	6.5		6.5	6.5		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	275	1581		193	1174		404	1331		195	859	
v/s Ratio Prot	c0.08	0.21			c0.25		c0.18	c0.29		0.03	0.20	
v/s Ratio Perm	0.24			0.20			0.26			0.12		
v/c Ratio	0.72	0.47		0.64	0.76		0.94	0.73		0.44	0.74	
Uniform Delay, d1	23.4	22.4		34.2	35.0		28.4	29.4		27.9	38.7	
Progression Factor	1.00	1.00		1.40	1.33		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.3	1.0		14.7	4.5		28.5	2.1		0.6	3.3	
Delay (s)	30.7	23.4		62.7	50.9		57.0	31.6		28.4	42.0	
Level of Service	C	C		E	D		E	C		C	D	
Approach Delay (s)		24.9			52.4			38.6			40.5	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7174	7263	7283	7273	7288	7257
Vehs Exited	7098	7259	7240	7212	7221	7205
Starting Vehs	326	347	328	348	308	333
Ending Vehs	402	351	371	409	375	383
Travel Distance (km)	12797	13069	13002	12996	12907	12954
Travel Time (hr)	375.2	390.8	380.9	380.3	382.1	381.9
Total Delay (hr)	139.8	150.1	140.9	141.1	144.3	143.2
Total Stops	8320	8682	8420	8441	8657	8506
Fuel Used (l)	1033.3	1063.4	1046.2	1051.1	1043.6	1047.5

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.
No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	7174	7263	7283	7273	7288	7257
Vehs Exited	7098	7259	7240	7212	7221	7205
Starting Vehs	326	347	328	348	308	333
Ending Vehs	402	351	371	409	375	383
Travel Distance (km)	12797	13069	13002	12996	12907	12954
Travel Time (hr)	375.2	390.8	380.9	380.3	382.1	381.9
Total Delay (hr)	139.8	150.1	140.9	141.1	144.3	143.2
Total Stops	8320	8682	8420	8441	8657	8506
Fuel Used (l)	1033.3	1063.4	1046.2	1051.1	1043.6	1047.5

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (m)	117.9	167.3	166.6	41.8	99.5	98.7	25.0	140.3	205.6	204.0	103.9	190.2
Average Queue (m)	63.6	107.1	114.5	19.2	54.9	56.7	8.3	53.0	129.7	131.1	69.9	120.0
95th Queue (m)	113.7	152.9	156.7	36.0	84.6	87.5	26.3	117.0	192.2	192.4	119.5	180.6
Link Distance (m)		453.6	453.6		1637.8	1637.8			731.4	731.4		530.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	30.0			40.0			15.0	60.0			64.0	
Storage Blk Time (%)	35	51		2	25	59	0	3	36		12	29
Queuing Penalty (veh)	136	131		4	21	25	0	17	56		71	55

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	190.0	80.0
Average Queue (m)	117.9	34.2
95th Queue (m)	176.9	90.3
Link Distance (m)	530.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		37.0
Storage Blk Time (%)	38	0
Queuing Penalty (veh)	39	0

Intersection: 6: Loyalist Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	10.3	73.3	76.2	41.4	65.7	74.7	27.2	43.4	41.4	48.7
Average Queue (m)	1.7	27.1	28.1	6.6	17.1	21.3	7.1	15.0	21.1	12.8
95th Queue (m)	7.2	65.8	66.8	22.6	47.0	55.6	18.7	30.0	36.3	31.4
Link Distance (m)		505.8	505.8		453.6	453.6		758.6		640.5
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	39.0			35.0			14.0		20.0	
Storage Blk Time (%)		4		0	2		7	13	22	3
Queuing Penalty (veh)		0		1	1		7	3	10	4

Intersection: 9: Colonial Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	32.4	101.3	99.2	20.5	76.3	82.6	53.0	69.4	30.3	58.5
Average Queue (m)	8.0	59.3	64.2	3.7	32.5	37.1	28.9	18.0	13.3	22.8
95th Queue (m)	21.5	95.8	97.7	12.4	65.9	72.3	49.1	50.7	27.0	45.1
Link Distance (m)		423.3	423.3		505.8	505.8		654.8		602.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	61.0			43.0			30.0		28.0	
Storage Blk Time (%)		6			4		15	1	2	6
Queuing Penalty (veh)		2			1		12	2	3	4

Intersection: 12: Ridgeway Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	54.1	114.5	122.2	94.5	73.1	75.5	44.7	57.5	63.7	65.4	130.8	132.8
Average Queue (m)	28.2	70.3	76.5	52.1	26.0	40.8	18.2	36.2	40.1	25.9	76.1	80.1
95th Queue (m)	49.3	101.6	108.9	92.3	54.4	67.3	34.7	53.3	59.1	60.0	121.8	125.0
Link Distance (m)					423.3	423.3		718.2	718.2		767.8	767.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	47.0			58.0			37.0			56.0		
Storage Blk Time (%)	2	24		16	0		2	7		0	23	
Queuing Penalty (veh)	7	44		32	0		5	6		1	25	

Intersection: 15: Ninth Line & Burnhamthorpe 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: 727

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8031	7953	7759	7967	7971	7936
Vehs Exited	7795	7884	7651	7794	7779	7779
Starting Vehs	444	407	430	321	404	400
Ending Vehs	680	476	538	494	596	557
Travel Distance (km)	13596	13612	13405	13634	13700	13589
Travel Time (hr)	556.6	473.6	455.5	447.0	507.5	488.0
Total Delay (hr)	306.7	223.6	209.4	196.5	256.2	238.5
Total Stops	11792	10438	9835	10238	10441	10552
Fuel Used (l)	1232.8	1167.4	1131.1	1141.6	1198.8	1174.3

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8031	7953	7759	7967	7971	7936
Vehs Exited	7795	7884	7651	7794	7779	7779
Starting Vehs	444	407	430	321	404	400
Ending Vehs	680	476	538	494	596	557
Travel Distance (km)	13596	13612	13405	13634	13700	13589
Travel Time (hr)	556.6	473.6	455.5	447.0	507.5	488.0
Total Delay (hr)	306.7	223.6	209.4	196.5	256.2	238.5
Total Stops	11792	10438	9835	10238	10441	10552
Fuel Used (l)	1232.8	1167.4	1131.1	1141.6	1198.8	1174.3

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (m)	117.9	211.4	198.0	139.9	443.2	448.0	25.0	150.0	419.9	416.2	103.8	157.3
Average Queue (m)	89.6	109.6	91.6	91.1	293.4	296.9	11.7	109.0	255.4	254.1	34.7	102.2
95th Queue (m)	136.6	227.8	180.5	187.3	511.0	514.7	31.4	186.8	483.2	473.5	77.6	147.8
Link Distance (m)		453.6	453.6		1637.8	1637.8			731.4	731.4		530.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	30.0			40.0			15.0	60.0			64.0	
Storage Blk Time (%)	74	33		6	74	75	0	23	45		0	28
Queuing Penalty (veh)	189	81		23	71	75	0	174	115		1	22

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	156.7	80.0
Average Queue (m)	99.4	36.4
95th Queue (m)	144.4	90.9
Link Distance (m)	530.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		37.0
Storage Blk Time (%)	40	0
Queuing Penalty (veh)	45	1

Intersection: 6: Loyalist Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	33.7	81.2	80.3	18.3	96.3	95.2	29.6	43.9	34.2	39.2
Average Queue (m)	10.9	40.0	42.9	6.4	27.3	31.5	5.9	16.3	13.9	13.7
95th Queue (m)	25.4	68.6	69.5	15.5	74.0	77.4	19.1	33.7	27.6	31.0
Link Distance (m)		505.8	505.8		453.6	453.6		758.6		640.5
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	39.0			35.0			14.0		20.0	
Storage Blk Time (%)	0	7			5		5	17	8	6
Queuing Penalty (veh)	2	4			3		5	3	6	4

Intersection: 9: Colonial Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	13.0	31.3	36.2	39.2	55.0	62.7	25.5	51.6	27.1	34.0
Average Queue (m)	3.4	9.0	11.0	13.3	15.7	18.4	6.8	20.3	13.4	12.1
95th Queue (m)	10.6	24.0	26.8	28.5	40.7	46.7	18.5	38.5	24.4	27.1
Link Distance (m)		423.3	423.3		505.8	505.8		654.8		602.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	61.0			43.0			30.0		28.0	
Storage Blk Time (%)				0	1			4	1	1
Queuing Penalty (veh)				1	1			1	1	1

Intersection: 12: Ridgeway Dr & Burnhamthorpe Rd

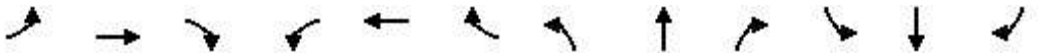
Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	115.9	132.6	118.5	77.3	133.5	141.0	132.7	140.3	124.0	40.7	83.5	93.2
Average Queue (m)	56.6	58.8	53.3	31.7	88.6	93.6	75.5	70.5	73.6	16.3	48.9	58.7
95th Queue (m)	109.7	105.4	88.3	60.7	131.7	135.8	129.6	114.4	111.8	31.1	73.3	86.2
Link Distance (m)					423.3	423.3		718.2	718.2		767.8	767.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	47.0			58.0			37.0			56.0		
Storage Blk Time (%)	36	9		4	31		47	25		0	4	
Queuing Penalty (veh)	94	17		16	38		198	94		0	3	

Intersection: 15: Ninth Line & Burnhamthorpe 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)

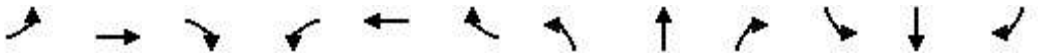
Network Summary

Network wide Queuing Penalty: 1287



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	246	809	111	111	528	72	113	1265	45	289	1312	104
Future Volume (vph)	246	809	111	111	528	72	113	1265	45	289	1312	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.0	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	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	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1650	3296		1604	3349	1341	1604	3448		1652	3510	1442
Flt Permitted	0.19	1.00		0.11	1.00	1.00	0.07	1.00		0.06	1.00	1.00
Satd. Flow (perm)	327	3296		188	3349	1341	111	3448		109	3510	1442
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)	267	879	121	121	574	78	123	1375	49	314	1426	113
RTOR Reduction (vph)	0	7	0	0	0	61	0	2	0	0	0	47
Lane Group Flow (vph)	267	993	0	121	574	17	123	1422	0	314	1426	66
Confl. Peds. (#/hr)	13		6	6		13			7	7		
Heavy Vehicles (%)	2%	2%	6%	5%	3%	11%	5%	3%	1%	2%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	57.8	45.1		43.7	34.0	34.0	71.5	61.0		88.2	74.7	74.7
Effective Green, g (s)	59.8	47.1		47.7	36.0	34.0	75.5	63.0		90.2	76.7	74.7
Actuated g/C Ratio	0.37	0.29		0.30	0.22	0.21	0.47	0.39		0.56	0.48	0.47
Clearance Time (s)	3.0	7.0		3.0	7.0	7.0	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	310	970		159	753	284	169	1357		314	1682	673
v/s Ratio Prot	c0.12	c0.30		0.06	0.17		0.06	c0.41		c0.16	0.41	
v/s Ratio Perm	0.20			0.17		0.01	0.29			0.40		0.05
v/c Ratio	0.86	1.02		0.76	0.76	0.06	0.73	1.05		1.00	0.85	0.10
Uniform Delay, d1	39.6	56.5		45.9	58.0	50.2	36.2	48.5		55.2	36.5	23.8
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	20.3	35.0		17.4	4.6	0.1	12.4	38.1		50.8	5.5	0.3
Delay (s)	59.9	91.5		63.2	62.6	50.3	48.6	86.6		105.9	42.0	24.1
Level of Service	E	F		E	E	D	D	F		F	D	C
Approach Delay (s)		84.8			61.4			83.5			51.8	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM 2000 Control Delay	69.9	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	862	8	37	638	91	28	19	108	113	18	22
Future Volume (vph)	5	862	8	37	638	91	28	19	108	113	18	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		3.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1673	3250		1396	3201		1630	1848		1636	1596	
Flt Permitted	0.33	1.00		0.27	1.00		0.73	1.00		0.32	1.00	
Satd. Flow (perm)	578	3250		400	3201		1250	1848		547	1596	
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)	5	937	9	40	693	99	30	21	117	123	20	24
RTOR Reduction (vph)	0	0	0	0	5	0	0	107	0	0	19	0
Lane Group Flow (vph)	5	946	0	40	787	0	30	31	0	123	25	0
Confl. Peds. (#/hr)	8		9	9		8	3					3
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	6%	0%	20%	6%	9%	3%	3%	0%	3%	3%	4%
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)	91.5	91.5		91.5	91.5		9.6	9.6		25.0	25.0	
Effective Green, g (s)	91.5	93.0		91.5	93.0		9.6	11.6		25.0	27.0	
Actuated g/C Ratio	0.70	0.72		0.70	0.72		0.07	0.09		0.19	0.21	
Clearance Time (s)	6.5	6.5		6.5	6.5		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	406	2325		281	2289		92	164		209	331	
v/s Ratio Prot		c0.29			0.25			0.02		c0.06	0.02	
v/s Ratio Perm	0.01			0.10			0.02			c0.06		
v/c Ratio	0.01	0.41		0.14	0.34		0.33	0.19		0.59	0.08	
Uniform Delay, d1	5.8	7.4		6.3	7.0		57.1	54.9		46.1	41.5	
Progression Factor	2.01	2.01		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		1.1	0.4		2.1	0.6		2.7	0.1	
Delay (s)	11.6	15.4		7.4	7.4		59.2	55.4		48.8	41.6	
Level of Service	B	B		A	A		E	E		D	D	
Approach Delay (s)		15.4			7.4			56.1			46.9	
Approach LOS		B			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	18.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

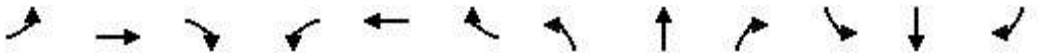
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	761	73	22	676	16	169	42	44	63	76	85
Future Volume (vph)	34	761	73	22	676	16	169	42	44	63	76	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		3.0	5.0		8.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.92		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1491	3786		1530	3759		1615	1638		1693	1589	
Flt Permitted	0.33	1.00		0.27	1.00		0.36	1.00		0.70	1.00	
Satd. Flow (perm)	514	3786		429	3759		610	1638		1241	1589	
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)	37	827	79	24	735	17	184	46	48	68	83	92
RTOR Reduction (vph)	0	4	0	0	1	0	0	34	0	0	36	0
Lane Group Flow (vph)	37	902	0	24	751	0	184	60	0	68	139	0
Confl. Peds. (#/hr)	12		15	15		12	2		10	10		2
Heavy Vehicles (%)	17%	2%	0%	9%	3%	3%	8%	4%	3%	2%	12%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	80.8	80.8		80.8	80.8		35.2	35.2		18.7	18.7	
Effective Green, g (s)	80.8	81.8		80.8	81.8		35.2	38.2		18.7	21.7	
Actuated g/C Ratio	0.62	0.63		0.62	0.63		0.27	0.29		0.14	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0		3.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	319	2382		266	2365		269	481		178	265	
v/s Ratio Prot		c0.24			0.20		c0.07	0.04			0.09	
v/s Ratio Perm	0.07			0.06			c0.11			0.05		
v/c Ratio	0.12	0.38		0.09	0.32		0.68	0.12		0.38	0.53	
Uniform Delay, d1	10.0	11.7		9.9	11.2		39.4	33.6		50.4	49.4	
Progression Factor	0.94	0.77		0.77	0.73		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		0.6	0.3		5.6	0.1		1.4	1.9	
Delay (s)	9.8	9.3		8.2	8.5		45.1	33.8		51.8	51.3	
Level of Service	A	A		A	A		D	C		D	D	
Approach Delay (s)		9.3			8.5			41.2			51.5	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	735	337	208	508	233	113	546	54	82	817	70
Future Volume (vph)	224	735	337	208	508	233	113	546	54	82	817	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		1.0	5.0		1.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.94		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	3448		1665	3221		1684	3401		1523	3363	
Flt Permitted	0.21	1.00		0.08	1.00		0.09	1.00		0.33	1.00	
Satd. Flow (perm)	381	3448		135	3221		157	3401		525	3363	
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)	257	845	387	239	584	268	130	628	62	94	939	80
RTOR Reduction (vph)	0	40	0	0	40	0	0	6	0	0	5	0
Lane Group Flow (vph)	257	1192	0	239	812	0	130	684	0	94	1014	0
Confl. Peds. (#/hr)	152		93	93		152	116		60	60		116
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	1%	1%	1%	6%	4%	5%	0%	2%	11%	8%	2%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	61.9	49.1		64.9	50.6		50.1	50.1		42.1	42.1	
Effective Green, g (s)	65.9	50.6		68.4	52.1		52.1	52.1		42.1	44.1	
Actuated g/C Ratio	0.51	0.39		0.53	0.40		0.40	0.40		0.32	0.34	
Clearance Time (s)	3.0	6.5		3.0	6.5		3.0	7.0		7.0	7.0	
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	349	1342		262	1290		145	1363		170	1140	
v/s Ratio Prot	0.08	c0.35		c0.11	0.25		c0.05	0.20			c0.30	
v/s Ratio Perm	0.29			0.37			0.31			0.18		
v/c Ratio	0.74	0.89		0.91	0.63		0.90	0.50		0.55	0.89	
Uniform Delay, d1	21.0	37.1		39.1	31.2		30.6	29.2		36.2	40.7	
Progression Factor	1.00	1.00		1.28	0.76		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.8	9.0		31.7	2.2		44.2	0.3		3.9	8.8	
Delay (s)	27.8	46.1		81.8	25.9		74.8	29.5		40.1	49.4	
Level of Service	C	D		F	C		E	C		D	D	
Approach Delay (s)		42.9			38.1			36.7			48.6	
Approach LOS		D			D			D			D	

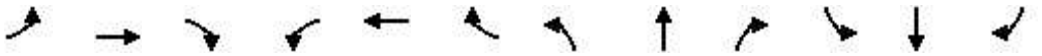
Intersection Summary			
HCM 2000 Control Delay	42.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	626	109	128	829	175	180	1751	75	144	1117	100
Future Volume (vph)	235	626	109	128	829	175	180	1751	75	144	1117	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.0	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		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
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1620	3321		1651	3415	1476	1685	3476		1668	3579	1500
Flt Permitted	0.10	1.00		0.13	1.00	1.00	0.10	1.00		0.05	1.00	1.00
Satd. Flow (perm)	171	3321		226	3415	1476	175	3476		95	3579	1500
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)	255	680	118	139	901	190	196	1903	82	157	1214	109
RTOR Reduction (vph)	0	9	0	0	0	84	0	2	0	0	0	60
Lane Group Flow (vph)	255	789	0	139	901	106	196	1983	0	157	1214	49
Confl. Peds. (#/hr)	7		9	9		7	4		4	4		4
Heavy Vehicles (%)	4%	1%	2%	2%	1%	2%	0%	2%	2%	1%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	57.0	42.6		48.4	37.0	37.0	89.0	77.0		81.3	72.3	72.3
Effective Green, g (s)	59.0	44.6		52.4	39.0	37.0	91.0	79.0		85.3	74.3	72.3
Actuated g/C Ratio	0.37	0.28		0.33	0.24	0.23	0.57	0.49		0.53	0.46	0.45
Clearance Time (s)	3.0	7.0		3.0	7.0	7.0	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	235	925		193	832	341	247	1716		158	1661	677
v/s Ratio Prot	c0.13	0.24		0.06	c0.26		c0.08	c0.57		c0.07	0.34	
v/s Ratio Perm	0.27			0.18		0.07	0.37			0.46		0.03
v/c Ratio	1.09	0.85		0.72	1.08	0.31	0.79	1.16		0.99	0.73	0.07
Uniform Delay, d1	50.1	54.6		41.9	60.5	50.9	31.7	40.5		51.5	34.7	24.9
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	83.2	7.7		10.6	56.1	0.5	15.0	77.1		69.3	2.9	0.2
Delay (s)	133.3	62.3		52.6	116.6	51.5	46.7	117.6		120.8	37.6	25.1
Level of Service	F	E		D	F	D	D	F		F	D	C
Approach Delay (s)		79.5			99.3			111.2			45.5	
Approach LOS		E			F			F			D	

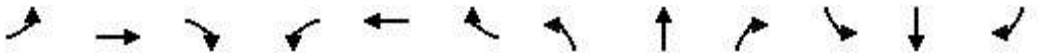
Intersection Summary			
HCM 2000 Control Delay	86.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.7%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	796	38	54	886	83	27	56	58	63	31	60
Future Volume (vph)	72	796	38	54	886	83	27	56	58	63	31	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1599	3300		1652	3323		1545	1956		1618	1512	
Flt Permitted	0.26	1.00		0.30	1.00		0.63	1.00		0.54	1.00	
Satd. Flow (perm)	430	3300		525	3323		1024	1956		925	1512	
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)	77	856	41	58	953	89	29	60	62	68	33	65
RTOR Reduction (vph)	0	1	0	0	3	0	0	40	0	0	56	0
Lane Group Flow (vph)	77	896	0	58	1039	0	29	82	0	68	42	0
Confl. Peds. (#/hr)	6					6	9		1	1		9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	5%	4%	0%	2%	3%	7%	8%	0%	2%	4%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	100.7	100.7		100.7	100.7		15.8	15.8		15.8	15.8	
Effective Green, g (s)	100.7	102.2		100.7	102.2		15.8	17.8		15.8	17.8	
Actuated g/C Ratio	0.77	0.79		0.77	0.79		0.12	0.14		0.12	0.14	
Clearance Time (s)	6.5	6.5		6.5	6.5		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	
Lane Grp Cap (vph)	333	2594		406	2612		124	267		112	207	
v/s Ratio Prot		0.27			c0.31			0.04			0.03	
v/s Ratio Perm	0.18			0.11			0.03			c0.07		
v/c Ratio	0.23	0.35		0.14	0.40		0.23	0.31		0.61	0.20	
Uniform Delay, d1	4.0	4.1		3.7	4.3		51.6	50.6		54.2	49.8	
Progression Factor	0.64	0.58		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.4		0.7	0.5		1.0	0.7		9.0	0.5	
Delay (s)	4.1	2.7		4.5	4.8		52.6	51.2		63.1	50.3	
Level of Service	A	A		A	A		D	D		E	D	
Approach Delay (s)		2.8			4.8			51.5			55.5	
Approach LOS		A			A			D			E	

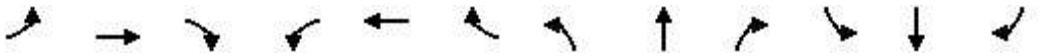
Intersection Summary			
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	645	34	127	870	70	36	71	104	79	74	31
Future Volume (vph)	22	645	34	127	870	70	36	71	104	79	74	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		8.0	5.0		3.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	3823		1679	3791		1605	1660		1744	1630	
Flt Permitted	0.24	1.00		0.34	1.00		0.68	1.00		0.32	1.00	
Satd. Flow (perm)	441	3823		607	3791		1155	1660		579	1630	
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)	24	701	37	138	946	76	39	77	113	86	80	34
RTOR Reduction (vph)	0	2	0	0	3	0	0	48	0	0	14	0
Lane Group Flow (vph)	24	736	0	138	1019	0	39	142	0	86	100	0
Confl. Peds. (#/hr)	10		3	3		10	7		3	3		7
Heavy Vehicles (%)	0%	2%	0%	0%	1%	2%	8%	1%	1%	0%	10%	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)	87.0	87.0		87.0	87.0		18.4	18.4		29.0	29.0	
Effective Green, g (s)	87.0	88.0		87.0	88.0		18.4	21.4		29.0	32.0	
Actuated g/C Ratio	0.67	0.68		0.67	0.68		0.14	0.16		0.22	0.25	
Clearance Time (s)	6.0	6.0		6.0	6.0		8.0	8.0		3.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	295	2587		406	2566		163	273		197	401	
v/s Ratio Prot		0.19			c0.27			c0.09		c0.03	0.06	
v/s Ratio Perm	0.05			0.23			0.03			0.07		
v/c Ratio	0.08	0.28		0.34	0.40		0.24	0.52		0.44	0.25	
Uniform Delay, d1	7.5	8.4		9.2	9.3		49.6	49.6		41.8	39.3	
Progression Factor	0.48	0.45		0.76	0.78		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		2.2	0.4		0.8	1.7		0.6	0.3	
Delay (s)	4.1	4.0		9.2	7.7		50.3	51.3		42.3	39.7	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		4.0			7.9			51.1			40.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	13.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	217	575	290	117	814	84	427	867	114	92	533	287
Future Volume (vph)	217	575	290	117	814	84	427	867	114	92	533	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		6.5	5.0		1.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3548		1677	3650		1651	3352		1588	3242	
Flt Permitted	0.11	1.00		0.27	1.00		0.11	1.00		0.26	1.00	
Satd. Flow (perm)	200	3548		478	3650		189	3352		434	3242	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	221	587	296	119	831	86	436	885	116	94	544	293
RTOR Reduction (vph)	0	48	0	0	6	0	0	8	0	0	56	0
Lane Group Flow (vph)	221	835	0	119	911	0	436	993	0	94	781	0
Confl. Peds. (#/hr)	6		6	6		6	9		12	12		9
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	1%	1%	2%	5%	1%	8%	2%	4%	7%	6%	3%	1%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.8	50.8		34.2	34.2		65.7	55.4		41.0	33.7	
Effective Green, g (s)	52.8	52.3		34.2	35.7		67.7	57.4		45.0	35.7	
Actuated g/C Ratio	0.41	0.40		0.26	0.27		0.52	0.44		0.35	0.27	
Clearance Time (s)	3.0	6.5		6.5	6.5		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	269	1427		125	1002		447	1480		232	890	
v/s Ratio Prot	c0.10	0.24			c0.25		c0.23	0.30		0.03	c0.24	
v/s Ratio Perm	0.23			0.25			0.27			0.11		
v/c Ratio	0.82	0.59		0.95	0.91		0.98	0.67		0.41	0.88	
Uniform Delay, d1	33.1	30.4		47.1	45.6		38.9	28.8		29.6	45.1	
Progression Factor	1.00	1.00		1.06	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.2	1.8		66.3	12.9		35.7	1.2		0.4	9.8	
Delay (s)	50.2	32.1		116.2	58.5		74.7	30.0		30.0	54.8	
Level of Service	D	C		F	E		E	C		C	D	
Approach Delay (s)		35.8			65.2			43.6			52.3	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	7876	7821	7651	7857	7758	7794
Vehs Exited	7658	7616	7607	7655	7596	7628
Starting Vehs	341	439	467	375	487	421
Ending Vehs	559	644	511	577	649	591
Travel Distance (km)	14000	13933	13665	13894	13670	13832
Travel Time (hr)	458.5	541.4	492.4	479.4	580.4	510.4
Total Delay (hr)	201.1	284.7	240.7	223.6	328.3	255.7
Total Stops	10402	12533	11527	11050	11510	11406
Fuel Used (l)	1164.6	1235.8	1177.0	1178.6	1261.8	1203.6

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	7876	7821	7651	7857	7758	7794
Vehs Exited	7658	7616	7607	7655	7596	7628
Starting Vehs	341	439	467	375	487	421
Ending Vehs	559	644	511	577	649	591
Travel Distance (km)	14000	13933	13665	13894	13670	13832
Travel Time (hr)	458.5	541.4	492.4	479.4	580.4	510.4
Total Delay (hr)	201.1	284.7	240.7	223.6	328.3	255.7
Total Stops	10402	12533	11527	11050	11510	11406
Fuel Used (l)	1164.6	1235.8	1177.0	1178.6	1261.8	1203.6

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (m)	118.0	318.9	318.9	79.4	124.2	129.8	25.0	149.9	433.3	432.1	104.0	344.6
Average Queue (m)	102.8	194.4	197.2	36.8	75.1	79.9	11.9	79.2	266.0	265.4	101.8	260.2
95th Queue (m)	146.7	309.5	313.2	78.6	114.4	118.0	31.2	181.0	440.7	434.9	114.6	509.7
Link Distance (m)		453.6	453.6		1637.8	1637.8			731.4	731.4		530.5
Upstream Blk Time (%)												14
Queuing Penalty (veh)												0
Storage Bay Dist (m)	30.0			40.0			15.0	60.0			64.0	
Storage Blk Time (%)	60	66		17	41	67	0	1	60		75	25
Queuing Penalty (veh)	240	163		44	45	49	0	4	67		490	71

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	339.3	80.0
Average Queue (m)	249.9	34.1
95th Queue (m)	507.0	91.1
Link Distance (m)	530.5	
Upstream Blk Time (%)	10	
Queuing Penalty (veh)	0	
Storage Bay Dist (m)		37.0
Storage Blk Time (%)	39	0
Queuing Penalty (veh)	40	0

Intersection: 6: Loyalist Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	9.2	80.8	79.9	49.7	95.2	98.4	30.0	53.6	40.6	36.0
Average Queue (m)	1.2	49.5	50.1	8.1	27.3	31.2	8.1	19.9	21.3	11.1
95th Queue (m)	6.0	76.9	76.2	25.9	73.6	79.1	22.1	39.5	35.7	28.7
Link Distance (m)		505.8	505.8		453.6	453.6		758.6		640.5
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	39.0			35.0			14.0		20.0	
Storage Blk Time (%)		11		0	5		8	22	23	3
Queuing Penalty (veh)		1		0	2		11	6	9	3

Intersection: 9: Colonial Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	23.5	56.2	59.0	17.9	70.1	67.7	53.5	87.5	54.8	77.1
Average Queue (m)	5.2	25.0	28.2	3.8	21.7	23.0	31.7	21.7	14.5	30.3
95th Queue (m)	15.1	47.3	52.4	11.8	53.7	53.1	51.9	57.9	34.0	57.5
Link Distance (m)		423.3	423.3		505.8	505.8		654.8		602.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	61.0			43.0			30.0		28.0	
Storage Blk Time (%)		0			4		16	2	3	14
Queuing Penalty (veh)		0			1		14	3	4	9

Intersection: 12: Ridgeway Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	96.1	145.8	152.5	95.3	97.4	115.3	77.9	92.3	81.2	63.1	115.7	119.7
Average Queue (m)	36.6	85.4	96.7	45.8	49.3	62.6	38.3	45.4	47.7	21.9	80.1	84.9
95th Queue (m)	66.4	130.1	139.8	80.4	86.9	99.8	84.0	73.0	71.1	48.8	108.7	114.4
Link Distance (m)					423.3	423.3		718.2	718.2		767.8	767.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	47.0			58.0			37.0			56.0		
Storage Blk Time (%)	5	31		8	7		30	12		0	25	
Queuing Penalty (veh)	19	70		21	15		81	14		0	21	

Intersection: 15: Ninth Line & Burnhamthorpe 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: 1517

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8585	8711	8672	8805	8664	8688
Vehs Exited	8261	8428	8257	8451	8303	8339
Starting Vehs	583	687	697	674	697	664
Ending Vehs	907	970	1112	1028	1058	1016
Travel Distance (km)	14377	14499	14258	14540	14384	14411
Travel Time (hr)	907.4	967.6	993.7	952.6	1009.0	966.1
Total Delay (hr)	643.2	701.5	731.7	685.4	744.1	701.2
Total Stops	13881	14148	13906	14452	13421	13964
Fuel Used (l)	1582.8	1643.1	1647.2	1625.3	1663.3	1632.3

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8585	8711	8672	8805	8664	8688
Vehs Exited	8261	8428	8257	8451	8303	8339
Starting Vehs	583	687	697	674	697	664
Ending Vehs	907	970	1112	1028	1058	1016
Travel Distance (km)	14377	14499	14258	14540	14384	14411
Travel Time (hr)	907.4	967.6	993.7	952.6	1009.0	966.1
Total Delay (hr)	643.2	701.5	731.7	685.4	744.1	701.2
Total Stops	13881	14148	13906	14452	13421	13964
Fuel Used (l)	1582.8	1643.1	1647.2	1625.3	1663.3	1632.3

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	TR	L	T
Maximum Queue (m)	115.6	299.9	284.7	139.9	1296.8	1288.4	25.0	150.0	748.0	747.8	104.0	269.2
Average Queue (m)	105.2	202.5	168.5	97.3	875.3	877.1	15.8	97.8	733.8	732.7	102.2	199.7
95th Queue (m)	145.1	353.1	302.0	187.5	1398.5	1392.9	34.7	198.3	784.0	786.9	111.4	304.1
Link Distance (m)		453.6	453.6		1637.8	1637.8			731.4	731.4		530.5
Upstream Blk Time (%)					1	1			74	64		
Queuing Penalty (veh)					0	0			0	0		
Storage Bay Dist (m)	30.0			40.0			15.0	60.0			64.0	
Storage Blk Time (%)	86	42		13	77	75	0	3	52		99	16
Queuing Penalty (veh)	269	100		55	99	131	0	27	94		552	24

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (m)	269.7	80.0
Average Queue (m)	191.8	38.5
95th Queue (m)	297.0	95.9
Link Distance (m)	530.5	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		37.0
Storage Blk Time (%)	39	0
Queuing Penalty (veh)	39	0

Intersection: 6: Loyalist Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	36.6	67.0	61.8	44.2	90.7	99.7	28.3	51.4	40.3	49.5
Average Queue (m)	12.5	26.2	27.8	7.1	27.3	31.6	7.0	21.2	15.4	16.7
95th Queue (m)	26.5	53.0	52.7	23.8	70.3	77.8	19.3	41.3	30.7	35.6
Link Distance (m)		505.8	505.8		453.6	453.6		758.6		640.5
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	39.0			35.0			14.0		20.0	
Storage Blk Time (%)	0	2			4		8	29	14	9
Queuing Penalty (veh)	1	2			2		9	8	13	6

Intersection: 9: Colonial Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	14.0	33.2	29.7	40.3	80.9	79.0	48.5	73.4	31.0	45.6
Average Queue (m)	3.3	11.9	12.7	14.9	24.3	26.7	11.4	31.1	15.3	18.2
95th Queue (m)	9.9	25.8	25.1	31.0	58.8	61.8	32.2	60.0	28.5	36.4
Link Distance (m)		423.3	423.3		505.8	505.8		654.8		602.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	61.0			43.0			30.0		28.0	
Storage Blk Time (%)				1	3		0	14	2	4
Queuing Penalty (veh)				3	4		0	5	2	3

Intersection: 12: Ridgeway Dr & Burnhamthorpe Rd

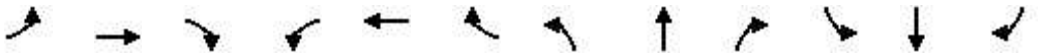
Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	90.3	124.7	122.6	109.5	167.8	173.4	137.0	280.6	266.7	76.5	120.6	134.0
Average Queue (m)	49.3	66.3	71.7	41.8	105.8	110.1	121.3	158.7	145.7	18.8	78.7	89.9
95th Queue (m)	91.2	105.3	105.3	99.9	197.9	202.5	164.1	280.6	262.7	48.4	111.6	125.2
Link Distance (m)					423.3	423.3		718.2	718.2		767.8	767.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	47.0			58.0			37.0			56.0		
Storage Blk Time (%)	19	18		7	49		72	22		0	26	
Queuing Penalty (veh)	54	40		28	58		313	96		0	24	

Intersection: 15: Ninth Line & Burnhamthorpe 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)

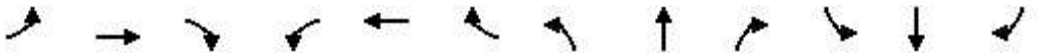
Network Summary

Network wide Queuing Penalty: 2060



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	341	787	116	98	511	85	95	1287	32	305	1481	128
Future Volume (vph)	341	787	116	98	511	85	95	1287	32	305	1481	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.5	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	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	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1650	3291		1604	3349	1348	1604	4961		1652	5043	1442
Flt Permitted	0.18	1.00		0.13	1.00	1.00	0.09	1.00		0.07	1.00	1.00
Satd. Flow (perm)	315	3291		213	3349	1348	151	4961		130	5043	1442
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)	371	855	126	107	555	92	103	1399	35	332	1610	139
RTOR Reduction (vph)	0	7	0	0	0	74	0	1	0	0	0	52
Lane Group Flow (vph)	371	974	0	107	555	18	103	1433	0	332	1610	87
Confl. Peds. (#/hr)	13		6	6		13			7	7		
Heavy Vehicles (%)	2%	2%	6%	5%	3%	11%	5%	3%	1%	2%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	64.2	50.5		42.2	31.5	31.5	59.9	50.5		81.3	68.9	68.9
Effective Green, g (s)	66.2	53.0		46.2	34.0	31.5	63.9	52.5		83.3	70.9	68.9
Actuated g/C Ratio	0.41	0.33		0.29	0.21	0.20	0.40	0.33		0.52	0.44	0.43
Clearance Time (s)	3.0	7.5		3.0	7.5	7.5	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	394	1090		171	711	265	163	1627		351	2234	620
v/s Ratio Prot	c0.19	c0.30		0.05	0.17		0.04	c0.29		c0.18	0.32	
v/s Ratio Perm	0.20			0.13		0.01	0.21			0.32		0.06
v/c Ratio	0.94	0.89		0.63	0.78	0.07	0.63	0.88		0.95	0.72	0.14
Uniform Delay, d1	41.8	50.8		44.8	59.5	52.3	33.0	50.8		51.5	36.4	27.6
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	30.4	9.5		5.1	5.6	0.1	5.8	7.2		33.6	2.0	0.5
Delay (s)	72.3	60.3		49.9	65.0	52.4	38.8	58.0		85.0	38.5	28.1
Level of Service	E	E		D	E	D	D	E		F	D	C
Approach Delay (s)		63.6			61.3			56.7			45.2	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	54.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	876	7	46	614	94	23	17	141	116	14	14
Future Volume (vph)	3	876	7	46	614	94	23	17	141	116	14	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		5.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1671	3250		1395	3193		1629	1834		1636	1609	
Flt Permitted	0.34	1.00		0.27	1.00		0.74	1.00		0.31	1.00	
Satd. Flow (perm)	596	3250		396	3193		1265	1834		542	1609	
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)	3	952	8	50	667	102	25	18	153	126	15	15
RTOR Reduction (vph)	0	0	0	0	4	0	0	141	0	0	12	0
Lane Group Flow (vph)	3	960	0	50	765	0	25	30	0	126	18	0
Confl. Peds. (#/hr)	8		9	9		8	3					3
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	6%	0%	20%	6%	9%	3%	3%	0%	3%	3%	4%
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)	109.1	109.1		109.1	109.1		9.7	9.7		27.4	27.4	
Effective Green, g (s)	109.1	110.6		109.1	110.6		11.7	11.7		29.4	29.4	
Actuated g/C Ratio	0.73	0.74		0.73	0.74		0.08	0.08		0.20	0.20	
Clearance Time (s)	6.5	6.5		6.5	6.5		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	433	2396		288	2354		98	143		228	315	
v/s Ratio Prot		c0.30			0.24			0.02		c0.06	0.01	
v/s Ratio Perm	0.01			0.13			0.02			0.05		
v/c Ratio	0.01	0.40		0.17	0.33		0.26	0.21		0.55	0.06	
Uniform Delay, d1	5.6	7.3		6.4	6.8		65.1	64.8		52.8	49.0	
Progression Factor	2.01	1.79		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.5		1.3	0.4		1.4	0.7		1.6	0.1	
Delay (s)	11.3	13.6		7.7	7.2		66.4	65.5		54.4	49.1	
Level of Service	B	B		A	A		E	E		D	D	
Approach Delay (s)		13.6			7.2			65.7			53.4	
Approach LOS		B			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

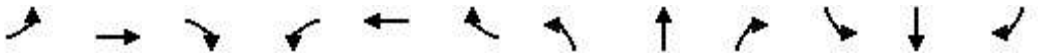
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	787	86	29	628	16	185	49	59	65	88	71
Future Volume (vph)	30	787	86	29	628	16	185	49	59	65	88	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		3.0	5.0		8.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1488	3774		1532	3757		1615	1626		1691	1597	
Flt Permitted	0.34	1.00		0.24	1.00		0.34	1.00		0.68	1.00	
Satd. Flow (perm)	536	3774		393	3757		576	1626		1214	1597	
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)	33	855	93	32	683	17	201	53	64	71	96	77
RTOR Reduction (vph)	0	4	0	0	1	0	0	37	0	0	23	0
Lane Group Flow (vph)	33	944	0	32	699	0	201	80	0	71	150	0
Confl. Peds. (#/hr)	12		15	15		12	2		10	10		2
Heavy Vehicles (%)	17%	2%	0%	9%	3%	3%	8%	4%	3%	2%	12%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	90.4	90.4		90.4	90.4		45.6	45.6		20.9	20.9	
Effective Green, g (s)	90.4	91.4		90.4	91.4		45.6	48.6		20.9	23.9	
Actuated g/C Ratio	0.60	0.61		0.60	0.61		0.30	0.32		0.14	0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0		3.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	323	2299		236	2289		325	526		169	254	
v/s Ratio Prot		c0.25			0.19		c0.09	0.05			0.09	
v/s Ratio Perm	0.06			0.08			c0.10			0.06		
v/c Ratio	0.10	0.41		0.14	0.31		0.62	0.15		0.42	0.59	
Uniform Delay, d1	12.6	15.3		12.9	14.1		42.0	36.1		59.0	58.5	
Progression Factor	0.95	0.78		0.69	0.68		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2		1.2	0.3		2.5	0.1		1.7	3.7	
Delay (s)	12.2	12.2		10.0	9.9		44.5	36.2		60.7	62.2	
Level of Service	B	B		B	A		D	D		E	E	
Approach Delay (s)		12.2			9.9			41.4			61.8	
Approach LOS		B			A			D			E	

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	752	365	231	392	240	96	618	62	78	825	49
Future Volume (vph)	226	752	365	231	392	240	96	618	62	78	825	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		1.0	5.0		1.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.95		1.00	0.91		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3413		1665	3102		1685	3397		1527	3388	
Flt Permitted	0.30	1.00		0.07	1.00		0.08	1.00		0.25	1.00	
Satd. Flow (perm)	553	3413		116	3102		142	3397		395	3388	
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)	260	864	420	266	451	276	110	710	71	90	948	56
RTOR Reduction (vph)	0	38	0	0	55	0	0	5	0	0	3	0
Lane Group Flow (vph)	260	1246	0	266	672	0	110	776	0	90	1001	0
Confl. Peds. (#/hr)	152		93	93		152	116		60	60		116
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	1%	1%	1%	6%	4%	5%	0%	2%	11%	8%	2%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	72.1	57.3		81.5	63.7		55.0	55.0		47.0	47.0	
Effective Green, g (s)	76.1	58.8		83.5	65.2		57.0	57.0		47.0	49.0	
Actuated g/C Ratio	0.51	0.39		0.56	0.43		0.38	0.38		0.31	0.33	
Clearance Time (s)	3.0	6.5		3.0	6.5		3.0	7.0		7.0	7.0	
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	413	1337		304	1348		125	1290		123	1106	
v/s Ratio Prot	0.07	c0.37		c0.14	0.22		c0.04	0.23			c0.30	
v/s Ratio Perm	0.25			0.35			0.29			0.23		
v/c Ratio	0.63	0.93		0.88	0.50		0.88	0.60		0.73	0.91	
Uniform Delay, d1	22.1	43.7		47.5	30.6		36.8	37.4		45.9	48.3	
Progression Factor	1.00	1.00		1.32	0.67		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	13.0		21.8	1.3		45.1	0.8		19.9	10.5	
Delay (s)	24.3	56.7		84.4	21.7		81.9	38.2		65.8	58.8	
Level of Service	C	E		F	C		F	D		E	E	
Approach Delay (s)		51.2			38.5			43.6			59.4	
Approach LOS		D			D			D			E	

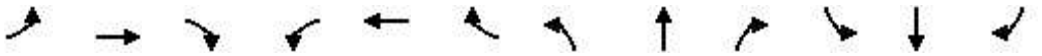
Intersection Summary			
HCM 2000 Control Delay	48.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	650	98	115	871	203	179	1924	73	179	1212	127
Future Volume (vph)	273	650	98	115	871	203	179	1924	73	179	1212	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.5	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		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
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1620	3333		1651	3415	1480	1685	4998		1668	5142	1500
Flt Permitted	0.09	1.00		0.22	1.00	1.00	0.10	1.00		0.06	1.00	1.00
Satd. Flow (perm)	154	3333		388	3415	1480	170	4998		114	5142	1500
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)	297	707	107	125	947	221	195	2091	79	195	1317	138
RTOR Reduction (vph)	0	7	0	0	0	81	0	2	0	0	0	70
Lane Group Flow (vph)	297	807	0	125	947	140	195	2168	0	195	1317	68
Confl. Peds. (#/hr)	7		9	9		7	4		4	4		4
Heavy Vehicles (%)	4%	1%	2%	2%	1%	2%	0%	2%	2%	1%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	67.0	53.5		51.7	41.2	41.2	78.2	62.3		72.8	59.6	59.6
Effective Green, g (s)	69.0	56.0		55.7	43.7	41.2	80.5	64.3		76.8	61.6	59.6
Actuated g/C Ratio	0.43	0.35		0.35	0.27	0.26	0.50	0.40		0.48	0.39	0.37
Clearance Time (s)	3.0	7.5		3.0	7.5	7.5	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	293	1166		233	932	381	255	2008		202	1979	558
v/s Ratio Prot	c0.16	0.24		0.04	c0.28		c0.09	c0.43		c0.09	0.26	
v/s Ratio Perm	0.28			0.14		0.09	0.30			0.37		0.05
v/c Ratio	1.01	0.69		0.54	1.02	0.37	0.76	1.08		0.97	0.67	0.12
Uniform Delay, d1	52.2	44.6		37.7	58.1	48.7	33.8	47.9		51.2	40.7	33.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	56.1	1.8		1.2	33.6	0.6	11.6	45.4		52.6	1.8	0.4
Delay (s)	108.3	46.4		38.9	91.7	49.3	45.4	93.2		103.9	42.5	33.4
Level of Service	F	D		D	F	D	D	F		F	D	C
Approach Delay (s)		63.0			79.4			89.3			49.0	
Approach LOS		E			E			F			D	

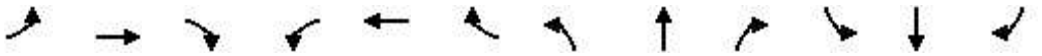
Intersection Summary			
HCM 2000 Control Delay	72.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	803	33	76	920	113	23	62	78	86	35	51
Future Volume (vph)	60	803	33	76	920	113	23	62	78	86	35	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		3.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	3302		1652	3303		1542	1937		1619	1521	
Flt Permitted	0.22	1.00		0.29	1.00		0.70	1.00		0.32	1.00	
Satd. Flow (perm)	371	3302		500	3303		1131	1937		539	1521	
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)	65	863	35	82	989	122	25	67	84	92	38	55
RTOR Reduction (vph)	0	1	0	0	4	0	0	36	0	0	43	0
Lane Group Flow (vph)	65	897	0	82	1107	0	25	115	0	92	50	0
Confl. Peds. (#/hr)	6					6	9		1	1		9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	5%	4%	0%	2%	3%	7%	8%	0%	2%	4%	13%	3%
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)	106.6	106.6		106.6	106.6		16.3	16.3		29.9	29.9	
Effective Green, g (s)	106.6	108.1		106.6	108.1		16.3	18.3		29.9	31.9	
Actuated g/C Ratio	0.71	0.72		0.71	0.72		0.11	0.12		0.20	0.21	
Clearance Time (s)	6.5	6.5		6.5	6.5		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	263	2379		355	2380		122	236		183	323	
v/s Ratio Prot		0.27			c0.34			0.06		c0.04	0.03	
v/s Ratio Perm	0.18			0.16			0.02			c0.06		
v/c Ratio	0.25	0.38		0.23	0.47		0.20	0.49		0.50	0.15	
Uniform Delay, d1	7.6	8.0		7.5	8.8		60.9	61.5		51.3	48.1	
Progression Factor	0.97	0.85		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.4		1.5	0.7		0.8	1.6		0.8	0.2	
Delay (s)	9.6	7.3		9.0	9.5		61.8	63.1		52.1	48.3	
Level of Service	A	A		A	A		E	E		D	D	
Approach Delay (s)		7.5			9.4			62.9			50.2	
Approach LOS		A			A			E			D	

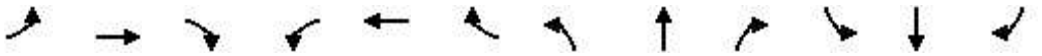
Intersection Summary			
HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	625	40	133	878	68	45	86	112	86	99	40
Future Volume (vph)	24	625	40	133	878	68	45	86	112	86	99	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		6.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	3817		1679	3791		1603	1668		1744	1631	
Flt Permitted	0.23	1.00		0.35	1.00		0.66	1.00		0.30	1.00	
Satd. Flow (perm)	434	3817		614	3791		1116	1668		554	1631	
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)	26	679	43	145	954	74	49	93	122	93	108	43
RTOR Reduction (vph)	0	2	0	0	3	0	0	36	0	0	11	0
Lane Group Flow (vph)	26	720	0	145	1025	0	49	179	0	93	140	0
Confl. Peds. (#/hr)	10		3	3		10	7		3	3		7
Heavy Vehicles (%)	0%	2%	0%	0%	1%	2%	8%	1%	1%	0%	10%	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)	100.6	100.6		100.6	100.6		22.1	22.1		35.4	35.4	
Effective Green, g (s)	100.6	101.6		100.6	101.6		24.1	25.1		37.4	38.4	
Actuated g/C Ratio	0.67	0.68		0.67	0.68		0.16	0.17		0.25	0.26	
Clearance Time (s)	6.0	6.0		6.0	6.0		8.0	8.0		3.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	291	2585		411	2567		179	279		235	417	
v/s Ratio Prot		0.19			c0.27			c0.11		c0.03	0.09	
v/s Ratio Perm	0.06			0.24			0.04			0.07		
v/c Ratio	0.09	0.28		0.35	0.40		0.27	0.64		0.40	0.34	
Uniform Delay, d1	8.7	9.6		10.7	10.7		55.3	58.3		45.3	45.4	
Progression Factor	0.57	0.55		0.71	0.72		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2		2.2	0.4		0.8	5.0		0.4	0.5	
Delay (s)	5.3	5.5		9.8	8.2		56.1	63.3		45.7	45.9	
Level of Service	A	A		A	A		E	E		D	D	
Approach Delay (s)		5.4			8.4			61.9			45.8	
Approach LOS		A			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	17.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	541	280	138	833	90	434	918	131	110	650	304
Future Volume (vph)	189	541	280	138	833	90	434	918	131	110	650	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		1.0	5.0		1.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3542		1681	3646		1652	3344		1588	3257	
Flt Permitted	0.10	1.00		0.10	1.00		0.09	1.00		0.25	1.00	
Satd. Flow (perm)	180	3542		176	3646		153	3344		416	3257	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	193	552	286	141	850	92	443	937	134	112	663	310
RTOR Reduction (vph)	0	43	0	0	5	0	0	7	0	0	37	0
Lane Group Flow (vph)	193	795	0	141	937	0	443	1064	0	112	936	0
Confl. Peds. (#/hr)	6		6	6		6	9		12	12		9
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	1%	1%	2%	5%	1%	8%	2%	4%	7%	6%	3%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	53.2	40.1		49.8	38.4		82.0	70.0		51.5	42.5	
Effective Green, g (s)	56.5	41.6		53.8	39.9		84.0	72.0		55.5	44.5	
Actuated g/C Ratio	0.38	0.28		0.36	0.27		0.56	0.48		0.37	0.30	
Clearance Time (s)	3.0	6.5		3.0	6.5		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	227	982		197	969		470	1605		239	966	
v/s Ratio Prot	c0.09	0.22		0.06	c0.26		c0.24	0.32		0.03	c0.29	
v/s Ratio Perm	0.23			0.19			0.29			0.14		
v/c Ratio	0.85	0.81		0.72	0.97		0.94	0.66		0.47	0.97	
Uniform Delay, d1	39.9	50.5		37.2	54.4		45.4	29.7		32.1	52.1	
Progression Factor	1.00	1.00		1.56	1.07		1.00	1.00		1.00	1.00	
Incremental Delay, d2	24.2	7.2		9.3	21.2		27.3	1.0		0.5	21.5	
Delay (s)	64.1	57.7		67.3	79.4		72.6	30.8		32.6	73.6	
Level of Service	E	E		E	E		E	C		C	E	
Approach Delay (s)		58.9			77.8			43.0			69.4	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	60.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	8172	8150	8147	8166	8194	8166
Vehs Exited	8112	8188	8128	8099	8152	8137
Starting Vehs	415	461	442	405	458	434
Ending Vehs	475	423	461	472	500	463
Travel Distance (km)	14363	14545	14395	14362	14508	14435
Travel Time (hr)	427.5	445.6	432.6	430.0	466.4	440.4
Total Delay (hr)	162.4	176.5	166.7	165.2	198.7	173.9
Total Stops	8847	9257	8895	8881	10101	9199
Fuel Used (l)	1159.2	1183.0	1158.2	1159.9	1203.0	1172.7

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	8172	8150	8147	8166	8194	8166
Vehs Exited	8112	8188	8128	8099	8152	8137
Starting Vehs	415	461	442	405	458	434
Ending Vehs	475	423	461	472	500	463
Travel Distance (km)	14363	14545	14395	14362	14508	14435
Travel Time (hr)	427.5	445.6	432.6	430.0	466.4	440.4
Total Delay (hr)	162.4	176.5	166.7	165.2	198.7	173.9
Total Stops	8847	9257	8895	8881	10101	9199
Fuel Used (l)	1159.2	1183.0	1158.2	1159.9	1203.0	1172.7

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	TR	L
Maximum Queue (m)	117.8	188.0	182.3	63.6	130.2	136.1	25.0	72.1	144.5	145.4	136.3	104.0
Average Queue (m)	95.0	108.8	107.3	23.6	78.5	85.2	12.8	23.1	100.0	101.4	94.9	88.1
95th Queue (m)	132.4	177.0	163.2	57.1	127.2	132.9	32.2	49.8	134.5	134.9	128.8	123.9
Link Distance (m)		449.9	449.9		1634.2	1634.2			731.0	731.0	731.0	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	30.0			40.0			15.0	60.0				64.0
Storage Blk Time (%)	62	44		2	44	68	0	0	36			36
Queuing Penalty (veh)	243	151		4	43	58	0	0	35			179

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	SB	SB	SB	SB
Directions Served	T	T	T	R
Maximum Queue (m)	197.8	185.8	161.2	80.0
Average Queue (m)	128.4	120.6	93.0	32.1
95th Queue (m)	224.4	208.7	149.1	85.0
Link Distance (m)	530.7	530.7	530.7	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				37.0
Storage Blk Time (%)	20		30	0
Queuing Penalty (veh)	61		39	2

Intersection: 6: Loyalist Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	7.7	91.5	83.7	25.3	88.1	88.0	30.3	66.8	42.6	60.2
Average Queue (m)	0.5	47.2	47.1	7.0	24.0	27.1	7.1	22.3	24.5	12.0
95th Queue (m)	3.5	80.5	78.1	19.1	65.8	69.6	19.6	47.6	40.6	37.1
Link Distance (m)		505.8	505.8		449.9	449.9		758.6		640.5
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	39.0			35.0			14.0		20.0	
Storage Blk Time (%)		11		0	5		7	25	32	1
Queuing Penalty (veh)		0		0	2		11	6	9	1

Intersection: 9: Colonial Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	24.4	50.3	52.8	16.4	74.9	78.2	53.6	99.2	58.8	92.3
Average Queue (m)	5.1	22.5	25.4	4.3	25.3	26.5	34.9	27.7	17.8	38.9
95th Queue (m)	15.9	46.1	48.7	12.2	60.1	62.2	55.7	71.4	41.0	75.2
Link Distance (m)		423.3	423.3		505.8	505.8		654.8		602.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	61.0			43.0			30.0		28.0	
Storage Blk Time (%)		0			5		21	3	3	23
Queuing Penalty (veh)		0			1		23	5	5	15

Intersection: 12: Ridgeway Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	90.0	164.5	180.7	84.5	85.4	97.8	55.8	87.8	92.9	100.6	127.2	132.6
Average Queue (m)	33.1	97.7	110.2	46.0	37.9	55.0	26.9	58.2	60.8	30.0	89.5	93.0
95th Queue (m)	63.0	139.8	156.8	79.3	70.4	88.8	49.4	81.8	86.2	67.3	123.4	127.0
Link Distance (m)					423.3	423.3		718.2	718.2		767.8	767.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	47.0			58.0			37.0			56.0		
Storage Blk Time (%)	3	32		7	2		9	25		2	33	
Queuing Penalty (veh)	12	73		13	6		29	24		9	25	

Intersection: 15: Ninth Line & Burnhamthorpe 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: 1086

Summary of All Intervals

Run Number	1	2	3	4	5	Avg
Start Time	6:57	6:57	6:57	6:57	6:57	6:57
End Time	8:27	8:27	8:27	8:27	8:27	8:27
Total Time (min)	90	90	90	90	90	90
Time Recorded (min)	60	60	60	60	60	60
# of Intervals	2	2	2	2	2	2
# of Recorded Intervals	1	1	1	1	1	1
Vehs Entered	9528	9566	9405	9583	9640	9547
Vehs Exited	9148	9069	9123	9189	9160	9136
Starting Vehs	655	651	668	627	698	658
Ending Vehs	1035	1148	950	1021	1178	1068
Travel Distance (km)	15629	15536	15681	15719	15709	15655
Travel Time (hr)	862.3	906.7	801.3	805.5	927.4	860.7
Total Delay (hr)	574.7	621.1	513.3	516.4	638.2	572.7
Total Stops	13947	16130	13430	13374	16361	14651
Fuel Used (l)	1594.2	1638.1	1548.1	1555.9	1658.8	1599.0

Interval #0 Information Seeding

Start Time	6:57
End Time	7:27
Total Time (min)	30

Volumes adjusted by Growth Factors.

No data recorded this interval.

Interval #1 Information Recording

Start Time	7:27
End Time	8:27
Total Time (min)	60

Volumes adjusted by Growth Factors.

Run Number	1	2	3	4	5	Avg
Vehs Entered	9528	9566	9405	9583	9640	9547
Vehs Exited	9148	9069	9123	9189	9160	9136
Starting Vehs	655	651	668	627	698	658
Ending Vehs	1035	1148	950	1021	1178	1068
Travel Distance (km)	15629	15536	15681	15719	15709	15655
Travel Time (hr)	862.3	906.7	801.3	805.5	927.4	860.7
Total Delay (hr)	574.7	621.1	513.3	516.4	638.2	572.7
Total Stops	13947	16130	13430	13374	16361	14651
Fuel Used (l)	1594.2	1638.1	1548.1	1555.9	1658.8	1599.0

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	T	TR	L	T	T	R	L	T	T	TR	L
Maximum Queue (m)	117.9	193.7	182.3	139.9	1509.6	1502.4	25.0	150.0	392.1	389.7	374.5	103.9
Average Queue (m)	102.1	124.8	100.9	86.3	1035.4	1035.6	15.5	104.1	276.3	275.3	267.1	89.8
95th Queue (m)	137.1	217.3	175.5	184.0	1545.5	1534.4	34.6	197.2	450.5	445.6	427.7	130.3
Link Distance (m)		449.9	449.9		1634.2	1634.2			731.0	731.0	731.0	
Upstream Blk Time (%)					1	0						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (m)	30.0			40.0			15.0	60.0				64.0
Storage Blk Time (%)	82	36		6	75	72	0	3	59			73
Queuing Penalty (veh)	265	99		25	86	146	0	18	105			296

Intersection: 3: Winston Churchill Blvd & Burnhamthorpe Rd

Movement	SB	SB	SB	SB
Directions Served	T	T	T	R
Maximum Queue (m)	246.1	238.6	198.6	79.9
Average Queue (m)	160.0	148.5	84.9	25.3
95th Queue (m)	294.0	282.4	147.7	69.5
Link Distance (m)	530.7	530.7	530.7	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				37.0
Storage Blk Time (%)	13		30	0
Queuing Penalty (veh)	24		38	1

Intersection: 6: Loyalist Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	30.3	67.4	73.3	49.4	107.0	108.7	34.1	65.2	42.6	53.0
Average Queue (m)	10.8	29.7	30.7	9.6	27.4	30.4	7.2	29.7	18.9	17.3
95th Queue (m)	23.2	56.1	57.9	27.9	74.7	79.9	23.1	55.7	35.6	39.7
Link Distance (m)		505.8	505.8		449.9	449.9		758.6		640.5
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	39.0			35.0			14.0		20.0	
Storage Blk Time (%)	0	5		0	5		9	45	19	8
Queuing Penalty (veh)	0	3		1	4		12	10	16	7

Intersection: 9: Colonial Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	TR	L	TR
Maximum Queue (m)	15.5	27.3	29.6	36.1	69.6	71.8	49.8	84.1	45.1	66.6
Average Queue (m)	3.9	11.2	13.6	14.6	29.1	31.8	14.8	39.6	19.4	28.7
95th Queue (m)	12.4	24.9	26.3	28.8	63.3	66.2	36.6	72.9	36.9	53.8
Link Distance (m)		423.3	423.3		505.8	505.8		654.8		602.3
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	61.0			43.0			30.0		28.0	
Storage Blk Time (%)				0	6		2	22	7	12
Queuing Penalty (veh)				1	8		3	10	10	10

Intersection: 12: Ridgeway Dr & Burnhamthorpe Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	132.5	166.3	153.1	147.8	203.1	201.0	136.9	282.9	275.2	125.9	285.9	282.0
Average Queue (m)	87.4	99.8	96.6	45.4	122.4	126.8	120.7	191.4	180.4	65.4	208.2	213.8
95th Queue (m)	149.7	162.6	150.7	116.4	187.7	190.1	159.4	410.3	393.2	152.0	357.1	355.8
Link Distance (m)					423.3	423.3		718.2	718.2		767.8	767.8
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	47.0			58.0			37.0			56.0		
Storage Blk Time (%)	65	33		0	60		71	28		1	63	
Queuing Penalty (veh)	176	63		2	82		325	120		4	69	

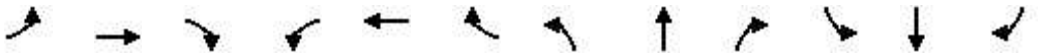
Intersection: 15: Ninth Line & Burnhamthorpe Rd

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

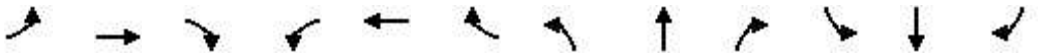
Network wide Queuing Penalty: 2041

APPENDIX G: SYNCHRO/SIM TRAFFIC OUTPUTS: FUTURE WITH WIDENING AND ADDITIONAL INTERSECTION IMPROVEMENT



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	246	809	111	111	528	72	113	1265	45	289	1312	104
Future Volume (vph)	246	809	111	111	528	72	113	1265	45	289	1312	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.0	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.96	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	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3197	3296		1604	3349	1341	1604	3448		1652	3510	1442
Flt Permitted	0.25	1.00		0.09	1.00	1.00	0.06	1.00		0.06	1.00	1.00
Satd. Flow (perm)	831	3296		154	3349	1341	107	3448		107	3510	1442
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)	267	879	121	121	574	78	123	1375	49	314	1426	113
RTOR Reduction (vph)	0	7	0	0	0	58	0	2	0	0	0	48
Lane Group Flow (vph)	267	993	0	121	574	20	123	1422	0	314	1426	65
Confl. Peds. (#/hr)	13		6	6		13			7	7		
Heavy Vehicles (%)	2%	2%	6%	5%	3%	11%	5%	3%	1%	2%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	58.0	48.0		48.8	41.8	41.8	72.5	62.0		88.0	74.5	74.5
Effective Green, g (s)	60.0	50.0		52.8	43.8	41.8	76.5	64.0		90.0	76.5	74.5
Actuated g/C Ratio	0.38	0.31		0.33	0.27	0.26	0.48	0.40		0.56	0.48	0.47
Clearance Time (s)	3.0	7.0		3.0	7.0	7.0	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	536	1030		132	916	350	168	1379		301	1678	671
v/s Ratio Prot	0.05	c0.30		c0.05	0.17		0.06	c0.41		c0.16	0.41	
v/s Ratio Perm	0.14			0.25		0.02	0.29			0.42		0.05
v/c Ratio	0.50	0.96		0.92	0.63	0.06	0.73	1.03		1.04	0.85	0.10
Uniform Delay, d1	35.5	54.1		43.3	50.9	44.3	37.2	48.0		55.3	36.7	23.9
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	19.8		52.4	1.3	0.1	13.2	32.7		63.6	5.6	0.3
Delay (s)	35.8	73.9		95.7	52.3	44.4	50.4	80.7		118.9	42.3	24.2
Level of Service	D	E		F	D	D	D	F		F	D	C
Approach Delay (s)		65.9			58.3			78.2			54.2	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM 2000 Control Delay	64.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



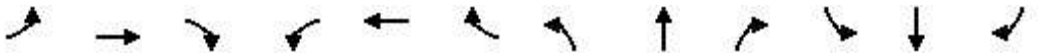
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	862	8	37	638	91	28	19	108	113	18	22
Future Volume (vph)	5	862	8	37	638	91	28	19	108	113	18	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		3.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1673	3250		1396	3201		1630	1848		1636	1596	
Flt Permitted	0.33	1.00		0.27	1.00		0.73	1.00		0.32	1.00	
Satd. Flow (perm)	578	3250		400	3201		1250	1848		547	1596	
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)	5	937	9	40	693	99	30	21	117	123	20	24
RTOR Reduction (vph)	0	0	0	0	5	0	0	107	0	0	19	0
Lane Group Flow (vph)	5	946	0	40	787	0	30	31	0	123	25	0
Confl. Peds. (#/hr)	8		9	9		8	3					3
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	6%	0%	20%	6%	9%	3%	3%	0%	3%	3%	4%
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)	91.5	91.5		91.5	91.5		9.6	9.6		25.0	25.0	
Effective Green, g (s)	91.5	93.0		91.5	93.0		9.6	11.6		25.0	27.0	
Actuated g/C Ratio	0.70	0.72		0.70	0.72		0.07	0.09		0.19	0.21	
Clearance Time (s)	6.5	6.5		6.5	6.5		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	406	2325		281	2289		92	164		209	331	
v/s Ratio Prot		c0.29			0.25			0.02		c0.06	0.02	
v/s Ratio Perm	0.01			0.10			0.02			c0.06		
v/c Ratio	0.01	0.41		0.14	0.34		0.33	0.19		0.59	0.08	
Uniform Delay, d1	5.8	7.4		6.3	7.0		57.1	54.9		46.1	41.5	
Progression Factor	1.94	1.98		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.5		1.1	0.4		2.1	0.6		2.7	0.1	
Delay (s)	11.2	15.2		7.4	7.4		59.2	55.4		48.8	41.6	
Level of Service	B	B		A	A		E	E		D	D	
Approach Delay (s)		15.2			7.4			56.1			46.9	
Approach LOS		B			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	17.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	761	73	22	676	16	169	42	44	63	76	85
Future Volume (vph)	34	761	73	22	676	16	169	42	44	63	76	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		3.0	5.0		8.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.92		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1491	3786		1530	3759		1615	1638		1693	1589	
Flt Permitted	0.33	1.00		0.27	1.00		0.36	1.00		0.70	1.00	
Satd. Flow (perm)	514	3786		429	3759		610	1638		1241	1589	
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)	37	827	79	24	735	17	184	46	48	68	83	92
RTOR Reduction (vph)	0	4	0	0	1	0	0	34	0	0	36	0
Lane Group Flow (vph)	37	902	0	24	751	0	184	60	0	68	139	0
Confl. Peds. (#/hr)	12		15	15		12	2		10	10		2
Heavy Vehicles (%)	17%	2%	0%	9%	3%	3%	8%	4%	3%	2%	12%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	80.8	80.8		80.8	80.8		35.2	35.2		18.7	18.7	
Effective Green, g (s)	80.8	81.8		80.8	81.8		35.2	38.2		18.7	21.7	
Actuated g/C Ratio	0.62	0.63		0.62	0.63		0.27	0.29		0.14	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0		3.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	319	2382		266	2365		269	481		178	265	
v/s Ratio Prot		c0.24			0.20		c0.07	0.04			0.09	
v/s Ratio Perm	0.07			0.06			c0.11			0.05		
v/c Ratio	0.12	0.38		0.09	0.32		0.68	0.12		0.38	0.53	
Uniform Delay, d1	10.0	11.7		9.9	11.2		39.4	33.6		50.4	49.4	
Progression Factor	0.97	0.80		0.77	0.73		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.3		0.6	0.3		5.6	0.1		1.4	1.9	
Delay (s)	10.1	9.6		8.2	8.5		45.1	33.8		51.8	51.3	
Level of Service	B	A		A	A		D	C		D	D	
Approach Delay (s)		9.6			8.5			41.2			51.5	
Approach LOS		A			A			D			D	

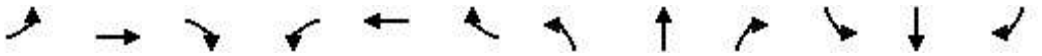
Intersection Summary			
HCM 2000 Control Delay	17.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	224	735	337	208	508	233	113	546	54	82	817	70
Future Volume (vph)	224	735	337	208	508	233	113	546	54	82	817	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		1.0	5.0		1.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.96		1.00	0.94		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1754	3448		1665	3221		3264	3401		1523	3363	
Flt Permitted	0.22	1.00		0.07	1.00		0.10	1.00		0.31	1.00	
Satd. Flow (perm)	410	3448		128	3221		327	3401		505	3363	
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)	257	845	387	239	584	268	130	628	62	94	939	80
RTOR Reduction (vph)	0	40	0	0	40	0	0	6	0	0	5	0
Lane Group Flow (vph)	257	1192	0	239	812	0	130	684	0	94	1014	0
Confl. Peds. (#/hr)	152		93	93		152	116		60	60		116
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	1%	1%	1%	6%	4%	5%	0%	2%	11%	8%	2%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	64.4	51.6		68.6	53.7		47.0	47.0		39.0	39.0	
Effective Green, g (s)	68.4	53.1		71.5	55.2		49.0	49.0		39.0	41.0	
Actuated g/C Ratio	0.53	0.41		0.55	0.42		0.38	0.38		0.30	0.32	
Clearance Time (s)	3.0	6.5		3.0	6.5		3.0	7.0		7.0	7.0	
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	368	1408		270	1367		281	1281		151	1060	
v/s Ratio Prot	0.08	c0.35		c0.11	0.25		0.02	c0.20			c0.30	
v/s Ratio Perm	0.29			0.37			0.15			0.19		
v/c Ratio	0.70	0.85		0.89	0.59		0.46	0.53		0.62	0.96	
Uniform Delay, d1	19.2	34.8		38.8	28.8		31.0	31.6		39.2	43.6	
Progression Factor	1.00	1.00		1.26	0.73		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.6	6.4		25.7	1.8		0.4	0.4		7.7	18.0	
Delay (s)	23.8	41.2		74.6	22.9		31.5	32.0		46.9	61.6	
Level of Service	C	D		E	C		C	C		D	E	
Approach Delay (s)		38.2			34.3			31.9			60.4	
Approach LOS		D			C			C			E	

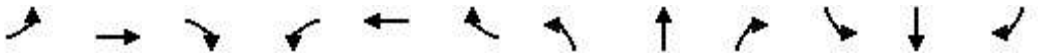
Intersection Summary			
HCM 2000 Control Delay	41.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	235	626	109	128	829	175	180	1751	75	144	1117	100
Future Volume (vph)	235	626	109	128	829	175	180	1751	75	144	1117	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.0	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		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
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3143	3321		1652	3415	1476	1685	3476		1668	3579	1500
Flt Permitted	0.10	1.00		0.15	1.00	1.00	0.08	1.00		0.06	1.00	1.00
Satd. Flow (perm)	338	3321		267	3415	1476	151	3476		100	3579	1500
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)	255	680	118	139	901	190	196	1903	82	157	1214	109
RTOR Reduction (vph)	0	10	0	0	0	62	0	2	0	0	0	51
Lane Group Flow (vph)	255	788	0	139	901	128	196	1983	0	157	1214	58
Confl. Peds. (#/hr)	7		9	9		7	4		4	4		4
Heavy Vehicles (%)	4%	1%	2%	2%	1%	2%	0%	2%	2%	1%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	55.5	48.5		55.5	48.5	48.5	87.5	72.0		81.0	68.5	68.5
Effective Green, g (s)	59.5	50.5		59.5	50.5	48.5	89.5	74.0		85.0	70.5	68.5
Actuated g/C Ratio	0.37	0.32		0.37	0.32	0.30	0.56	0.46		0.53	0.44	0.43
Clearance Time (s)	3.0	7.0		3.0	7.0	7.0	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	283	1048		177	1077	447	257	1607		195	1576	642
v/s Ratio Prot	c0.05	0.24		0.04	c0.26		c0.09	c0.57		c0.07	0.34	
v/s Ratio Perm	0.28			0.25		0.09	0.34			0.36		0.04
v/c Ratio	0.90	0.75		0.79	0.84	0.29	0.76	1.23		0.81	0.77	0.09
Uniform Delay, d1	39.2	49.1		38.3	50.9	42.5	37.4	43.0		47.9	37.9	27.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	28.8	3.1		18.7	5.8	0.4	11.4	111.0		19.9	3.7	0.3
Delay (s)	68.0	52.2		57.0	56.7	42.9	48.8	154.0		67.8	41.6	27.5
Level of Service	E	D		E	E	D	D	F		E	D	C
Approach Delay (s)		56.1			54.6			144.5			43.3	
Approach LOS		E			D			F			D	

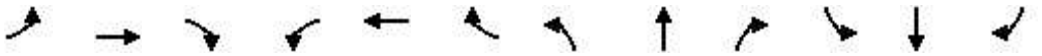
Intersection Summary			
HCM 2000 Control Delay	85.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	72	796	38	54	886	83	27	56	58	63	31	60
Future Volume (vph)	72	796	38	54	886	83	27	56	58	63	31	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.92		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1599	3300		1652	3323		1545	1956		1618	1512	
Flt Permitted	0.26	1.00		0.30	1.00		0.63	1.00		0.54	1.00	
Satd. Flow (perm)	430	3300		525	3323		1024	1956		925	1512	
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)	77	856	41	58	953	89	29	60	62	68	33	65
RTOR Reduction (vph)	0	1	0	0	3	0	0	40	0	0	56	0
Lane Group Flow (vph)	77	896	0	58	1039	0	29	82	0	68	42	0
Confl. Peds. (#/hr)	6					6	9		1	1		9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	5%	4%	0%	2%	3%	7%	8%	0%	2%	4%	13%	3%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	100.7	100.7		100.7	100.7		15.8	15.8		15.8	15.8	
Effective Green, g (s)	100.7	102.2		100.7	102.2		15.8	17.8		15.8	17.8	
Actuated g/C Ratio	0.77	0.79		0.77	0.79		0.12	0.14		0.12	0.14	
Clearance Time (s)	6.5	6.5		6.5	6.5		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	
Lane Grp Cap (vph)	333	2594		406	2612		124	267		112	207	
v/s Ratio Prot		0.27			c0.31			0.04			0.03	
v/s Ratio Perm	0.18			0.11			0.03			c0.07		
v/c Ratio	0.23	0.35		0.14	0.40		0.23	0.31		0.61	0.20	
Uniform Delay, d1	4.0	4.1		3.7	4.3		51.6	50.6		54.2	49.8	
Progression Factor	0.53	0.54		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.4		0.7	0.5		1.0	0.7		9.0	0.5	
Delay (s)	3.7	2.5		4.5	4.8		52.6	51.2		63.1	50.3	
Level of Service	A	A		A	A		D	D		E	D	
Approach Delay (s)		2.6			4.8			51.5			55.5	
Approach LOS		A			A			D			E	

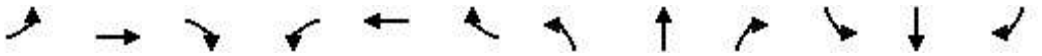
Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	10.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	645	34	127	870	70	36	71	104	79	74	31
Future Volume (vph)	22	645	34	127	870	70	36	71	104	79	74	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		8.0	5.0		3.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	3823		1679	3791		1605	1660		1744	1630	
Flt Permitted	0.24	1.00		0.34	1.00		0.68	1.00		0.32	1.00	
Satd. Flow (perm)	441	3823		607	3791		1155	1660		579	1630	
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)	24	701	37	138	946	76	39	77	113	86	80	34
RTOR Reduction (vph)	0	2	0	0	3	0	0	48	0	0	14	0
Lane Group Flow (vph)	24	736	0	138	1019	0	39	142	0	86	100	0
Confl. Peds. (#/hr)	10		3	3		10	7		3	3		7
Heavy Vehicles (%)	0%	2%	0%	0%	1%	2%	8%	1%	1%	0%	10%	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)	87.0	87.0		87.0	87.0		18.4	18.4		29.0	29.0	
Effective Green, g (s)	87.0	88.0		87.0	88.0		18.4	21.4		29.0	32.0	
Actuated g/C Ratio	0.67	0.68		0.67	0.68		0.14	0.16		0.22	0.25	
Clearance Time (s)	6.0	6.0		6.0	6.0		8.0	8.0		3.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	295	2587		406	2566		163	273		197	401	
v/s Ratio Prot		0.19			c0.27			c0.09		c0.03	0.06	
v/s Ratio Perm	0.05			0.23			0.03			0.07		
v/c Ratio	0.08	0.28		0.34	0.40		0.24	0.52		0.44	0.25	
Uniform Delay, d1	7.5	8.4		9.2	9.3		49.6	49.6		41.8	39.3	
Progression Factor	0.68	0.62		0.76	0.78		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		2.2	0.4		0.8	1.7		0.6	0.3	
Delay (s)	5.6	5.5		9.2	7.7		50.3	51.3		42.3	39.7	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		5.5			7.9			51.1			40.8	
Approach LOS		A			A			D			D	

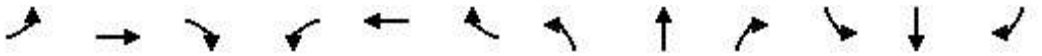
Intersection Summary			
HCM 2000 Control Delay	14.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	70.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	217	575	290	117	814	84	427	867	114	92	533	287
Future Volume (vph)	217	575	290	117	814	84	427	867	114	92	533	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		6.5	5.0		1.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3548		1677	3650		3204	3352		1589	3242	
Flt Permitted	0.16	1.00		0.32	1.00		0.11	1.00		0.11	1.00	
Satd. Flow (perm)	292	3548		565	3650		367	3352		187	3242	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	221	587	296	119	831	86	436	885	116	94	544	293
RTOR Reduction (vph)	0	47	0	0	5	0	0	8	0	0	56	0
Lane Group Flow (vph)	221	836	0	119	912	0	436	993	0	94	781	0
Confl. Peds. (#/hr)	6		6	6		6	9		12	12		9
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	1%	1%	2%	5%	1%	8%	2%	4%	7%	6%	3%	1%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	65.1	65.1		48.3	48.3		51.4	41.6		40.6	33.8	
Effective Green, g (s)	67.1	66.6		48.3	49.8		53.4	43.6		44.6	35.8	
Actuated g/C Ratio	0.52	0.51		0.37	0.38		0.41	0.34		0.34	0.28	
Clearance Time (s)	3.0	6.5		6.5	6.5		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.0	3.0		3.0	3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	329	1817		209	1398		513	1124		159	892	
v/s Ratio Prot	c0.08	0.24			c0.25		c0.11	c0.30		0.04	0.24	
v/s Ratio Perm	0.26			0.21			0.24			0.16		
v/c Ratio	0.67	0.46		0.57	0.65		0.85	0.88		0.59	0.88	
Uniform Delay, d1	21.4	20.2		32.6	33.0		34.1	40.8		32.3	45.0	
Progression Factor	1.00	1.00		1.07	0.99		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	0.8		10.2	2.3		12.0	8.4		3.9	9.6	
Delay (s)	25.6	21.1		45.2	34.9		46.1	49.2		36.2	54.6	
Level of Service	C	C		D	C		D	D		D	D	
Approach Delay (s)		22.0			36.1			48.3			52.7	
Approach LOS		C			D			D			D	

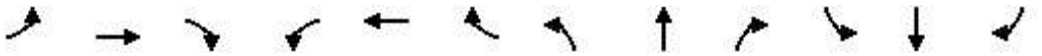
Intersection Summary			
HCM 2000 Control Delay	40.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	341	787	116	98	511	85	95	1287	32	305	1481	128
Future Volume (vph)	341	787	116	98	511	85	95	1287	32	305	1481	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.5	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	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	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3197	3291		1604	3349	1348	1604	4961		1652	5043	1442
Flt Permitted	0.35	1.00		0.08	1.00	1.00	0.09	1.00		0.08	1.00	1.00
Satd. Flow (perm)	1173	3291		133	3349	1348	155	4961		132	5043	1442
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)	371	855	126	107	555	92	103	1399	35	332	1610	139
RTOR Reduction (vph)	0	7	0	0	0	59	0	1	0	0	0	62
Lane Group Flow (vph)	371	974	0	107	555	33	103	1433	0	332	1610	77
Confl. Peds. (#/hr)	13		6	6		13			7	7		
Heavy Vehicles (%)	2%	2%	6%	5%	3%	11%	5%	3%	1%	2%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	57.5	50.5		64.2	54.2	54.2	58.8	49.6		81.3	69.1	69.1
Effective Green, g (s)	61.5	53.0		66.2	56.7	54.2	62.8	51.6		83.3	71.1	69.1
Actuated g/C Ratio	0.38	0.33		0.41	0.35	0.34	0.39	0.32		0.52	0.44	0.43
Clearance Time (s)	3.0	7.5		3.0	7.5	7.5	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	564	1090		171	1186	456	162	1599		360	2240	622
v/s Ratio Prot	c0.04	c0.30		c0.05	0.17		0.04	c0.29		c0.18	0.32	
v/s Ratio Perm	0.22			0.21		0.02	0.21			0.30		0.05
v/c Ratio	0.66	0.89		0.63	0.47	0.07	0.64	0.90		0.92	0.72	0.12
Uniform Delay, d1	38.2	50.8		35.5	40.0	35.9	33.5	51.6		50.7	36.3	27.3
Progression Factor	0.98	0.96		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	9.1		5.1	0.3	0.1	5.9	8.2		28.1	2.0	0.4
Delay (s)	39.5	57.7		40.6	40.3	35.9	39.3	59.9		78.8	38.3	27.7
Level of Service	D	E		D	D	D	D	E		E	D	C
Approach Delay (s)		52.7			39.8			58.5			44.1	
Approach LOS		D			D			E			D	

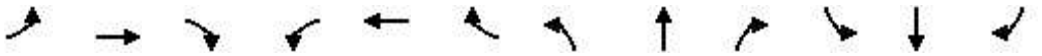
Intersection Summary			
HCM 2000 Control Delay	49.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	876	7	46	614	94	23	17	141	116	14	14
Future Volume (vph)	3	876	7	46	614	94	23	17	141	116	14	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		5.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98		1.00	0.87		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1670	3250		1394	3193		1628	1834		1636	1609	
Flt Permitted	0.34	1.00		0.27	1.00		0.74	1.00		0.31	1.00	
Satd. Flow (perm)	597	3250		398	3193		1264	1834		534	1609	
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)	3	952	8	50	667	102	25	18	153	126	15	15
RTOR Reduction (vph)	0	0	0	0	4	0	0	142	0	0	12	0
Lane Group Flow (vph)	3	960	0	50	765	0	25	29	0	126	18	0
Confl. Peds. (#/hr)	8		9	9		8	3					3
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	6%	0%	20%	6%	9%	3%	3%	0%	3%	3%	4%
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)	118.1	118.1		118.1	118.1		9.9	9.9		28.4	28.4	
Effective Green, g (s)	118.1	119.6		118.1	119.6		11.9	11.9		30.4	30.4	
Actuated g/C Ratio	0.74	0.75		0.74	0.75		0.07	0.07		0.19	0.19	
Clearance Time (s)	6.5	6.5		6.5	6.5		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	440	2429		293	2386		94	136		221	305	
v/s Ratio Prot		c0.30			0.24			0.02		c0.06	0.01	
v/s Ratio Perm	0.01			0.13			0.02			0.05		
v/c Ratio	0.01	0.40		0.17	0.32		0.27	0.22		0.57	0.06	
Uniform Delay, d1	5.5	7.2		6.3	6.7		69.9	69.7		57.1	53.1	
Progression Factor	2.23	1.67		2.52	3.07		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.5		1.2	0.3		1.5	0.8		2.2	0.1	
Delay (s)	12.3	12.5		17.0	20.9		71.4	70.5		59.3	53.2	
Level of Service	B	B		B	C		E	E		E	D	
Approach Delay (s)		12.5			20.7			70.6			58.1	
Approach LOS		B			C			E			E	

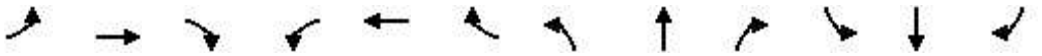
Intersection Summary			
HCM 2000 Control Delay	24.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	30	787	86	29	628	16	185	49	59	65	88	71
Future Volume (vph)	30	787	86	29	628	16	185	49	59	65	88	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		3.0	5.0		8.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.92		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1487	3773		1546	3757		1615	1625		1690	1596	
Flt Permitted	0.34	1.00		0.25	1.00		0.32	1.00		0.68	1.00	
Satd. Flow (perm)	539	3773		401	3757		549	1625		1213	1596	
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)	33	855	93	32	683	17	201	53	64	71	96	77
RTOR Reduction (vph)	0	4	0	0	1	0	0	35	0	0	22	0
Lane Group Flow (vph)	33	944	0	32	699	0	201	82	0	71	151	0
Confl. Peds. (#/hr)	12		15	15		12	2		10	10		2
Heavy Vehicles (%)	17%	2%	0%	9%	3%	3%	8%	4%	3%	2%	12%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		Perm	NA	
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	98.9	98.9		98.9	98.9		47.1	47.1		21.7	21.7	
Effective Green, g (s)	98.9	99.9		98.9	99.9		47.1	50.1		21.7	24.7	
Actuated g/C Ratio	0.62	0.62		0.62	0.62		0.29	0.31		0.14	0.15	
Clearance Time (s)	6.0	6.0		6.0	6.0		3.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	333	2355		247	2345		310	508		164	246	
v/s Ratio Prot		c0.25			0.19		c0.09	0.05			0.09	
v/s Ratio Perm	0.06			0.08			c0.10			0.06		
v/c Ratio	0.10	0.40		0.13	0.30		0.65	0.16		0.43	0.61	
Uniform Delay, d1	12.4	15.1		12.7	13.9		46.1	39.8		63.5	63.2	
Progression Factor	0.42	0.39		0.26	0.25		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2		1.0	0.3		3.5	0.1		1.8	4.5	
Delay (s)	5.4	6.1		4.4	3.8		49.6	39.9		65.3	67.7	
Level of Service	A	A		A	A		D	D		E	E	
Approach Delay (s)		6.0			3.8			46.0			67.0	
Approach LOS		A			A			D			E	

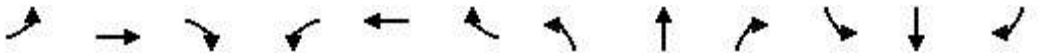
Intersection Summary			
HCM 2000 Control Delay	17.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	59.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	226	752	365	231	392	240	96	618	62	78	825	49
Future Volume (vph)	226	752	365	231	392	240	96	618	62	78	825	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		1.0	5.0		1.0	5.0		7.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.95		1.00	0.90		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.98	1.00		1.00	1.00		1.00	1.00		0.98	1.00	
Frt	1.00	0.95		1.00	0.94		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3402		1665	3083		3268	3395		1526	3386	
Flt Permitted	0.29	1.00		0.07	1.00		0.08	1.00		0.25	1.00	
Satd. Flow (perm)	533	3402		114	3083		273	3395		398	3386	
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)	260	864	420	266	451	276	110	710	71	90	948	56
RTOR Reduction (vph)	0	32	0	0	47	0	0	5	0	0	3	0
Lane Group Flow (vph)	260	1252	0	266	680	0	110	776	0	90	1001	0
Confl. Peds. (#/hr)	152		93	93		152	116		60	60		116
Confl. Bikes (#/hr)									1			
Heavy Vehicles (%)	1%	1%	1%	6%	4%	5%	0%	2%	11%	8%	2%	9%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		Perm	NA	
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	76.4	58.3		86.2	65.1		60.3	60.3		52.3	52.3	
Effective Green, g (s)	80.4	59.8		88.2	66.6		62.3	62.3		52.3	54.3	
Actuated g/C Ratio	0.50	0.37		0.55	0.42		0.39	0.39		0.33	0.34	
Clearance Time (s)	3.0	6.5		3.0	6.5		3.0	7.0		7.0	7.0	
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	418	1271		323	1283		237	1321		130	1149	
v/s Ratio Prot	0.08	c0.37		c0.14	0.22		0.02	c0.23			c0.30	
v/s Ratio Perm	0.23			0.31			0.16			0.23		
v/c Ratio	0.62	0.99		0.82	0.53		0.46	0.59		0.69	0.87	
Uniform Delay, d1	24.2	49.7		49.9	35.0		36.5	38.7		46.8	49.6	
Progression Factor	1.00	1.00		1.30	0.59		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	21.9		14.2	1.5		0.5	0.7		14.8	7.5	
Delay (s)	26.3	71.6		78.9	22.3		37.0	39.3		61.6	57.0	
Level of Service	C	E		E	C		D	D		E	E	
Approach Delay (s)		64.0			37.5			39.1			57.4	
Approach LOS		E			D			D			E	

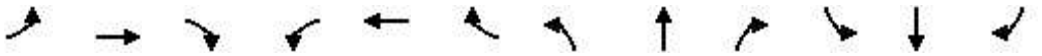
Intersection Summary			
HCM 2000 Control Delay	51.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	98.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	273	650	98	115	871	203	179	1924	73	179	1212	127
Future Volume (vph)	273	650	98	115	871	203	179	1924	73	179	1212	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.2	3.2	3.0	3.5	3.5	3.0	3.7	3.2
Total Lost time (s)	1.0	5.0		1.0	5.0	7.5	1.0	5.0		1.0	5.0	7.0
Lane Util. Factor	0.97	0.95		1.00	0.95	1.00	1.00	0.91		1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		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
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3143	3333		1651	3415	1480	1685	4998		1668	5142	1500
Flt Permitted	0.08	1.00		0.13	1.00	1.00	0.13	1.00		0.06	1.00	1.00
Satd. Flow (perm)	275	3333		230	3415	1480	226	4998		98	5142	1500
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)	297	707	107	125	947	221	195	2091	79	195	1317	138
RTOR Reduction (vph)	0	8	0	0	0	49	0	2	0	0	0	77
Lane Group Flow (vph)	297	806	0	125	947	172	195	2168	0	195	1317	61
Confl. Peds. (#/hr)	7		9	9		7	4		4	4		4
Heavy Vehicles (%)	4%	1%	2%	2%	1%	2%	0%	2%	2%	1%	2%	1%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	56.1	46.1		55.3	45.7	45.7	81.7	68.5		85.9	70.6	70.6
Effective Green, g (s)	60.1	48.6		59.3	48.2	45.7	85.7	70.5		88.8	72.6	70.6
Actuated g/C Ratio	0.38	0.30		0.37	0.30	0.29	0.54	0.44		0.55	0.45	0.44
Clearance Time (s)	3.0	7.5		3.0	7.5	7.5	3.0	7.0		3.0	7.0	7.0
Vehicle Extension (s)	2.0	3.0		2.0	3.0	3.0	2.0	3.0		2.0	3.0	3.0
Lane Grp Cap (vph)	318	1012		188	1028	422	259	2202		224	2333	661
v/s Ratio Prot	c0.07	0.24		0.05	c0.28		0.07	c0.43		c0.09	0.26	
v/s Ratio Perm	0.28			0.20		0.12	0.33			0.39		0.04
v/c Ratio	0.93	0.80		0.66	0.92	0.41	0.75	0.98		0.87	0.56	0.09
Uniform Delay, d1	42.7	51.2		37.7	54.1	46.2	23.9	44.2		51.8	32.1	26.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	33.1	4.4		6.7	13.0	0.6	10.5	15.9		28.0	1.0	0.3
Delay (s)	75.8	55.6		44.4	67.1	46.9	34.4	60.1		79.8	33.1	26.3
Level of Service	E	E		D	E	D	C	E		E	C	C
Approach Delay (s)		61.0			61.5			57.9			38.0	
Approach LOS		E			E			E			D	

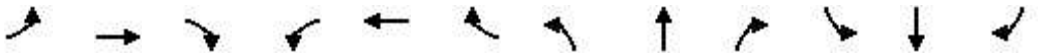
Intersection Summary			
HCM 2000 Control Delay	54.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	160.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	60	803	33	76	920	113	23	62	78	86	35	51
Future Volume (vph)	60	803	33	76	920	113	23	62	78	86	35	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.0	3.2	3.2	3.0	3.3	3.6	3.0	4.8	3.6	3.0	3.2	3.6
Total Lost time (s)	6.5	5.0		6.5	5.0		7.0	5.0		3.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1600	3302		1652	3303		1542	1937		1619	1521	
Flt Permitted	0.22	1.00		0.29	1.00		0.70	1.00		0.32	1.00	
Satd. Flow (perm)	371	3302		500	3303		1131	1937		539	1521	
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)	65	863	35	82	989	122	25	67	84	92	38	55
RTOR Reduction (vph)	0	1	0	0	4	0	0	36	0	0	43	0
Lane Group Flow (vph)	65	897	0	82	1107	0	25	115	0	92	50	0
Confl. Peds. (#/hr)	6					6	9		1	1		9
Confl. Bikes (#/hr)						1						1
Heavy Vehicles (%)	5%	4%	0%	2%	3%	7%	8%	0%	2%	4%	13%	3%
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)	106.6	106.6		106.6	106.6		16.3	16.3		29.9	29.9	
Effective Green, g (s)	106.6	108.1		106.6	108.1		16.3	18.3		29.9	31.9	
Actuated g/C Ratio	0.71	0.72		0.71	0.72		0.11	0.12		0.20	0.21	
Clearance Time (s)	6.5	6.5		6.5	6.5		7.0	7.0		3.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	263	2379		355	2380		122	236		183	323	
v/s Ratio Prot		0.27			c0.34			0.06		c0.04	0.03	
v/s Ratio Perm	0.18			0.16			0.02			c0.06		
v/c Ratio	0.25	0.38		0.23	0.47		0.20	0.49		0.50	0.15	
Uniform Delay, d1	7.6	8.0		7.5	8.8		60.9	61.5		51.3	48.1	
Progression Factor	0.83	0.74		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.4		1.5	0.7		0.8	1.6		0.8	0.2	
Delay (s)	8.5	6.4		9.0	9.5		61.8	63.1		52.1	48.3	
Level of Service	A	A		A	A		E	E		D	D	
Approach Delay (s)		6.5			9.4			62.9			50.2	
Approach LOS		A			A			E			D	

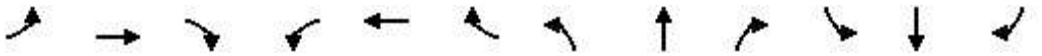
Intersection Summary			
HCM 2000 Control Delay	15.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	24	625	40	133	878	68	45	86	112	86	99	40
Future Volume (vph)	24	625	40	133	878	68	45	86	112	86	99	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.4	4.4	3.6	3.0	4.3	3.6	3.3	3.4	3.6	3.3	3.3	3.6
Total Lost time (s)	6.0	5.0		6.0	5.0		6.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.91		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	3817		1679	3791		1603	1668		1744	1631	
Flt Permitted	0.23	1.00		0.35	1.00		0.66	1.00		0.30	1.00	
Satd. Flow (perm)	434	3817		614	3791		1116	1668		554	1631	
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)	26	679	43	145	954	74	49	93	122	93	108	43
RTOR Reduction (vph)	0	2	0	0	3	0	0	36	0	0	11	0
Lane Group Flow (vph)	26	720	0	145	1025	0	49	179	0	93	140	0
Confl. Peds. (#/hr)	10		3	3		10	7		3	3		7
Heavy Vehicles (%)	0%	2%	0%	0%	1%	2%	8%	1%	1%	0%	10%	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)	100.6	100.6		100.6	100.6		22.1	22.1		35.4	35.4	
Effective Green, g (s)	100.6	101.6		100.6	101.6		24.1	25.1		37.4	38.4	
Actuated g/C Ratio	0.67	0.68		0.67	0.68		0.16	0.17		0.25	0.26	
Clearance Time (s)	6.0	6.0		6.0	6.0		8.0	8.0		3.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	291	2585		411	2567		179	279		235	417	
v/s Ratio Prot		0.19			c0.27			c0.11		c0.03	0.09	
v/s Ratio Perm	0.06			0.24			0.04			0.07		
v/c Ratio	0.09	0.28		0.35	0.40		0.27	0.64		0.40	0.34	
Uniform Delay, d1	8.7	9.6		10.7	10.7		55.3	58.3		45.3	45.4	
Progression Factor	0.61	0.61		0.71	0.72		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		2.2	0.4		0.8	5.0		0.4	0.5	
Delay (s)	5.8	6.1		9.8	8.2		56.1	63.3		45.7	45.9	
Level of Service	A	A		A	A		E	E		D	D	
Approach Delay (s)		6.1			8.4			61.9			45.8	
Approach LOS		A			A			E			D	

Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	189	541	280	138	833	90	434	918	131	110	650	304
Future Volume (vph)	189	541	280	138	833	90	434	918	131	110	650	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	4.1	3.6	3.4	4.0	3.6	3.0	3.5	3.6	3.0	3.4	3.6
Total Lost time (s)	1.0	5.0		1.0	5.0		1.0	5.0		1.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.98		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1767	3542		1680	3646		3204	3344		1589	3257	
Flt Permitted	0.11	1.00		0.18	1.00		0.11	1.00		0.11	1.00	
Satd. Flow (perm)	209	3542		322	3646		383	3344		179	3257	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	193	552	286	141	850	92	443	937	134	112	663	310
RTOR Reduction (vph)	0	38	0	0	5	0	0	9	0	0	43	0
Lane Group Flow (vph)	193	800	0	141	937	0	443	1062	0	112	930	0
Confl. Peds. (#/hr)	6		6	6		6	9		12	12		9
Confl. Bikes (#/hr)												2
Heavy Vehicles (%)	1%	1%	2%	5%	1%	8%	2%	4%	7%	6%	3%	1%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	66.4	52.4		61.8	50.1		69.4	56.5		62.3	52.4	
Effective Green, g (s)	69.1	53.9		65.8	51.6		71.4	58.5		66.3	54.4	
Actuated g/C Ratio	0.46	0.36		0.44	0.34		0.48	0.39		0.44	0.36	
Clearance Time (s)	3.0	6.5		3.0	6.5		3.0	7.0		3.0	7.0	
Vehicle Extension (s)	2.0	3.0		2.0	3.0		2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	262	1272		265	1254		483	1304		190	1181	
v/s Ratio Prot	c0.08	0.23		0.05	c0.26		c0.10	c0.32		0.05	0.29	
v/s Ratio Perm	0.26			0.18			0.34			0.21		
v/c Ratio	0.74	0.63		0.53	0.75		0.92	0.81		0.59	0.79	
Uniform Delay, d1	30.1	39.8		28.3	43.4		35.3	40.9		29.9	42.6	
Progression Factor	1.00	1.00		1.41	1.11		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.9	2.4		1.0	3.9		21.8	4.0		3.0	3.6	
Delay (s)	39.1	42.1		40.8	51.9		57.1	44.9		32.9	46.2	
Level of Service	D	D		D	D		E	D		C	D	
Approach Delay (s)		41.6			50.5			48.5			44.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	46.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

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